Species name	Listing status	Area of value within the project area
Otway Burrowing Crayfish	Vulnerable under FFG Act	May occur throughout wetter forest types (e.g. Wet Forest, Riparian Forest, etc.) intercepted by the assessment corridor >100m in altitude within Ground Truthed Alignment 1 project area.

A further 28 FFG Act listed flora species were either recorded or have a medium to high likelihood of occurring within the project area. Table 6 below summarises the key habitat types which support them.

Table 6 Summary of FFG Act listed flora most likely to occur in project area

Habitat type	Suitable habitat
Heathy woodland / Forests with heathy understorey	• Wiry Bossiaea • Angahook Pink-fingers • Robust Spider-orchid • Large White Spider-orchid • Slender Pink-fingers • Naked Beard-orchid • Top Bog-sedge • Nodding Baeckea • Hoary Rapier-sedge • Elegant Leek-orchid • Large Plume-orchid • Blotched Sun-orchid • Winter Sun-orchid • Pallid Sun-orchid • Merran's Sun-orchid • Paper Flower (recorded) • Tufted Grass-tree • Parsley Xanthosia • Southern Xanthosia
Dry forests	• Western Peppermint • Dwarf Silver-wattle (particularly around Lorne)
Damp / wet forests	• Brooker's Gum (recorded) • Southern Blue-gum (recorded) • Madeira Moss • Satinwood
Coastal sand dune / saltmarsh	• Salt Lawrencia • Coast Fescue • Dune Poa

1.1.1 DELWP habitat importance modelling for threatened species

To support decision making under the Guidelines, DELWP has produced maps for Victoria showing the modelled extent of habitat for most threatened species. These maps are called 'habitat importance maps' and they assign a 'habitat importance score' to a location based on the importance of that location in the landscape as habitat for a particular threatened species, in relation to other suitable habitat for that species (DELWP 2017a).

Under the Guidelines, these maps form the basis for determining the impact of potential native vegetation removal on threatened species. The maps only apply where a proposal to remove native vegetation is considered on detailed assessment pathway. The habitat importance scores are used to calculate the type and extent of biodiversity offsets required for native vegetation removal that impacts on individual threatened species habitat.

A summary of those species for which habitat is modelled in the assessment corridor is provided in the Native Vegetation removal report by DELWP (Appendix 7). A list of threatened species recorded in the project area is provided in Appendix 1 (flora) and Appendix 2 (fauna).

Determination of the requirement for a species offset based on the extent of impact to one or more rare or threatened species is addressed in Section 5.

1.1.2 Threatened ecological communities

Five EPBC Act listed threatened ecological communities (TECs) were predicted to occur, or are known to occur within the project area. These include:

- Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community.
- Giant Kelp Marine Forests of South East Australia.
- Natural Damp Grassland of the Victorian Coastal Plains.
- Subtropical and Temperate Coastal Saltmarsh.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Of these, only Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community, and Subtropical and Temperate Coastal Saltmarsh are likely to be intersected by the trail alignment. Where the intersect occurs, existing bridges and roads are proposed to be included as part of the trail network. Further impacts to these TECs are therefore considered to be minor. Additionally, trail construction methodologies will occur under a site specific Construction Environmental Management Plan (CEMP) that outlines mitigations methods to reduce impacts on riparian systems and prevent downstream impacts. A significant impact is unlikely to occur on these TECs.

Two FFG Act listed threatened ecological communities were predicted to occur within the project area:

- Cool Temperate Rainforest Community (CTRC).
- Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland Community.

Cool Temperate Rainforest Community was not recorded within the assessment corridor of GTR 1. It is likely to occur in the higher elevations within the sheltered gullies west of Lorne. Variations of the trail alignment that extend into that area will require consideration of the occurrence and impacts on this TEC.

Coastal Moonah Woodland Community is likely to intersect with the proposed trail alignment (GTR 1). However, existing trails are proposed for incorporating into the trail network through these sections. A significant impact on this TEC is not anticipated.

1.2 Other ecological values

Refuge areas for ground-dwelling mammals provide important habitat and resources to reduce the risk of local extinction, in areas with restricted or unfavourable conditions. Several refuge areas have been identified throughout the Otway Ranges by Corangamite Catchment Management Authority. Within the assessment corridor, vegetation adjacent to Coalmine Creek is considered a refuge area as it supports a number of threatened species, including Swamp Antechinus, Southern Brown Bandicoot, Long-nosed Potoroo and White-footed Dunnart. Habitat found here is also likely to support Broad-toothed Rat.

1.3 Further survey recommendations

As the current survey was conducted under less than optimal seasonal/other conditions and was intended to be a general flora and fauna survey, we recommend the following additional targeted surveys for EPBC Act listed flora:

- Wrinkled Buttons
  - EVC 45 - Shrubby Dry Forest within the Otway Plain and Otway Ranges Bioregions (GTR 1trails 8, 17, 20, 21, 22, 30, 31, 33, 41, 42, optional 6, 49, option 9, 59, 60, 61, 62, 63, alternate 2, alternate 3)
  - Timing: Summer
- Green-striped Greenhood
  - EVC 48 – Heathy Woodland & EVC 16 – Lowland Forest (GTR 1trails 2, 4, 6, 8, 12, 14, 15, 19, 20, 39, 40, 41)
  - Timing: Late winter
- Spiral Sun-orchid
  - EVC 48 – Heathy Woodland (GTR 1 trails 2, 4, 6, 8, 12, 14, 15, 19)
  - Timing: Late winter
- Anglesea Grevillea
  - EVC 48 – Heathy Woodland (GTR 1 trails 2, 4, 6, 8, 12, 14, 15, 19)
  - Timing: Late spring / early summer

Targeted surveys are also recommended for the following threatened fauna species:

- Swamp Antechinus;
  - Remote camera trap and/or Elliott trap surveys in suitable habitat.
  - Timing: All year round
- Broad-toothed Rat
  - Remote camera traps and scat surveys in suitable habitat.
  - Timing: October to March
- Otway Burrowing Crayfish
  - Burrow tube traps or burrow excavation in areas of suitable habitat.
  - Timing: Spring

It is also a requirement of the project to consider FFG Act listed species, the following are likely to occur within the assessment corridor. Targeted surveys would allow the construction of the corridor to avoid impacts to the following FFG Act threatened flora species:

- Wiry Bossiaea
- Angahook Pink-fingers
- Robust Spider-orchid
- Large White Spider-orchid
- Slender Pink-fingers
- Naked Beard-orchid
- Top Bog-sedge
- Nodding Baeckea
- Hoary Rapier-sedge
- Elegant Leek-orchid
- Large Plume-orchid
- Blotched Sun-orchid
- Winter Sun-orchid
- Pallid Sun-orchid
- Merran's Sun-orchid
- Paper Flower
- Tufted Grass-tree
- Parsley Xanthosia
- Southern Xanthosia.

1.4 Weeds

As part of the project, it was deemed important to conduct a weed risk assessment for all invasive species encountered along GTR 1. All weeds recorded during fieldwork by Biosis were scrutinised for their level of risk and the likely pathways of spread and invasion. It is important to note that the assessment also included Australian native species which are growing well out of their natural range and are considered environmental weeds such as Early Black Wattle *Acacia decurrens*, Coast Wattle *Acacia longifolia* subsp. *sophorae*, Sallow Wattle *Acacia longifolia* and Sweet Pittosporum. Most of the weeds recorded occur at existing disturbed sites within the project area such as vegetation adjoining car parks, along roadsides and the coast, and close to settlements, private properties and power lines. Trail alignments away from disturbed areas are generally weed free, that is that weed species represent < 1% projected foliage cover. Larger infestations were encountered, particularly consisting of Sweet Pittosporum (Photo 10) and Boneseed (Photo 11) and were mapped accordingly (Figure 4). These heavier infestations are notable as left uncontrolled they are likely to provide significant source locations of weed infestations and are therefore should be considered as a significant threat on the adjoining vegetation communities. It should be noted that detailed weed mapping was not undertaken outside of the assessment corridor as the intent is to manage potential weed spread

associated with the project through appropriate construction and operation. Consequently, weed infestations are likely to be larger than represented by the mapping as their precise extent was not recorded.

Areas with the highest weed cover and potential source locations for weed invasion include:

- Riparian zones of Coalmine Creek and Spout Creek, Eastern View (trails 14-17 and 21).
- Trail 19, large Sweet Pittosporum infestation occupying a gully. The trail does not pass through the weed zone, however the infestation is visually evident from the trail that extends south towards the coast.
- Trail 20, traverses a heavy Boneseed infestation that is otherwise inaccessible to public access.
- Trail 43, as the trail nears Stony Creek, passes through significant Sweet Pittosporum and Boneseed infestations.
- Optional trail 9, west of Cumberland River, moderate infestation of Sweet Pittosporum. This ridgeline is also known to have a population of the threatened Wrinkle Buttons.
- Trail 70 passes through a very dense and extensive Sweet Pittosporum infestation.

Of the 54 weed species recorded in the project area and assessment corridor (Appendix 1) there are four species classified as Restricted under the CaLP Act. These plants are prohibited from sale, but the classification imposes little requirements on landowners to eradicate or control this weed. There are also six weed species which are listed under the CaLP Act as Regionally Controlled weeds. Under the Act, landowners have a responsibility to take all reasonable steps to prevent the growth and spread of these weeds on their land, and therefore these species need special consideration, in terms of actions to prevent their introduction and spread during project works, and for reducing the extent of infestations where they are already present. In accordance with the requirements of the CaLP Act, all reasonable precautions must also be taken to ensure that any soil and equipment is free from noxious weed seeds and other vegetative material prior to transporting any soil and equipment to and from the site.

1.4.1 Weed invasion pathways assessment

Weed risk assessment

To determine the level of risk for each weed species, we referred to the risk ratings for the weed species according to DELWP's Advisory List of Environmental Weeds in Victoria (White et al. 2018). This list was developed by DELWP to help land managers determine the relative risks posed by different environmental weeds and the urgency for managing the higher risk species in Victoria's natural areas. Rankings for weeds in the list were developed based on the species stage in its invasion process (early / new invaders given higher priority), the impact potential of species on natural areas, and each species' potential rate of spread (White et al. 2018). This assessment was fit for purpose and provided clear risk ratings for the 56 weed species recorded in the project area or assessment corridor.

Table 7 shows the final risk ratings for each weed species. There are 17 species considered Very High risk, 18 are High risk, 10 are Moderately High risk, 10 are Medium risk and one species is considered Lower risk. The respective risk level of weed species should be used to guide land manager efforts to:

- Take actions to prevent introductions of the highest risk species during project construction works and as part of trail use and ongoing maintenance.
- Take actions to eradicate small populations of high risk species.
- Implement actions to prevent the spread of high risk weeds into clean areas.

- Undertake works to reduce the size of large infestations of the highest risk species.

Means of spread

The means by which weeds can spread were listed for each weed species. Resources used to determine the biology of each weed and its most common means of spread included the CABI Invasive Species Compendium, Atlas of Living Australia Weed Profiles, HerbiGuide, and other online resources. Many species spread exclusively by seeds and these species can be controlled by limiting the opportunities for these plants to set seed, controlling (depleting) the existing seed bank, and by limiting the movement of seed for populations that do get the opportunity to set seed. Some weeds produce by seed and also by vegetative means, such as stolons and via detached root or branch fragments. These species require additional consideration, to ensure controls are in place to limit seed production and spread, but also limit the chance that plant or soil disturbance may contribute to the movement of plant material which may also result in new populations of these weed species.

Invasion pathways

The main pathways that the weed species tend to arrive in new sites were also listed. The pathways were based on the 17 invasion pathways developed by Sindel et al. (2009). The 17 pathways fall under the three categories; deliberate human spread, accidental human spread and natural pathways of spread. Awareness of these weed spread pathways will assist land managers to consider these pathways and help limit the introduction of these weeds into news areas, for example via community education and increased monitoring for new introductions. The outcomes of the invasion pathways assessment is provided in Table 7.

Table 7 Weed risk and invasions pathway assessment for species recorded in the project area or assessment corridor

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Acacia longifolia **subsp**. *longifolia*	Sallow Wattle		**Very High**	Seeds	Water; machinery; construction; waste disposal; ornamental
Agapanthus praecox **subsp**. *orientalis*	Agapanthus		**Very High**	Seeds; vegetative root fragments	Wind; water; human; machinery; construction; waste disposal; ornamental
Asparagus scandens	Asparagus Fern	R	**Very High**	Seeds/fruit; vegetative tubers	Ornamental; birds; animals; water; waste disposal
Billardiera fusiformis	Bluebell Creeper		**Very High**	Seeds/fruit; vegetative root fragments	Animals; birds; machinery; construction; waste disposal
Cenchrus clandestinus	Kikuyu		**Very High**	Seeds; vegetative stolons and rhizomes	Wind; water; animals; human; machinery; construction; waste disposal
Coprosma repens	Mirror Bush		**Very High**	Seeds	Animals; birds; machinery; construction; waste disposal; ornamental
Cotoneaster **spp**.[1]	Cotoneaster		**Very high**	Seeds; vegetative fragments	Animals; birds; machinery; construction; waste disposal
Ehrharta erecta	Panic Veldt-grass		**Very High**	Seeds	Wind; water; animals; human; machinery; construction; waste disposal

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Foeniculum vulgare	Fennel	RC	**Very High**	Seeds; vegetative fragments	Water; animals; birds; human; machinery; construction; waste disposal
Genista monspessulana	Montpellier Broom	RC	**Very High**	Seeds	Water; animals; birds; human; machinery; construction; waste disposal
Hedera helix	English Ivy		**Very High**	Seeds/fruit; vegetative fragments	Ornamental; wind; water; birds; animals; machinery; construction; waste disposal
Ilex aquifolium	English Holly		**Very High**	Seeds/fruit; vegetative fragments	Ornamental; wind; water; birds; animals; machinery; construction; waste disposal
Oxalis incarnata	Pale Wood-sorrel		**Very High**	Vegetative bulbs	Wind; water; birds; machinery; construction; waste disposal
Oxalis pes-caprae	Soursob	RC	**Very High**	Vegetative bulbs	Wind; water; birds; machinery; construction; waste disposal
Ranunculus repens	Creeping Buttercup		**Very High**	Seeds	Ornamental; water; machinery; construction; waste disposal
Watsonia **spp.**[1]	Watsonia		**Very high**	Vegetative tuber	Water; human; machinery; construction; waste disposal; ornamental

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Zantedeschia aethiopica	White Arum-lily		**Very High**	Seeds; vegetative root fragments	Water; birds; animals; construction; waste
Acacia decurrens	Early Black-wattle		**High**	Seeds	Water; machinery; construction; waste disposal; ornamental
Agrostis capillaris	Brown-top Bent		**High**	Seeds	Wind; water; animals, human; machinery; construction
Allium triquetrum	Angled Onion	R	**High**	Seeds; vegetative bulbs	Animals; human; machinery; construction; waste disposal; ornamental
Anthoxanthum odoratum	Sweet Vernal-grass		**High**	Seeds	Wind; water; birds; animals; human; machinery; construction
Chrysanthemoides monilifera	Boneseed	RC	**High**	Seeds	Water; animals; birds; human; machinery; construction; waste disposal
Cynosurus echinatus	Rough Dog's-tail		**High**	Seeds	Wind; human; machinery; construction; waste disposal
Cytisus scoparius	English Broom	RC	**High**	Seeds	Wind; water; animals; birds; human; machinery; construction; waste disposal
Dactylis glomerata	Cocksfoot		**High**	Seeds	Wind; human; machinery; construction; waste disposal

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Euphorbia paralias	Sea Spurge		**High**	Seeds	Wind; water; human; machinery; construction; waste disposal
Helminthotheca echioides	Ox-tongue		**High**	Seeds	Wind; human; machinery; construction; waste disposal
Holcus lanatus	Yorkshire Fog		**High**	Seeds	Wind; water; birds; animals; human; machinery; construction; waste disposal
Oxalis purpurea	Large-flower Wood-sorrel		**High**	Vegetative bulbs	Wind; water; birds; machinery; construction; waste disposal
Pittosporum undulatum	Sweet Pittosporum		**High**	Seeds/fruit	Ornamental; water; birds; animals; machinery; construction; waste disposal
Rubus anglocandicans	Common Blackberry	RC	**High**	Seeds/fruit; vegetative fragments	Ornamental; water; birds; animals; machinery; construction; waste disposal
Rumex **spp. (naturalised)**[1]	Dock (naturalised)		**High**	Seeds	Animals; birds; human; machinery; construction; waste disposal
Sporobolus africanus	Rat-tail Grass		**High**	Seed	Wind; water; animals; human; machinery; construction; waste disposal
Trifolium subterraneum	Subterranean Clover		**High**	Seeds; vegetative stolons/fragments;	Water; birds; animals; machinery; construction; waste disposal

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Vinca major	Blue Periwinkle		**High**	Seeds	Wind; human; machinery; construction; waste disposal
Aira **spp.**[1]	Hair Grass		**Moderately High**	Seeds	Wind; water; human; machinery; construction; waste disposal
Briza maxima	Large Quaking-grass		**Moderately High**	Seeds	Water; wind; animals; machinery; construction
Centaurium erythraea	Common Centaury		**Moderately High**	Seeds	Ornamental; wind; water; animals; human; machinery; construction; waste disposal
Cirsium vulgare	Spear Thistle	RC	**Moderately High**	Seeds	Wind; water; animals; human; machinery; construction
Hypochaeris radicata	Flatweed		**Moderately High**	Seeds	Ornamental; wind; water; birds; animals; human; machinery; construction; waste disposal
Lysimachia arvensis	Pimpernel		**Moderately High**	Seeds	Ornamental; water; birds; animals; human; machinery; construction; medicinal; waste disposal

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Physalis peruviana	Cape Gooseberry		**Moderately High**	Seeds; vegetative fragments	Wind; water; animals; birds; human; machinery; construction; waste disposal
Senecio jacobaea	Ragwort	RC	**Moderately High**	Seeds	Ornamental; water; birds; animals; human; machinery; construction; medicinal; waste
Sonchus oleraceus	Common Sow-thistle		**Moderately High**	Seeds	Wind; human; machinery; construction; waste disposal
Vulpia **spp.**[1]	Fescue		**Moderately high**	Seeds	Wind; human; machinery; construction; waste disposal
Arctotheca calendula	Cape Weed		**Medium**	Seeds	Wind; water; animals, human; machinery; construction
Cyperus eragrostis	Drain Flat-sedge		**Medium**	Seeds; vegetative fragments	Water; birds; animals; human; machinery; construction; waste disposal
Erigeron bonariensis	Flaxleaf Fleabane		**Medium**	Seeds	Wind; human; machinery; construction; waste disposal
Lagurus ovatus	Hare's-tail Grass		**Medium**	Seeds	Wind; animals; human; machinery; construction; waste disposal
Paspalum dilatatum	Paspalum		**Medium**	Seeds; vegetative rhizomes	Wind; water; animals; birds; human; machinery; construction; waste disposal; ornamental

Species name	Common name	CaLP Act Status	DELWP Environmental weeds Advisory list 'Risk Ranking' ((White et al. 2018))	Means of spread	Invasion pathways (Sindel et al 2009)
Plantago lanceolata	Ribwort		**Medium**	Seeds	Wind; water; birds; animals; human; machinery; construction; waste disposal
Plantago major	Greater Plantain		**Medium**	Seeds	Wind; water; birds; animals; human; machinery; construction; waste disposal
Prunella vulgaris	Self-heal		**Medium**	Seeds; vegetative stolons	Ornamental; wind; water; birds; animals; human; machinery; construction; waste disposal
Solanum nigrum	Black Nightshade		**Medium**	Seeds/fruits	Ornamental; water; birds; animals; machinery; construction; waste disposal
Vicia **spp.**[1]	Vetch		**Medium**	Seed	Wind; human; machinery; construction; waste disposal
Cupressus sempervirens.	Cypress		**Lower**	Seeds/fruit	Wind; machinery; construction; waste disposal; ornamental

[1] For taxa not identified to species, a risk ranking score has been applied through consideration of the DELWP weed advisory 'risk ranking' for those species listed under the genus and assessing the most appropriate rank given the location of taxa and vegetation type within the project area.

1.5 Pathogens

The following pathogens are relevant to the project:

- Cinnamon Fungus *Phytophthora cinnamomi*.
- Myrtle Wilt *Chalara australis* – a fungal pathogen that infects and kills mature Myrtle Beech trees. This pathogen has been recorded throughout the Central Highlands and in the Yarra Ranges National Park (Parks Victoria 2002).
- Chytrid Fungus *Batrachochytrium dendrobatidis* – a fungal pathogen that infects and kills amphibians.

Myrtle Wilt

Myrtle Wilt is a fatal fungal disease that affects mature Myrtle Beech. The disease poses a significant threat to Cool Temperate Rainforests in Victoria. Myrtle Wilt develops when the fungal pathogen *Chalara australis* infects a stand of Myrtle Beech via stem or root wounds. The pathogen is considered indigenous to Australia. Studies in 1991 showed Myrtle Wilt to be present throughout the range of Myrtle Beech-dominated Cool Temperate Rainforest, although some stands of uninfected rainforest exist in the Strzelecki Ranges of South Gippsland (DSE 2004b).

The disease is spread through air- and water-borne spores. Once infected, pathogen can be spread from one Myrtle Beech individual to others within a stand via underground root grafts (Packham 1994), thereby creating patches of dead trees. It is responsible for the death of large numbers of mature Myrtle Beech trees in some parts of Victoria (DSE 2009).

Myrtle Wilt is considered by Parks Victoria (2009) to have reached epidemic levels in the Great Otway National Park. Of particular concern stated in the Great Otway National Park and Otway Forest Park Management Plan is the movement of the disease into Cool Temperate Rainforest vegetation communities by any unnecessary soil disturbance.

No evidence of Myrtle Wilt was recorded during the field assessment of GTR 1 as no Myrtle Beech trees or Cool Temperate Rainforest vegetation was recorded. Future design iterations (such as GTR 2) are more likely to encounter vegetation communities supporting Myrtle Beech trees that are susceptible to this disease. Particularly as the proposed trail passes through the gullies within the tall forests west of the Kennett River.

Cinnamon Fungus

Cinnamon Fungus is a soil-borne plant pathogen (now understood to not be a fungus) which can infect and kill a large range of native plant species. It has previously been recorded in the broader landscape area including in the following national heritage places: the Great Otway National Park and the Great Ocean Road and Scenic Environs, and in the nearby Anglesea Heath (DEE 2018). Long term studies have documented changes in the structure and composition of flora (DEE 2018), and subsequent impacts on fauna, particularly small mammals (Wilson 1990). The Great Otway National Park and Otway Forest Park Management Plan (Parks Victoria & DSE 2009) has stated that this disease is present within some of its coastal headland and woodland sites and is spread by the movement of soil or water, or by gravel on machinery, vehicles, boots, bicycles and animals. A review by Gibson *et al*. (2002) indicated that 8% of the flora species within the Great Otway National Park are considered to be susceptible to this plant disease.

Current projects within the Otways have identified Priority Protection Areas where the use of Phosphite treatments have been applied to minimise the spread of Cinnamon Fungus. Research is also being undertaken in these areas to understand the rate of spread and transmission vectors and determine

vulnerable areas. Consultation from local experts indicated that the current trail design avoids the Priority Protection Areas.

Cinnamon fungus was detected at four locations within the assessment corridor of GTR 1 (Figure 4). The trails where this pathogen was observed were all situated within a localised area of EVC 48 – Heathy Woodland within the Otway Ranges Bioregion. The expression of the pathogen was most evident on Austral Grass-tree *Xanthorrhoea australis* (Photo 12) which noted a visual decline in the health of infected plants. Trails that recorded evidence of this pathogen include:

- Trail 15 (2 infestations).
- Trail 19 (2 infestations).

Recommendations

To prevent the spread of Cinnamon Fungus along the trail network, an emphasis on containing current infestations and protecting susceptible plants and communities should include:

- The installation of hygiene stations at all access points where the trail intersects with EVC 48 – Heathy Woodland.
- Treatment of Cinnamon Fungus infestations along the trail network with Phosphite fungicide.
- Protect Austral Grass-tree from adverse drainage during construction and operation of trail to reduce impact of Cinnamon Fungus.
- Create a trail CEMP that mitigates the spread of soil pathogens and diseases, such as Cinnamon Fungus, Myrtle Wilt and Chytrid Fungus. Such plans should detail:
  - Strict hygiene methods to be implemented during trail construction.
  - On-going monitoring to assess the spread of Cinnamon Fungus and Myrtle Wilt.
- Develop a Cinnamon Fungus monitoring strategy that:
  - Documents the extent of existing infestations.
  - Conducts annual assessment of all known infections that records: the extent of infestations, and the effectiveness of treatment strategies implemented.
  - Monitors susceptible EVCs along the trail network for new infestations to be included in future monitoring and treatment programs.

Effective management measures should also be implemented to control the spread and introduction of other pathogens and weed species. This should be incorporated into the proposed hygiene stations as indicated above, but also include the following:

- Implementing strict weed and pathogen hygiene protocols during construction and operation of trails.
- Any plant or equipment used should be washed down and cleaned prior to and following use to reduce the translocation risk of weed species.
- Develop a weed control strategy that monitors weed invasion along the trail, at a minimum:
  - Within key threatened species habitat (i.e. Wrinkled Buttons habitat; and small mammal refuge habitat at the Coalmine Creek intersect).
  - Along tracks that extend through major weed infestations.

2. Biodiversity legislation and government policy

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. Where available, links to further information are provided.

2.1 Commonwealth

2.1.1 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 (MNES) protected under the Act.

Link for further information including a guide to the referral process is available at: http://www.environment.gov.au/epbc/index.html.

MNES relevant to the project are summarised in Table 8. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 8 Assessment of project in relation to the EPBC Act

MNES	Project specifics	Assessment against significant impact guidelines
EPBC Act listed species	Sixteen EPBC Act listed flora species and 67 EPBC Act listed fauna species have been recorded or predicted to occur in the project search area. The likelihood of these species occurring in the project area is assessed in Appendix **1** (flora) and Appendix **2** (fauna).	The following species have been recorded or are considered to have a medium or greater likelihood of occurring within the assessment corridor: **Flora** • Anglesea Grevillea • Wrinkled Buttons (recorded) • Green-striped Greenhood • Spiral Sun-orchid Assessments against the Significant Impact Criteria (Commonwealth of Australia 2013) have been prepared for all flora species listed above (Appendix 3) **Fauna** • Gang-gang Cockatoo (recorded) • Australian Grayling • Broad-toothed Rat • White-throated Needle-tail • Southern Bent-winged Bat • Grey-headed Flying-fox • Southern Brown Bandicoot

MNES	Project specifics	Assessment against significant impact guidelines
		• Long-nosed Potoroo (recorded) • Swamp Antechinus • Yellow-bellied Glider Assessments against the Significant Impact Criteria (Commonwealth of Australia 2013) have been prepared for Gang-gang Cockatoo, White-throated Needletail, Yellow-bellied Glider, Broad-toothed Rat, Southern Bent-winged Bat, Long-nosed Potoroo, Southern Brown Bandicoot, Australian Grayling and Swamp Antechinus (Appendix 4). It has been concluded that if the avoidance, minimisation and mitigation measures recommended in this report are strictly implemented, and based on design changes already made, a significant impact is unlikely for these fauna species. There are possible significant impacts on Wrinkle Buttons, Anglesea Grevillea, Green-striped Greenhood and Spiral Sun-orchid. However, further surveys are required to determine presence / or extent of the population.
EPBC Act listed ecological communities	Five EPBC Act listed ecological communities have been recorded or predicted to occur in the project search area.	Of these the following are not likely to occur in the project area: • Giant Kelp Marine Forests of South East Australia. • Natural Damp Grassland of the Victorian Coastal Plains. • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. The following ecological communities are likely to occur in the project area, however, are not likely to be significantly impacted by the project (Appendix 1): • Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community. • Subtropical and Temperate Coastal Saltmarsh.
Migratory species	Sixty-eight migratory species have been recorded or predicted to occur in the project search area (Appendix **2**).	While some of these species would be expected to use habitat within the assessment on occasion, and some of them may do so regularly or may be resident, it does not provide important habitat for an ecologically significant proportion

MNES	Project specifics	Assessment against significant impact guidelines
		of any of these species.
Wetlands of international importance (Ramsar sites).	The project area is identified as being within the catchment of one Ramsar sites: Port Phillip Bay (Western Shoreline) and Bellarine Peninsula.	The project area does not drain directly into this Ramsar site and the project is not likely to result in a significant impact.

On the basis that the project may have a significant impact on Wrinkled Buttons, Anglesea Grevillea, Spiral Sun-orchid and Green-stripped Greenhood, the EPBC Act is likely to be triggered and referral of the proposed action to the Australian Government Minister for the Environment is therefore recommended. Targeted surveys for these species is recommended to resolve occurrence within the assessment corridor and provide further input into the significant impact assessments.

2.1.2 Significant Impact Assessments

Significant impact assessments were undertaken for the following EPBC Act threatened species that are likely to be impacted by the project. These are presented in Appendix 3 and 4.

- Wrinkled buttons
- Australian Grayling
- Broad-toothed Rat
- Grey-headed Flying Fox
- Southern Brown Bandicoot
- Southern Bent-winged Bat
- Long-nosed Potoroo
- Swamp Antechinus
- White-throated Needletail
- Yellow-bellied Glider.

2.2 State

2.2.1 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 DELWP to 'take' protected flora species. Permit exemptions under the FFG Act generally apply to the non-commercial removal of protected flora from private land, unless there is 'critical habitat' that has been declared on the land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish on private or public land.

Link for further information: https://www.environment.vic.gov.au/conserving-threatened-species/victorias-framework-for-conserving-threatened-species

The FFG Act defines public land as *Crown land or land owned by, or vested in, a public authority,* while private land is defined as *any land other than public land.* A public authority is defined in the FFG Act as a body established for a public purpose by or under any Act and includes:

- an Administrative Office
- a Government Department
- a municipal council
- a public entity
- a State-owned enterprise.

The project area is on Crown Land or land owned by or vested in a public authority and is therefore public land for the purposes of the FFG Act. Therefore, if flora protected or threatened flora under the FFG Act is required to be removed as part of the project, a protected flora permit will be required. This will be determined as part of the project's final biodiversity impact assessments.

In addition to the requirement for a protected flora permit, it is a requirement of the FFG Act that a public authority, in performing its functions, must consider the objectives of the FFG Act and the impact on biodiversity. Public authorities are also required to consider the Biodiversity 2037 targets (DELWP 2017b), action statements, critical habitat determinations and management plans made under the FFG Act.

Results

Seventy-nine protected flora species and five threatened fauna species were recorded within the assessment area of GTR 1 (Appendix 1), no FFG Act threatened communities were recorded within the assessment corridor of GTR 1.

The following FFG Act listed species were recorded within the assessment corridor:

- Brooker's Gum *Eucalyptus brookeriana*:
  - Eleven trees were identified within the assessment corridor near Kennett River (trails: alternative 9 and 72).
  - These trail can be micro-sited to avoid direct removal of the species.
  - If avoidance of TPZ's through micro-siting is unachievable, then trail construction methodologies will follow construction guidelines identified in the Arborists report (Axiom Tree Management 2022). Providing that these mitigation measures are adhered to, it is anticipated that Brooker's Gum will not be adversely impacted by the project.
- Southern Blue-gum *Eucalyptus globulus* subsp. *globulus*:
  - Southern Blue-gum occurred in mixed populations with Gippsland Blue-gum *Eucalyptus globulus* subsp. *pseudoglobulus.* Determining the taxonomy of specific trees in this situation was problematic due to the uncertainty around the precise source of the reproductive material observed on the ground (i.e. buds and fruit). Consequently, Southern Blue-gum was mapped as *Eucalyptus globulus* unless the sufficient evidence was available to classify the species to subspecies level. Precise numbers of the FFG Act listed Southern Blue-gum are difficult to quantify, instead it is possible to determine broader distribution along GTR 1.
  - Southern Blue-gum was recorded within EVC 21 – Shrubby Dry Forest and EVC 45 – Shrubby Foothill Forest between Eastern View and Kennett River.

  - Impacts based on GTR 1 will result in significant TPZ incursions to four Southern Blue-gum at locations of the bridge abutments. These trees will be deemed lost unless consultation with a suitably qualified arborist can determine otherwise. There may also be opportunity for the construction design to avoid impacts to Southern Blue-gum through micro-siting works outside of TPZs once the final alignment has been confirmed. Furthermore, no trees will be directly impacted by the construction of the trail and will be avoided by micro-siting the trail around large trees. If trail construction occurs within the trees TPZ, then construction guidelines identified in the Arborists report (Axiom Tree Management 2022) will need to be followed. Providing that these mitigation measures are adhered to, it is anticipated that Southern Blue-gum will not be adversely impacted by the project.

- Paper Flower *Thomasia petalocalyx*:
  - Two plants were identified adjacent to trail 4, within EVC 48 – Heathy Woodland. This section of trail has subsequently been removed from the proposed trail route and is not part of GTR 2.
  - Further surveys are required to verify population extent in other sections of trail that intersect EVC 48 – Heathy Woodland.
- Grey Goshawk *Accipiter novaehollandiae*, Powerful Owl *Ninox strenua*, Rufous Bristlebird *Dasyornis broadbenti caryochrous* and White-bellied Sea Eagle *Haliaeetus leucogaster*:
  - Each species was observed within the project area.
  - Further surveys are not required due to the high mobility of each species and the low likelihood of an impact, with the large extent of surrounding available habitat. Hollow-bearing trees will be avoided by construction techniques and the micro-siting location of trail.

2.2.2 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.

Declared noxious weeds identified in the project area are listed in Appendix 1 and established pest animals are listed in Appendix 2.

The proponent 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.

Link for further information: http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds.

Refer to section 3.6 for further information.

2.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities.

Of particular relevance to the development proposal are controls relating to the removal, destruction or lopping of native vegetation contained within the Surf Coast and the Colac Otway Planning Scheme (the Scheme), including permit requirements. The Scheme (Clause 73.01) defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses'. It is an objective of Clause 12.01-2 of the State Planning Policy Framework (Native Vegetation Management) that removal of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity.

Clause 52.17 (Native Vegetation) requires a planning permit to remove, destroy or lop native vegetation including some dead native vegetation. The Crown land exemption under Clause 52.17-7 may apply to the project, or at least for particular sections of trail. Consultation is required between with DELWP, PV and GORCAPA, and the exemption may be available to use following the procedure if GORCAPA are the permit applicant. Further details are provided in the planning report.

Decision guidelines that must be considered by the referral or responsible authority are contained in Section 7 of the Guidelines, and referred to in Clause 52.17-4. Clause 52.17 does not apply if a Native Vegetation Precinct Plan corresponding to the land is incorporated in the Scheme. It should be noted that where native vegetation does not meet the definition of a patch or scattered tree, as described in Section 3.2, the Guidelines do not apply. However, a permit may still be required to remove, destroy or lop native vegetation under the provisions of the Scheme.

Clause 65.02 requires consideration of native vegetation retention in a subdivision application and siting of open space areas.

Under Clause 66.02 a permit application to remove, destroy or lop native vegetation is required to be referred to DELWP as a recommending referral authority if any of the following apply:

- the class of application is on the detailed assessment pathway
- a property vegetation precinct plan applies to the site or
- the native vegetation is on Crown land occupied or managed by the Responsible Authority.

If a permit is required, the application will be referred to DELWP as the vegetation to be removed on Crown land managed by the Responsible Authority and by DELWP. The need for a permit to remove native vegetation may also be triggered by zones and overlays within the Scheme. The location of the overlays in relation to the project area can be determined via the following link: http://planningschemes.dpcd.vic.gov.au.

Further approval pathways are provided in the project planning approvals strategy (Biosis 2022c) that address permit requirements under the relevant overlays.

Victoria's Guidelines for the removal, destruction or lopping of native vegetation

The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria (DELWP 2017a). The Guidelines replaced the previous incorporated document titled *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (DEPI 2013) on 12 December 2017.

The purpose of the Guidelines is to guide how impacts to biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation. The objective for the guidelines in Victoria is 'No net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

A detailed assessment of the implications for the project under the Guidelines is provided in Section 5 of this report. Under the Guidelines, there are three assessment pathways for assessing an application for a permit to remove native vegetation: basic, intermediate and detailed.

A detailed determination of the assessment pathway for the planning application relevant to the proposed development is provided in Section 5.2. In summary, the planning application for removal of native vegetation must meet the requirements of, and be assessed in, the detailed assessment pathway.

2.2.4 Environment Effects Act 1978

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 2005).

The 'Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978' (DSE 2005) 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.

An assessment of the project (GTR 1) against the individual and combined potential effects criteria based on the level of proposed native vegetation removal, EVC bioregional conservation status, impacts on FFG Act listed species and impacts on wetlands indicates the project has the potential to trigger a referral to the Minister for Planning for an EES determination (Table 9). The removal of 9.929 hectares of understorey vegetation for the trails from least concern and depleted EVCs has low potential to have regional or State significant environmental impacts. However, this conclusion will need to be considered in the context of future trail stages and increased impacts or design changes and additions.

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

Table 9 Assessment of the project against the individual and combined EES referral criteria

EES referral criteria	Project impact and response
Individual types of effects	
Potential clearing of 10 ha or more of native vegetation from an area that: • **is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or** • **is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and** • **is not authorised under an approved Forest Management Plan or Fire Protection Plan**	This criterion is not triggered as: • The 9.929 hectares of understorey native vegetation proposed for removal in a narrow (2.5 m wide) trail construction corridor within National Parks and conservation reserves does not include an endangered EVC. • Reference to 'very high conservation significance' vegetation is not relevant in the current native vegetation policy setting for Victoria. • The project is not part of a forest operation or fire protection planning in Victoria.
Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria	This criterion is not triggered by the project. Key threatened species recorded in the project area: • Wrinkled Buttons (EPBC and FFG Act listed) • Long-nosed Potoroo (EPBC and FFG Act listed) • Gang-gang Cockatoo (EPBC Act listed) • Yellow-bellied Glider (EPBC Act listed) • Rufous Bristlebird (FFG Act listed) • Otway Black Snail (FFG Act listed) • Brooker's Gum (FFG Act listed)

EES referral criteria	Project impact and response
	• Southern Blue-gum (FFG Act listed) • Paper flower (FFG Act listed) • Grey Goshawk (FFG Act listed) • Rufous Bristlebird (Otway) (FFG Act listed) • White-bellied Sea-Eagle (FFG Act listed) • Powerful Owl (FFG Act listed) Of the species listed above only Wrinkled buttons is likely to have limited habitat distribution across Victoria. An assessment is made below: **Wrinkled Buttons** Wrinkle Buttons distribution is restricted to the South East Coastal Plain IBRA Bioregion, preferring EVC 45 – Shrubby Dry Forest. The extent of possible habitat can therefore be equated to 1,018.38 ha. The impact from the proposed trail (GTR 1) is 2.9 hectares of EVC 45 – Shrubby Dry Forest which represents 0.28% of potential Wrinkled Buttons habitat. **Otway Black Snail** Key habitat for this species is Cool Temperate Rainforest and EVC 201 Shrubby Wet Forest within the Otway Ranges. This equates to a potential habitat area of 32,715 ha. The trail (GTR 1) will impact 0.317 ha of EVC 201 which represents 0.001% of available habitat for Otway Black Snail. It may also be necessary to determine the impact on threatened species that are identified during targeted surveys, particularly those with localised distributions or small home ranges. Populations of many threatened species listed under the EPBC and FFG Acts are not yet resolved within the current alignment (GTR 1).
Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'	This criterion has very low potential to be triggered as the project area is very remote from listed Ramsar sites and will not directly impact on a DIWA wetland. The nearest DIWA wetland is the Lake Connewarre State Wildlife Reserve, located 38 km north-east of the project area.
Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term	This criterion has very low potential to be triggered as all creek and waterways crossings will be small clear span elevated structures to avoid impacts on the beds and banks of streams (freshwater aquatic habitats). Strict sediment control and trail design responses will be put in place to manage soil erosion and waterway sedimentation risks. Furthermore, where the trail crosses estuaries that have modelled or recorded threatened communities listed under the EPBC Act will utilise existing bridges that are in place. These sites

EES referral criteria	Project impact and response
	have been heavily disturbed through previous land management and will not be impacted further.
Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences	This criterion is not considered applicable due to the low impact nature of the project (i.e. trail construction).
Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.	This criterion is not considered applicable due to the low impact nature of the project (i.e. trail construction with small machinery).
A combination of potential environmental effects	
Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan	This criterion is unlikely to be triggered as: • Vegetation removal in the narrow (2.5 m wide) trail construction corridor is for understorey strata only and the canopy will be retained. Therefore, the 9.929 ha trail footprint is not complete native vegetation loss in relation to the 10 ha trigger for the criterion.
Matters listed under the Flora and Fauna Guarantee Act 1988: • **potential loss of a significant area of a listed ecological community; or** • **potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or** • **potential loss of critical habitat; or** • **potential significant effects on habitat values of a wetland supporting migratory bird species**	This criterion is unlikely to be triggered as: • Vegetation proposed for removal to construct the trail and bridges does not form part of a threatened community that is listed under the FFG Act. • Further assessments are required to determine the impact on FFG Act listed species. • No critical habitat has been declared in the project area. • No wetlands will be impacted by the project.
Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the *National Parks Act 1975*	This criterion is **likely** to be triggered as: • The project occurs within the Great Otway National Park that is reserved under the *National Parks Act 1975*. The impacts are likely to be considered extensive to the extent over the landscape which they occur. However, the impacts are considered to be low impact and not of major effects on landscape values or regional importance.
Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term	This criterion has not been assessed. It is out of scope of the Ecological assessment. Refer to the Geotechnical report.
Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, stream flows or regional groundwater levels	This criterion has very low potential to be triggered as the project does not involve surface water or groundwater extraction or use. All creek and waterways crossings will be small clear span elevated structures to avoid impacts on the beds and banks of streams (freshwater aquatic habitats). Strict sediment control

EES referral criteria	Project impact and response
	and trail design responses will be put in place to manage soil erosion and waterway sedimentation risks.
Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities	This criterion has not been assessed. It is out of scope of the Ecological assessment.
Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development	This criterion has very low potential to be triggered as the project area is all on public land and will not displace residents or restrict access to public land. The project is likely to improve access opportunities for a broader range of public land users.
Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions	This criterion has very low potential to be triggered as the project area is on remote public land with few neighbouring properties. Project construction will be low impact operations restricted to public land will involve trail building in forested areas that are well-screened from adjacent residences. Noise, dust and traffic increases are likely to be minimal and may impact a very small number of local residences during construction and operation.
Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport	This criterion is not considered applicable due to the low impact nature of the project (i.e. trail construction with small machinery).
Potential extensive or major effects on Aboriginal cultural heritage	This criterion has not been assessed. It is out of scope of the Ecological assessment.
Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.	This criterion has not been assessed. It is out of scope of the Ecological assessment.

Based on the above self-assessment of GTR 1, it is possible that the project will have a significant environment effect. It is considered that the proposed GORCT Project does not meet the referral criteria for a single potential environment effect or combined potential environmental effects. At this stage, GTR 1 meets one criteria under combined environmental effects (requiring two criteria to be met before referral is triggered). It is possible that other criteria are triggered, such as on cultural heritage and social impacts that were not considered in the current assessment. Furthermore, it is anticipated that large increases to the trail alignments will occur as trail design variations are updated. Consequently, the degree of vegetation removal is likely to be increased significantly and exceed the referral criteria. Once these considerations have been made, it is likely that referral under the EE Act is triggered and an EES will be required.

It is noted that the only way to get legal certainty on whether nor not an EES is required for a project is to submit an EES referral and have the Minister for Planning determine if an EES is required.

2.2.5 National Parks Act 1975

The *National Parks Act 1975* makes provision for National and other parks and for their management, the appointment of a Director of National Parks and the appointment of a National Parks Advisory Council and park advisory committees. The primary purpose of the *National Parks Act 1975* is for the preservation and protection of the natural environment.

The Great Otway National Park Management Plan (Parks Victoria & DSE 2009) specifies five management zones including: Reference Area, Conservation, Conservation and Recreation, Special Protection and Multiple Use.

The areas subject to proposed trail development in the national park are within the Conservation Zone and the Conservation and Recreation Zone. It is likely that the development of the GORCT within the Great Otway National Park requires consent from Parks Victoria (PV) subject to Section 27 of the NP Act. Advice is provided within the approvals strategy report.

2.2.6 *Crown Land (Reserves) Act 1978* (Crown Land Reserves Act)

Our previous assessment concluded that GORCAPA are the relevant committee responsible for protecting, enhancing and developing coastal Crown land under the Crown Land Reserves Act (Biosis 2022b).

It is our understanding that any specific recommendations relating to the protection of Coastal Crown Land (as per the Crown Land Reserves Act) will be discussed between GORCAPA and DELWP.

2.2.7 *Reference Areas Act 1978* (Reference Areas Act)

The following Reference Areas were located in proximity to GTR 1:

- Olangolah Creek Reference Area – Tanybryn, Victoria
- Aquila Creek Reference Area – Benwerrin, Victoria
- Painkalac Creek Reference Area – Boonah, Victoria

Review of the GTR 1 alignment indicates that the trail does not intersect with these reference areas. DELWP will need to ensure that any new iterations of the GORCT continues to avoid these reference areas.

2.2.8 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. 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 development include:

- Australian Grayling
- Australian Mudfish
- Otway Bush Yabby
- Otway Burrowing Crayfish.

Providing mitigation measures outlined in this report are adhered to, the potential for protected aquatic biota as listed above, to be injured, damaged or destroyed is considered to be negligible and no permit is required from DELWP.

2.2.9 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.

The proposed trail (GTR 1) will involve construction or maintenance activities that affect beds and banks of waterways, riparian vegetation or quality or quantity of water of the following designated waterways:

- Anderson Creek
- Brown Creek
- Carisbrook Creek
- Cherry Tree Creek
- Coalmine Creek
- Cumberland River
- Erskine River
- Grassy Creek
- Grey River
- Hitchcock Gully
- Jamieson Creek
- Kennett River
- Moggs Creek
- Monash Gully
- Nettle Creek
- Petticoat Creek
- Reedy Creek
- Saint George River
- Separation Creek
- Sheoak Creek
- Skenes Creek
- Smythe Creek
- Spout Creek
- Stony Creek
- Sugarloaf Creek
- Von Mueller Creek
- Wye River

Works within the assessment corridor will require a permit from the Corangamite Catchment Management Authority. Guidelines and application forms are available from CMAs online: https://ccma.vic.gov.au/floodplains/works-on-waterways-application-form/

2.2.10 Environment Protection Act 2017: Environmental Reference Standards

The Environment Protection Act 2017 provides a legal framework for the systematic and strategic management of potential and realised environmental impacts. The Environment Protection Act 2017, the Environment Protection Regulations 2021 and Environment Reference Standards (ERS) introduced from 1 July 2021 provide a regulatory framework designed to prevent harm by eliminating or minimising risks of harm to human health and the environment.

Under the regulatory changes, SEPP (Waters) will not continue as a subordinate instrument under the EP Act, and its formal statutory role ended on 1 July 2021. Much of the content of SEPP (Waters) has been saved under the Environment Protection Transitional Regulations 2021 for a period of 2 years after the commencement of the Environment Protection Regulations 2021. As SEPP (Waters) contributes to the state of knowledge and provides guidance on compliance with the General Environmental Duty (GED), the policy remains relevant to the protection and management of Victoria's water environments, including surface waters, estuarine and marine waters and groundwaters.

While not being saved under the Environment Protection Transitional Regulations 2021, the following clauses of SEPP (Waters) applicable to the project remain relevant as they provide guidance for compliance with the GED under the Environment Protection Act 2017:

Clause 42 – Construction activities:

- Minimise soil erosion, land disturbance and discharge of sediment and other pollutants to surface waters

- Where construction activities impinge on surface waters, construction managers need to monitor affected surface waters to assess whether beneficial uses are being protected

Clause 45 – Native vegetation protection and rehabilitation:

- Minimise the removal of and rehabilitate native vegetation within or adjacent to surface waters

The ERS requires 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 as a result of the project must not result in changes that exceed background levels and/or the water quality objectives specified for the Uplands B segment to protect surface water uses and values.

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, it is recommended that World Trail prepare and implement a site-specific Constructional Environmental Management Plan, which includes all EPA approved erosion control measures. These temporary control measures should be inspected during rainfall events to ensure controls are able to prevent/minimize offsite discharges and longer term impacts. Sediment control measures selected should also reflect the level of protection required to protect the ecological values within the creeks downstream of the project area.

Link to further information: http://www.gazette.vic.gov.au/gazette/Gazettes2021/GG2021S245.pdf

3. Victoria's Guidelines for the removal, destruction or lopping of native vegetation

The Guidelines were introduced in December 2017. They set out and describe the application of Victoria's statewide policy in relation to assessing and compensating for the removal of native vegetation in order to achieve the objective of 'no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

This objective is to be achieved through Victoria's planning system using an assessment approach that relies on strategic planning and the permit and offset system. The key policy for achieving no net loss to biodiversity is the three-step approach of avoid, minimise and offset:

- **Avoid** the removal, destruction or lopping of native vegetation to ensure that the important biodiversity values of native vegetation continue to be delivered into the future.
- **Minimise** impacts resulting from the removal of native vegetation that cannot be avoided.
- Provide an **offset** to compensate for the biodiversity impact resulting from the removal of native vegetation.

The strategic and site level steps taken during the design of the development to minimise biodiversity impacts resulting from the removal of native vegetation are outlined below. A detailed avoid and minimise statement in accordance with DELWP's Assessors Handbook is provided in the planning report for the project:

- Detailed project planning including feasibility studies, desktop constraints assessment, terrain modelling and an initial trail mark-out and later assessments that aimed to micro-site around potential areas of high ecological value. This process resulted in the reduction in the length of proposed trails, and the removal of some trails from the proposed alignment due to potential impacts to threatened flora and fauna species, and to sensitive EVCs.
- Removing trails from the network that intercept or pass close to:
  - Southern Bent-winged Bat non-breeding caves and roost sites.
  - High quality areas of EVC 6 – Sand Heathland and EVC 48 - Heathy Woodland that support a high proportion of threatened flora and fauna species within the project area.
  - Hooded Plover breeding habitat.
- Minimising trail development near estuaries and coastal wetlands.
- Further micro-siting are proposed to avoid ecological features and threatened flora populations.
- Developing and incorporating trail construction methods that avoid impacts to canopy trees.
- Aligning trails on 43 kilometres of existing track or trail.

DELWP has provided biodiversity information tools to assist with determining the assessment pathway associated with the removal of native vegetation and the contribution that native vegetation within the project area makes to Victoria's biodiversity.

All planning permit applications to remove native vegetation are assigned to an assessment pathway determined by the extent and location of proposed native vegetation removal. The assessment pathway will dictate the information to be provided in a planning permit application and the decision guidelines the

responsible authority (e.g. Council) and/or DELWP as a referral authority will use to assess the permit application.

The biodiversity information tools have two components:

Site-based information

The site-based information is observable at a particular site. Biosis has collected the requisite site-based information for the assessment against the Guidelines.

Landscape scale information

Landscape scale information requires consideration of information beyond the site. This information is managed by DELWP and can be accessed via the NVIM.

The following section summarises the results of the site-based assessment and the outputs generated by the Native Vegetation Removal Report, which identifies the assessment pathway on which the planning application will be assessed. The full Native Vegetation Removal Report can be viewed in Appendix 7.

3.1 Proposed removal of native vegetation

The extent of native vegetation patches, the location of large trees within patches and any scattered trees were mapped within the project area Figure 7) and the condition was assessed in relation to standard methods provided by DSE (2004a) and pre-determined EVC benchmarks: https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks.

The proposed removal of native vegetation was assessed in accordance with the concept design provided and ground checked by World Trail. The trails will remove 9.929 hectares of native vegetation, all of which is considered patch vegetation (Figure 7). Eight large trees within patches are proposed to be removed. Spatial data (shapefiles) of proposed vegetation removal were submitted to DELWP's native vegetation support team, who provided a Native Vegetation Removal Report for the project. This is provided in Appendix 7 and summarised in the following sections.

3.1.1 Habitat hectares

A continuous area of the same EVC is termed a 'habitat zone'. Different habitat zones exists where there are different EVCs present and/or discrete (non-continuous) patches of the same EVC. A separate vegetation quality assessment was conducted for each habitat zone. The vegetation quality assessment score was multiplied by the extent of the habitat zone to give a value in habitat hectares.

Multiple habitat zones were identified. The results of the vegetation quality assessment are provided in Appendix 6.

A total of 1,863 large trees occur within patches of native vegetation within the project area. The locations of large trees within patches are shown in Figure 7 and the circumference of each large tree marked for removal is provided in Appendix 6.

3.2 Determining the assessment pathway

Applications to remove native vegetation are categorised into one of three assessment pathways: basic, intermediate or detailed. Two factors are used to determine the assessment pathway for a permit application, the **location** and **extent** of the native vegetation proposed to be removed. Location has been divided into three possible categories by DELWP, and has been pre-determined by DELWP for all locations in Victoria. The location of a particular site is determined using the *location map* available in the Native Vegetation Information Management (NVIM) system (http://nvim.depi.vic.gov.au).

The extent of native vegetation proposed to be removed determines the assessment pathway by considering the following:

- The total area (hectares) of native vegetation (including any patches and scattered trees) proposed to be removed
- Whether any large trees are proposed to be removed, either as scattered trees or occurring in patches.

It is proposed to remove greater than 0.5 hectares of native vegetation and eight large trees from within location category 3, therefore the project must meet the requirements of, and be assessed in, the detailed assessment pathway. These requirements are provided in Appendix 6.

3.3 Offset requirements

In order to ensure a gain to Victoria's biodiversity that is equivalent to the loss resulting from the proposed removal of native vegetation, compensatory offsets are required where Clause 52.17 applies to the project. Losses and gains are measured in general or species habitat scores or units. The offset must also include at least one large tree for every large tree removed.

For a detailed assessment pathway project, the species-general offset test will determine if a general offset, species offset or combination of both is required.

The results of the species-general offset test are provided in Appendix 7 and summarised in Table 10.

Table 10 Summary of DELWP Native Vegetation Removal Report

Attribute	Outcome	Notes
Location category	3	High location risk
Native vegetation removal extent	9.929 hectares	Including 8 large trees
Assessment pathway	Detailed	Location 3 and removal of > 0.5 hectares of native vegetation
Strategic Biodiversity Value Score	0.560 – 1.000	Range for multiple habitat zones
Modelled habitat for threatened species	Yes	Modelled habitat for 133 species (Appendix **7**)
Offset type	General and species	
Offset multiplier	1.5 X – General 2 X - Species	

Attribute	Outcome	Notes
Offset amount: general habitat units	0.541 general habitat units	
General offset vicinity		The offset site must be located within the same Catchment Management Authority boundary or municipal district as the native vegetation to be removed.
General offset minimum Strategic Biodiversity Value Score	0.682	
Offset amount: Species habitat units	8.281 species habitat units	• 7.061 species units of habitat for Wrinkled Buttons • 1.061 species units of habitat for Coast Correa • 0.024 species units of habitat for Otway Black Snail • 0.135 species units of habitat for Southern Blue-gum
Large tree attributes	8 large trees	The offset must include protection of at least one large tree for every large tree to be removed.

3.4 Proposed offset strategy

Consultation with DELWP, Parks Victoria and GORCAPA concluded that the Crown land exemption is only able to be used by the relevant authority for land which is under their own management (For example, DELWP is only able to use the Crown land exemption on land which is under management by DELWP). This exemption is implemented through DELWP's *Procedure for the removal destruction or lopping of native vegetation on Crown land* (DELWP 2018) and would negate the need for native vegetation offsets. Further advice about the implications of this for the GORCT's approvals pathway are provided in the planning approvals strategy report (Biosis 2022c). Where the procedure is not met or does not apply, a planning permit will be required under Clause 52.17.

Once the final design has been determined, and if offsets are required (depending on whether exemptions are followed), there are a number of options to secure the required offsets to compensate for the losses of native vegetation and threatened species habitat.

3.4.1 First Party Offset

Based on the offset site security standards detailed on page 28 of DELWP (2017a), the offset owner will be required to enter into a security agreement with a relevant statutory body that meets the following security standards:

- Contains a legally enforceable provision
- Has no termination date
- Is registered on the land title.

An offset management plan will need to be developed and this area will need to be actively managed for a nominated 10 year period and then maintained as an offset in perpetuity.

3.4.2 Third party offset credit purchase

The proponent may be able to purchase the offset credits from the Victorian native vegetation credit register if suitable offsets are available.

4. Key ecological values and recommendations

This section identifies the key ecological features of the assessment corridor, provides an outline of potential implications of the proposed walking trail on those values and includes recommendations to assist World Trail and DELWP to avoid, mitigate and offset impacts on biodiversity.

The location of the Great Ocean Road trail network, largely within National Parks and conservation reserves, has resulted in an alignment that contains a diverse array of ecological values. Then proponent, DELWP, and the project team have demonstrated consideration of these values throughout the early stages of project planning by actively engaging in analysis of site values, formulating design responses and selecting alignments that minimised impacts on significant ecological features where possible.

This report outlines the potential impacts of the proposed trail network and contains recommendations to minimise and mitigate these impacts at the design, construction and operational stages of the project.

4.1 Ecological values

Key ecological values identified within the assessment area and broader habitat are as follows:

- The project area crosses two bioregions with distinct environmental conditions, vegetation communities and species assemblages (the Otway Plain and the Otway Ranges).
- Two EVCs in the Otway Plain bioregion composed of three condition states:
  - EVC 21 – Shrubby Dry Forest, Bioregional Conservation Status (BCS) of least concern.
  - EVC 48 – Heathy Woodland, BCS of least concern.
- Eight EVCs in the Otway Ranges bioregion composed of 15 condition states:
  - EVC 16 – Lowland Forest, BCS of depleted.
  - EVC 18 – Riparian Forest, BCS of least concern.
  - EVC 21 – Shrubby Dry Forest, BCS of least concern.
  - EVC 22 – Grassy Dry Forest, BCS of depleted.
  - EVC 45 – Shrubby Foothill Forest, BCS of least concern.
  - EVC 48 – Heathy Woodland, BCS of least concern.
  - EVC 161 – Coastal Headland Scrub, BCS of depleted.
  - EVC 201 – Shrubby Wet Forest, BCS of least concern.
- Forest, woodland and coastal scrub vegetation that supports a suite of habitat elements including large trees, fallen timber, rocks, tussock-forming grasses, major river systems with minor tributaries, seasonally wet areas and structurally-complex understorey.
- Populations of Wrinkled Buttons and Long-nosed Potoroo listed under the EPBC Act and FFG Act.
- Populations of Gang-gang Cockatoo and Yellow-bellied Glider listed under the EPBC Act.
- Populations of threatened species listed under the FFG Act: Brooker's Gum, Southern Blue-gum, Paper flower and Otway Black-snail.

- Populations of threatened fauna species listed under the FFG Act: Grey Goshawk, Rufous Bristlebird (Otway), White-bellied Sea-Eagle, and Powerful Owl.
- Potential habitat for 50 threatened species:
  - Listed under EPBC Act: Anglesea Grevillea, Green-striped Greenhood, Spiral Sun-orchid, Australian Grayling, White-throated Needle-tail, Southern Bent-winged Bat, Grey-headed Flying-fox, Southern Brown Bandicoot and Swamp Antechinus.
  - Listed under FFG Act: 25 flora species and 16 fauna species (section 4.2.1)
- Waterways and aquatic habitats, major river systems include:
  - Anderson Creek
  - Brown Creek
  - Carisbrook Creek
  - Cherry Tree Creek
  - Coalmine Creek
  - Cumberland River
  - Erskine River
  - Grassy Creek
  - Grey River
  - Hitchcock Gully
  - Jamieson Creek
  - Kennett River
  - Moggs Creek
  - Monash Gully
  - Nettle Creek
  - Petticoat Creek
  - Reedy Creek
  - Saint George River
  - Separation Creek
  - Sheoak Creek
  - Skenes Creek
  - Smythe Creek
  - Spout Creek
  - Stony Creek
  - Sugarloaf Creek
  - Von Mueller Creek
  - Wye River

4.2 Summary of potential impacts

Construction of the trail network (GTR 1) is likely to result in the following impacts:

- Up to 9.929 hectares of native vegetation removal for trails (understorey) and abutments of three swing bridges (full removal). Impacts are summarised below:
  - Otway Plain Bioregion
    - 0.12898 hectares of EVC 21 - Shrubby Dry Forest (condition state: High)
    - 0.115808 hectares of EVC 48 - Heathy Woodland (condition state: Moderate)
    - 0.197555 hectares of EVC 48 - Heathy Woodland (condition state: High)
  - Otway Ranges Bioregion
    - 0.361648 hectares of EVC 16 - Lowland Forest (condition state: High)
    - 0.047066 hectares of EVC 18 - Riparian Forest (condition state: Low)
    - 0.153055 hectares of EVC 18 - Riparian Forest (condition state: High)
    - 0.078413 hectares of EVC 21 - Shrubby Dry Forest (condition state: Moderate)
    - 2.82634 hectares of EVC 21 - Shrubby Dry Forest (condition state: High)
    - 0.074558 hectares of EVC 22 - Grassy Dry Forest (condition state: Moderate)
    - 0.065355 hectares of EVC 45 - Shrubby Foothill Forest (condition state: Low)
    - 0.959014 hectares of EVC 45 - Shrubby Foothill Forest (condition state: Moderate)
    - 4.109948 hectares of EVC 45 - Shrubby Foothill Forest (condition state: High)
    - 0.056217 hectares of EVC 48 - Heathy Woodland (condition state: Moderate)
    - 0.093215 hectares of EVC 48 - Heathy Woodland (condition state: High)
    - 0.100327 hectares of EVC 161 - Coastal Headland Scrub (condition state: Low)
    - 0.169869 hectares of EVC 161 - Coastal Headland Scrub (condition state: Moderate)
    - 0.075067 hectares of EVC 161 - Coastal Headland Scrub (condition state: High)
    - 0.316978 hectares of EVC 161 - Shrubby Wet Forest (condition state: High)
- The loss of eight large trees (including four FFG Act listed Southern Blue-gum) for construction of the bridge abutments.
- Potential impacts to threatened species may occur, most of which are temporary in nature (e.g. during the construction phase), or of a relatively minor scale due to the linear nature of the impact and the restriction of the impact to understorey habitat, these include:
  - Disturbance to habitat of four EPBC Act listed flora species recorded or predicted to occur within the trail corridor including: Wrinkled Buttons, Anglesea Grevillea, Green-striped Greenhood, and Spiral Sun-orchid.

  - Disturbance to habitat of ten EPBC Act listed fauna species: Gang-gang Cockatoo, White-throated Needletail, Swamp Antechinus, Long-nosed Potoroo, Broad-toothed Rat, Southern Brown Bandicoot, Grey-headed Flying-fox, Southern Bent-winged Bat, Yellow-bellied Glider and Australian Grayling.
  - Disturbance to habitat for 38 listed FFG Act flora species (Table 6).
  - Disturbance to habitat for 17 listed FFG fauna species (Table 5).
- Disturbance to sensitive EVCs that rely on the existing hydrology and ground disturbance remaining intact (i.e. EVC 201 – Shrubby Wet Forest which has a high ground fern component including Soft Tree-fern and Water Fern).
- Potential spread of noxious and/or high threat weeds into areas of high quality remnant vegetation.
- Potential spread of pathogens, particularly Cinnamon fungus.

The following key legislative considerations have been identified:

- Based on the proposed walking trail network within the project area, construction descriptions and information provided to Biosis, there is potential for the project to have a significant effect on Wrinkled Buttons and Green-striped Greenhood. As such, it is recommended that DELWP refers the project to the Minister of the Environment for assessment under the EPBC Act.
- There is also potential for the works to have minor and localised effects that will be short-term to medium term (e.g. effects will be measurable in weeks or months) on:
  - Spiral Sun-orchid
  - Gang-gang Cockatoo
  - Australian Grayling
  - Southern Bent-winged Bat
  - Grey Headed Flying-fox
  - Long-nosed Potoroo
  - Swamp Antechinus
  - Southern Brown Bandicoot
  - White-throated Needletail
  - Yellow Bellied Glider
- In accordance with Clause 52.17 of the Victoria Planning Provisions a permit to remove, destroy or lop native vegetation, including some dead native vegetation, may be required and under Clause 66.02 this permit will be referred to DELWP as the approval authority. However, the Crown land exemption at Clause 52.17-7 may apply to this project. This is discussed further within the Planning Approvals Report (Biosis 2022c) and relies on the status of the project proponent (i.e. whether the project is led by DELWP or GORCAPA).
- An FFG Act permit to 'take' protected flora species and impact on threatened flora from public land will be required, as 79 protected flora species, several listed flora and fauna species and one listed community were recorded within the assessment corridor.

- A works on waterways permit from Corangamite CMA may be required and Corangamite CMA should be consulted on the status of waterways and tributaries within the assessment corridor.
- An EES referral may be required as the project has the potential to have regional or State significant environmental impacts.

A summary of potential implications for trail development and recommendations to minimise impacts of the project is provided in Table 11.

Table 11 Summary of key ecological values, potential implications of constructing the trail and recommendations to minimise ecological impacts.

Ecological feature (Figure 5 and Figure 6)	Implications of development	Recommendations
Native vegetation	The permanent removal of 9.929 hectares of mostly understorey vegetation. The application will be assessed on the detailed assessment pathway. Proportional impacts to native vegetation above the species offset threshold for four species: • Southern Blue-gum • Otway Black Snail • Coast Correa • Wrinkled Buttons.	Where native vegetation removal is unavoidable then minimise impacts in accordance with No Net Loss policy. Refer to Section 5. Identify and implement appropriate offsets for vegetation losses as outlined in Section 5.3 by establishing and registering the Crown land offset site. Implement the trail rehabilitation component of the CEMP to assist trail rehabilitation during and post-construction. This should detail measures such as placement of cut material and soil sods along trail edges to reduce erosion and encourage natural regeneration. Undertake ongoing weed control as required.
Significant species and ecological communities	Impacts on significant species and communities and their habitat (see above).	• Avoid the removal of hollow-bearing trees. • Avoid impacts to Sand Heathland and Heathy Woodland, which may provide important habitat for Southern Brown Bandicoot, Swamp Antechinus, Long-nosed Potoroo, Southern Toadlet, Brown Toadlet, and White-footed Dunnart. Where impacts cannot be avoided, undertake targeted surveys in accordance with published survey methodologies. • Implement a site-specific Construction Environmental Management Plan (CEMP) to manage erosion and pollutants during construction to prevent impacts to threatened species Australian Grayling, Platypus, Australian Mudfish and Otway Bush Yabby. • Micro-site works areas to avoid removal of trees containing raptor nests and/or tree hollows, which provide habitat for threatened forest owls and diurnal raptors such as Grey Goshawk. • Undertake construction works outside of threatened bird nesting and fledging seasons, to avoid impacts to Rufous Bristlebird, Diamond Firetail and Chestnut-rumped Heathwren.

Ecological feature (Figure 5 and Figure 6)	Implications of development	Recommendations
		• Implement a site-specific Fauna Management Plan to ensure suitable salvage techniques and mitigation measures are applied during construction to avoid and/or minimize the death and/or injury of individuals of threatened species.
Aquatic habitat features	Loss of, or alterations to, riparian and in-stream habitat within and in the vicinity of the assessment corridor (e.g. downstream) via: direct removal, notable hydrological changes, deterioration in water quality (including pollution event) and, sedimentation.	• Design trail and construction methods to minimise removal of riparian vegetation and avoid instream works via the use of clear span elevated structures. • Comply with the General Environmental Duty (GED) of the EP Act 2017, by taking all reasonable steps to prevent or minimise risks so as to avoid environmental damage (e.g. pollution of nearby waterways). • Implement a site-specific CEMP to ensure appropriate sediment control measures are put in place to ensure run-off during construction does not impact surrounding streams and creeks. Control measures implemented should reflect the level of protection required to protect nearby ecological values and ensure that any impacts as a result of the project do not result in changes that exceed background levels and/or objectives; as outlined in Part Five, Division Three (Surface Waters) of the Environmental Reference Standards. • Avoid instream works. • Utilise the most sensitive short term (i.e. during construction) and long term sediment control methods available for all works located in within and in the vicinity of all flowing and all mapped waterways (including ephemeral first order tributaries). • Design the trails to direct runoff through a buffer of vegetation (preferably > 30 m in width) rather than directly into waterways defined above.
Other habitat features	• Refuge areas for ground-dwelling mammals. • Large trees and fallen logs.	• Avoid areas identified as refuge areas for ground-dwelling mammals. • Avoid the removal of large fallen logs and timber whenever possible.
Habitat connectivity	Small scale fragmentation of habitat connectivity for vertebrate and invertebrate fauna species.	Design all waterway crossings in accordance with relevant guidelines from the CMA and in accordance with guidelines for fish friendly waterway crossings (Witheridge 2002, Fairfull & Witheridge 2003). For minor ephemeral tributaries, boardwalks and grates should suffice or larger waterways, appropriate full span bridges should be used.

4.3 Avoidance strategies and mitigation recommendations

Key impact avoidance and minimisation strategies, and mitigation measures include:

Project specific recommendations

- Develop a weed control strategy that monitors weed invasion along the trail, at a minimum:
  - Within key threatened species habitat (i.e. Wrinkled Buttons habitat, and small mammal refuge habitat at the Coalmine Creek intersect).
  - Along tracks that extend through major weed infestations.
- Incorporate/develop the following mitigation strategies to prevent the spread of Cinnamon Fungus:
  - Control Cinnamon Fungus infestations that occur along the trail network with a Phosphite fungicide.
  - Protect Austral Grass-tree from adverse drainage during construction and operation of trail to reduce impact of Cinnamon Fungus.
  - Develop a Cinnamon Fungus monitoring strategy that:
    - Documents the extent of existing infestations.
    - Conducts annual assessment of all known infections that records: the extent of infestations, and the effectiveness of treatment strategies implemented.
    - Monitors susceptible EVCs along the trail network for new infestations to be included in future monitoring and treatment programs.
  - Incorporate hygiene stations to reduce the spread of weeds and pathogens into the trail network. Critical areas for positioning hygiene stations include:
    - At the fronts of Cinnamon Fungus infestations that are intersected by the trail. This is to contain the infection to the existing area and prevent further spread along the trail.
    - At entry and exit point where the trail intersects with EVC 45 – Heathy Woodland or EVC 6 – Sand Heathland that are susceptible to Cinnamon Fungus (note: EVC 6 was not recorded within GTR 1 alignment).
- Create a trail Construction and Environment Management Plan that mitigates the spread of soil pathogens and diseases, such as Cinnamon Fungus and Myrtle Wilt. Such plans should detail:
  - Strict hygiene methods to be implemented during trail construction.
  - On-going monitoring to assess the spread of Cinnamon Fungus and Myrtle Wilt.
  - All environmental controls and mitigation measures covering vegetation removal prescriptions/seasonality, work site delineation, weed/pathogen hygiene, sediment control and unexpected finds protocols and salvage protocols.
- Construct elevated boardwalks, to reduce impacts on hydrology and/or soil compaction, when the walking trail intersects:
  - Ephemeral waterways and minor tributaries.
  - EVC 201 – Shrubby Wet Forest.

  - EVC 31 – Cool Temperate Rainforest (if intersected by future trail design variations).
- Adhere to construction methodology outlined in Axiom Tree Management (2022) to reduce impacts on trees through the implementation of tree protection measures.
- Protect critical refuge habitat for small to medium sized ground-dwelling mammals by:
  - Aligning trail to avoid areas of critical refuge habitat (i.e trail 15 is appropriately aligned above refuge habitat and no other critical refuge habitat is intersected by GTR 1).
  - Avoid impacts to vegetation functioning as a corridor to the refuge habitat (elevate trail 43 as it crosses Coalmine Creek so that the grass and shrub layer are not impacted).
  - Use appropriate fencing, that enables small mammal passage, however discourages pedestrians from leaving trail at the Coalmine Creek intersect.
  - Install hygiene stations for *Phytophthora cinnamomic* in consultation with the Corangamite Catchment Management Authority (CCMA).
  - Consider improving habitat and protecting environmental values by:
    - Improving the vegetation for small mammals at Coalmine Creek habitat corridor in consultation with the CCMA.
    - Installing interpretive signage that emphasises the importance of habitat along the trail for threatened species (i.e small mammals) and the importance of remaining on the trail to preserve those habitats.
- Microsite the trail to avoid Button Wrinkle populations (trail 8, 42, 43, optional 9, 61, alternative 3 of GTR 1).
- Undertake woody weed removal prior to constructing trail 70. Microsite the trail once Sweet Pittosporum has been removed to avoid / minimise disturbance to the high-quality understorey within EVC 161 – Coastal Headland Scrub (particularly within the Moderate and High condition states).
- Micro-site bridge abutments, where possible, to locate outside of TPZs, particularly of large trees and Southern Blue-gum.

General recommendations

– General trail construction and maintenance recommendations include:

- Avoiding the direct removal of canopy trees along trails, particularly large hollow-bearing trees, through the micro-siting of the trail.
- Undertaking necessary pre-construction site visits with contractors prior to any works commencing to ensure all high value areas are avoided and protected.
- Restricting disturbance to track margins in areas where existing trails are present.
- To the fullest extent practicable, minimise disturbance to any native vegetation, including aquatic vegetation, within the project area. This may include the demarcation of areas of native vegetation to be retained during works.
- Adhering to the construction corridors, maintenance zones and permanent vegetation removal footprints outlined in this report.
- Implementing best practice trail design, construction and sediment management practices.

- Minimising the impacts of construction by 'building from the trail' and from within the construction footprint.
- Implementing strict weed and pathogen hygiene protocols during construction and operation of trails.
- Any plant or equipment used should be washed down and cleaned prior to and following use to reduce the translocation risk of weed species.
- Engage a suitably qualified arborist to advise on the management of trees during the construction phase of the project. The project arborist should induct workers prior to commencing trail construction works on:
  - Basic tree functions and impacts from trail.
  - Construction guidelines for working close to trees.
  - Procedure when roots are damaged and native vegetation offsets are required.
- Should instream or riparian works be proposed, undertake biological and physicochemical monitoring of waterways to be impacted in accordance with *The Environment Protection Act 2017*, the Environment Protection Regulations 2021 and Environment Reference Standards (ERS) introduced from 1 July 2021. Biological and physicochemical monitoring should be undertaken in appropriate locations and seasons prior to and following any proposed instream / riparian zone works to determine if there has been any negative impact on the health of waterways as a result of the project.
- The results of this assessment should be incorporated into the future stages of project design, by ensuring the flora and fauna mapping information is incorporated into, or used alongside mapping.

A number of standard precautions and mitigations relevant to the protection of fish habitat are provided in Witheridge (2002), these should be considered and deployed as relevant. Further recommendations specific to the construction of bridges and protection of aquatic habitats include:

- Silt curtains or a coffer dam should be deployed around aquatic work sites where required, to protect against any impacts to water quality. In addition to standard erosion and sediment control measures.
- If the stockpiling of sediment is required it should be located as far away from the waterway as possible and managed so that it is secure against flooding, to at least the 1 in 10 year flood interval.
- Any runoff from stockpiled sediment must be managed to prevent any sediment entering the waterway.
- Instream works should be avoided. If they cannot be avoided, then they should be limited low flow periods wherever possible and undertaken during calm weather conditions.
- Appropriate erosion and sediment controls that take into account works near creeks and their floodplains should be employed to protect against any impacts to water quality or indirect impacts to retained vegetation.
- Any sections of creek banks that are impacted or modified by the proposed works should be reformed or remediated to resemble the pre-works condition and form wherever possible.
- Minimise soil transportation within, into or out of the project area to reduce the spread of weeds.

Biosis recommends that these strategies be conferred through to the detailed design and construction phase of the project, and that the appointed construction contractor be accountable for achieving a high level of

environmental compliance consistent with the environmental management framework in the project masterplan and an endorsed CEMP that is subject to regular third-party compliance monitoring.

4.4 Next steps

The following steps are relevant to finalising the biodiversity impact assessment and approvals process for the project:

- Make a determination regarding the applicability of the Crown Land exemption in Clause 52.17-7 of the Victoria Planning Provisions (this exemption is implemented through DELWP's *Procedure for the removal destruction or lopping of native vegetation on Crown land*).
- Undertake ecological assessments for any unassessed trails of the final alignment.
- Re-run native vegetation removal report through DELWP's Ensym NVR Tool Support team depending on permit application requirements.
- Determine if offsets are available and develop an offset strategy or determine counter balancing measures under the Crown land Procedure.
- Undertake targeted surveys for EPBC and FFG listed species recommended in this report.
- Undertake assessment against other Biodiversity legislation based on the final trail alignment and magnitude, scale and context of impacts (i.e. EPBC Act, FFG Act and EE Act) once targeted surveys and any additional trail assessments have been completed.

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Appendices

Appendix 1 Flora

The following abbreviations and symbols are relevant to this Appendix:

Code	Meaning	Reference
National listings (EPBC Act)		
EX	Extinct	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
CR	Critically endangered	
EN	Endangered	
VU	Vulnerable	
PMST	Protected Matters Search Tool	
State listings (FFG Act and DELWP Advisory List)		
x	Extinct	Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
cr	Critically endangered	
e	Endangered	
v	Vulnerable	
t	Threatened	
P	Protected (public land only)	
Weed status (CaLP Act, DCCEEW Weeds of National Significance and DELWP Advisory List[1])		
SP	State prohibited species	Victorian *Catchment and Land Protection Act 1994* (CaLP Act)
RP	Regionally prohibited species	
RC	Regionally controlled species	
R	Restricted species	
Other		
#	Native species outside its natural range	Victorian Biodiversity Atlas (VBA)

[1] The DELWP Advisory List for Rare or Threatened Plants was revoked in 2021 and are superseded by the current list of threatened species under the FFG Act 1988.

A1.1 Flora species recorded from the assessment corridor

Table A1.1 Flora species recorded from the assessment corridor

Status	Scientific Name	Common Name
Indigenous species		
	Acacia dealbata	Silver Wattle
P	*Acacia gunnii*	Ploughshare Wattle
P	*Acacia leprosa* var. *magna*	Otway Wattle
P #	*Acacia longifolia*	Sallow Wattle
P #	*Acacia longifolia* subsp. *longifolia*	Sallow Wattle
P #	*Acacia longifolia* subsp. *sophorae*	Coast Wattle
P	*Acacia mearnsii*	Black Wattle
	Acacia melanoxylon	Blackwood
P	*Acacia mucronata* subsp. *longifolia*	Narrow-leaf Wattle
P	*Acacia myrtifolia*	Myrtle Wattle
P	*Acacia oxycedrus*	Spike Wattle
P	*Acacia stricta*	Hop Wattle
P	*Acacia suaveolens*	Sweet Wattle
P	*Acacia ulicifolia*	Juniper Wattle
P	*Acacia verniciflua* s.s.	Varnish Wattle
P	*Acacia verticillata*	Prickly Moses
	Acaena novae-zelandiae	Bidgee-widgee
P	*Acianthus pusillus*	Small Mosquito-orchid
P	*Acianthus* spp.	Mosquito Orchid
P	*Acrotriche serrulata*	Honey-pots
P	*Acrotriche* spp.	Ground Berry
P	*Adiantum aethiopicum*	Common Maidenhair
	Ajuga australis	Austral Bugle
	Allocasuarina misera	Slender Sheoak
	Allocasuarina spp.	Sheoak
	Allocasuarina verticillata	Drooping Sheoak
	Alyxia buxifolia	Sea Box
	Amperea xiphoclada var. *xiphoclada*	Broom Spurge
	Asperula conferta	Common Woodruff
	Asperula oblanceolata	Otway Woodruff
	Asperula spp.	Woodruff
P	*Asplenium flabellifolium*	Necklace Fern
	Austrostipa spp.	Spear Grass
	Banksia integrifolia subsp. *integrifolia*	Coast Banksia
	Banksia marginata	Silver Banksia
P	*Bedfordia arborescens*	Blanket Leaf
	Billardiera mutabilis	Common Apple-berry

Status	Scientific Name	Common Name
	Billardiera spp.	Apple Berry
P	*Blechnum* spp.	Water Fern
	Bossiaea prostrata	Creeping Bossiaea
P	*Brachyscome multifida*	Cut-leaf Daisy
	Bromus spp.	Brome
P	*Brunonia australis*	Blue Pincushion
	Bulbine spp.	Bulbine Lily
	Burchardia umbellata	Milkmaids
	Bursaria spinosa subsp. *spinosa*	Sweet Bursaria
P	*Calocephalus lacteus*	Milky Beauty-heads
P	*Calochlaena dubia*	Common Ground-fern
	Cardamine spp.	Bitter Cress
	Carex appressa	Tall Sedge
P	*Cassinia longifolia*	Shiny Cassinia
	Cassytha glabella	Slender Dodder-laurel
	Cassytha melantha	Coarse Dodder-laurel
	Cassytha pubescens s.s.	Downy Dodder-laurel
	Cassytha spp.	Dodder Laurel
	Chamaescilla corymbosa var. *corymbosa*	Blue Stars
P	*Cheilanthes austrotenuifolia*	Green Rock-fern
P	*Chrysocephalum apiculatum* s.s.	Common Everlasting
P	*Chrysocephalum semipapposum*	Clustered Everlasting
	Clematis aristata	Mountain Clematis
	Clematis microphylla s.s.	Small-leaved Clematis
	Comesperma volubile	Love Creeper
	Coprosma quadrifida	Prickly Currant-bush
P	*Coronidium scorpioides* s.s.	Button Everlasting
P	*Correa alba*	White Correa
P	*Correa lawrenceana*	Mountain Correa
P	*Correa reflexa*	Common Correa
P	*Correa reflexa* var. *reflexa*	Common Correa
	Crassula spp.	Crassula
P	*Cyathea australis*	Rough Tree-fern
P	*Cymbonotus preissianus*	Austral Bear's-ear
	Cynoglossum australe	Australian Hound's-tongue
	Cyperus spp.	Flat Sedge
	Daviesia brevifolia	Leafless Bitter-pea
	Desmodium gunnii	Southern Tick-trefoil
	Dianella admixta	Black-anther Flax-lily
	Dianella longifolia s.l.	Pale Flax-lily
	Dianella revoluta s.l.	Black-anther Flax-lily

Status	Scientific Name	Common Name
	Dianella revoluta var. *revoluta s.l.*	Black-anther Flax-lily
	Dianella spp.	Flax Lily
	Dianella tasmanica	Tasman Flax-lily
	Dichondra repens	Kidney-weed
P	*Dicksonia antarctica*	Soft Tree-fern
	Dillwynia spp.	Parrot Pea
	Drosera auriculata	Tall Sundew
	Drosera spp.	Sundew
	Echinopogon spp.	Hedgehog Grass
	Einadia nutans	Nodding Saltbush
P	*Epacris impressa*	Common Heath
	Eucalyptus aromaphloia	Scentbark
	Eucalyptus baxteri s.l.	Brown Stringybark
e, r	*Eucalyptus brookeriana*	Brooker's Gum
	Eucalyptus cypellocarpa	Mountain Grey-gum
e, r	*Eucalyptus globulus* subsp. *globulus*	Southern Blue-gum
	Eucalyptus globulus subsp. *pseudoglobulus*	Gippsland Blue-gum
	Eucalyptus obliqua	Messmate Stringybark
	Eucalyptus radiata s.l.	Narrow-leaf Peppermint
	Eucalyptus radiata subsp. *radiata*	Narrow-leaf Peppermint
	Eucalyptus tricarpa	Red Ironbark
	Eucalyptus tricarpa subsp. *tricarpa*	Red Ironbark
	Eucalyptus viminalis	Manna Gum
	Eucalyptus viminalis subsp. *pryoriana*	Coast Manna-gum
	Eucalyptus viminalis subsp. *viminalis*	Manna Gum
P	*Euchiton* spp.	Cudweed
	Exocarpos cupressiformis	Cherry Ballart
	Ficinia nodosa	Knobby Club-sedge
	Gahnia radula	Thatch Saw-sedge
	Gahnia spp.	Saw Sedge
	Galium ciliare subsp. *terminale*	Hairy Bedstraw
	Geranium spp.	Crane's Bill
P	*Glossodia major*	Wax-lip Orchid
	Glycine clandestina	Twining Glycine
	Glycine spp.	Glycine
	Gonocarpus humilis	Shade Raspwort
	Gonocarpus spp.	Raspwort
	Gonocarpus tetragynus	Common Raspwort
	Goodenia lanata	Trailing Goodenia
	Goodenia ovata	Hop Goodenia
	Goodia lotifolia s.s.	Common Golden-tip

Status	Scientific Name	Common Name
	Gynatrix pulchella s.s.	Hemp Bush
	Hackelia latifolia	Forest Hound's-tongue
	Hackelia suaveolens	Sweet Hound's-tongue
	Hakea ulicina	Furze Hakea
	Hedycarya angustifolia	Austral Mulberry
	Hibbertia acicularis	Prickly Guinea-flower
	Hibbertia fasciculata var. *prostrata*	Bundled Guinea-flower
	Hibbertia riparia	Erect Guinea-flower
	Hibbertia spp.	Guinea Flower
	Hydrocotyle foveolata	Yellow Pennywort
	Hydrocotyle laxiflora	Stinking Pennywort
	Hydrocotyle spp.	Pennywort
P	*Hymenophyllum cupressiforme*	Common Filmy-fern
	Hypericum gramineum	Small St John's Wort
	Hypolaena fastigiata	Tassel Rope-rush
	Isopogon ceratophyllus	Horny Cone-bush
	Juncus procerus	Tall Rush
	Juncus spp.	Rush
	Kennedia prostrata	Running Postman
P	*Lagenophora stipitata* s.s.	Blue Bottle-daisy
VU, cr, P, v	*Leiocarpa gatesii*	Wrinkled Buttons
	Lepidosperma sieberi	*Sandhill Sword-sedge*
	Lepidosperma spp.	Sword Sedge
	Leptospermum continentale	Prickly Tea-tree
	Leptospermum laevigatum	Coast Tea-tree
	Leptospermum lanigerum	Woolly Tea-tree
	Leptospermum myrsinoides	Heath Tea-tree
	Leptospermum scoparium	Manuka
P	*Leucopogon parviflorus*	Coast Beard-heath
P	*Leucopogon virgatus*	Common Beard-heath
P	*Lindsaea linearis*	*Screw Fern*
	Lomandra filiformis	Wattle Mat-rush
	Lomandra filiformis subsp. *coriacea*	Wattle Mat-rush
	Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush
	Lomandra longifolia	Spiny-headed Mat-rush
	Lomandra longifolia subsp. *longifolia*	Spiny-headed Mat-rush
	Lomandra nana	Dwarf Mat-rush
	Lomatia fraseri	Tree Lomatia
	Lomatia ilicifolia	Holly Lomatia
	Luzula meridionalis var. *flaccida*	Common Woodrush
	Melaleuca lanceolata	Moonah

Status	Scientific Name	Common Name
	Microlaena stipoides var. *stipoides*	Weeping Grass
P	*Microsorum pustulatum* subsp. *pustulatum*	Kangaroo Fern
	Myoporum insulare	Common Boobialla
	Myoporum petiolatum	Sticky Boobialla
	Notelaea ligustrina	Privet Mock-olive
P	*Olearia argophylla*	Musk Daisy-bush
P	*Olearia axillaris*	Coast Daisy-Bush
P	*Olearia erubescens*	Moth Daisy-bush
P	*Olearia lirata*	Snowy Daisy-bush
P	*Olearia myrsinoides*	Silky Daisy-bush
P	*Olearia ramulosa*	Twiggy Daisy-bush
P	*Olearia ramulosa* var. *ramulosa*	Twiggy Daisy-bush
P	*Olearia* spp.	Daisy Bush
P	*Olearia teretifolia*	Cypress Daisy-bush
P	*Orchidaceae* spp.	Orchid
	Oxalis exilis	Shade Wood-sorrel
	Oxalis perennans	Grassland Wood-sorrel
P	*Ozothamnus ferrugineus*	Tree Everlasting
P	*Ozothamnus* spp.	Everlasting
	Patersonia fragilis	Short Purple-flag
	Pelargonium spp.	Stork's Bill
	Persicaria spp.	Knotweed
	Persoonia juniperina	Prickly Geebung
	Phragmites australis	Common Reed
	Phyllanthus gunnii	Shrubby Spurge
	Pimelea axiflora	Bootlace Bush
	Pimelea humilis	Common Rice-flower
	Pittosporum bicolor	Banyalla
#	*Pittosporum undulatum*	Sweet Pittosporum
	Plantago spp.	Plantain
	Platylobium obtusangulum	Common Flat-pea
	Poa ensiformis	Sword Tussock-grass
	Poa labillardierei	Common Tussock-grass
	Poa labillardierei var. *labillardierei*	Common Tussock-grass
	Poa morrisii	Soft Tussock-grass
	Poa sieberiana	Grey Tussock-grass
	Poa tenera	Slender Tussock-grass
P	*Polystichum proliferum*	Mother Shield-fern
P	*Polystichum* spp.	Shield Fern
	Pomaderris aspera	Hazel Pomaderris

Status	Scientific Name	Common Name
	Poranthera microphylla s.s.	Small Poranthera
P	*Prostanthera lasianthos*	Victorian Christmas-bush
P	*Prostanthera melissifolia*	Balm Mint-bush
	Pteridium esculentum subsp. *esculentum*	Austral Bracken
P	*Pterostylis longifolia* s.l.	Tall Greenhood
P	*Pterostylis* spp.	Greenhood
	Pultenaea daphnoides	Large-leaf Bush-pea
	Pultenaea forsythiana	Prickly Bush-pea
	Rhagodia candolleana subsp. *candolleana*	Seaberry Saltbush
	Rubus parvifolius	Small-leaf Bramble
	Rytidosperma pallidum	Silvertop Wallaby-grass
	Rytidosperma racemosum var. *racemosum*	Slender Wallaby-grass
	Rytidosperma setaceum	Bristly Wallaby-grass
	Rytidosperma spp.	Wallaby Grass
	Sambucus gaudichaudiana	White Elderberry
	Samolus repens	Creeping Brookweed
P	*Senecio linearifolius*	Fireweed Groundsel
P	*Senecio odoratus*	Scented Groundsel
P	*Senecio pinnatifolius* var. *lanceolatus*	Lance-leaf Groundsel
P	*Senecio* spp.	Groundsel
P	*Sigesbeckia orientalis* subsp. *orientalis*	Indian Weed
	Solanum spp.	Nightshade
P	*Solenogyne dominii*	Smooth Solenogyne
	Spyridium parvifolium	Dusty Miller
	Stackhousia monogyna s.l.	Creamy Stackhousia
	Stellaria flaccida	Forest Starwort
	Stellaria pungens	Prickly Starwort
	Stellaria spp.	Starwort
P	*Stylidium graminifolium* s.l.	Grass Triggerplant
P	*Stylidium* spp.	Trigger Plant
P	*Styphelia humifusa*	Cranberry Heath
	Tetragonia implexicoma	Bower Spinach
	Tetragonia tetragonioides	New Zealand Spinach
	Tetrarrhena distichophylla	Hairy Rice-grass
	Tetrarrhena juncea	Forest Wire-grass
	Tetratheca ciliata	Pink-bells
P	*Thelymitra* spp.	Sun Orchid
e, r	*Thomasia petalocalyx*	Paper Flower
P	*Thysanotus* spp.	Fringe Lily
	Typha spp.	Bulrush
	Veronica calycina	Hairy Speedwell

Status	Scientific Name	Common Name
	Veronica gracilis	Slender Speedwell
	Veronica plebeia	Trailing Speedwell
	Viola hederacea sensu Entwisle (1996)	Ivy-leaf Violet
	Wahlenbergia spp.	Bluebell
P	*Xanthorrhoea australis*	Austral Grass-tree
P	*Xanthorrhoea minor* subsp. *lutea*	Small Grass-tree
P	*Xanthorrhoea* spp.	Grass Tree
	Xanthosia spp.	Xanthosia
Introduced species		
	Acacia decurrens	Early Black-wattle
	Agapanthus praecox subsp. *orientalis*	Agapanthus
	Agrostis capillaris var. *capillaris*	Brown-top Bent
	Aira spp.	Hair Grass
R	*Allium triquetrum*	Angled Onion
	Anthoxanthum odoratum	Sweet Vernal-grass
R	*Asparagus* spp.	Asparagus
	Billardiera heterophylla	Bluebell Creeper
	Briza maxima	Large Quaking-grass
	Cenchrus clandestinus	Kikuyu
	Centaurium erythraea	Common Centaury
RC	*Chrysanthemoides monilifera*	Boneseed
R	*Cirsium vulgare*	Spear Thistle
	Coprosma repens	Mirror Bush
	Cotoneaster spp.	Cotoneaster
	Cupressus spp.	Cypress
	Cynosurus echinatus	Rough Dog's-tail
	Cyperus eragrostis	Drain Flat-sedge
RC	*Cytisus scoparius*	English Broom
	Dactylis glomerata	Cocksfoot
	Ehrharta erecta	Panic Veldt-grass
	Erigeron bonariensis	Flaxleaf Fleabane
	Euphorbia paralias	Sea Spurge
RC	*Foeniculum vulgare*	Fennel
RC	*Genista monspessulana*	Montpellier Broom
	Hedera helix s.l.	English Ivy
	Helminthotheca echioides	Ox-tongue
	Holcus lanatus	Yorkshire Fog
	Hypochaeris radicata	Flatweed
	Ilex aquifolium	English Holly
	Lagurus ovatus	Hare's-tail Grass
	Lysimachia arvensis	Pimpernel

Status	Scientific Name	Common Name
	Oxalis incarnata	Pale Wood-sorrel
R	*Oxalis pes-caprae*	Soursob
	Oxalis purpurea	Large-flower Wood-sorrel
	Paspalum dilatatum	Paspalum
	Physalis peruviana	Cape Gooseberry
	Plantago lanceolata	Ribwort
	Plantago major	Greater Plantain
	Prunella vulgaris	Self-heal
	Ranunculus repens	Creeping Buttercup
RC	*Rubus anglocandicans*	Common Blackberry
	Rumex spp. (naturalised)	Dock (naturalised)
RC	*Senecio jacobaea*	Ragwort
	Solanum nigrum s.l.	Black Nightshade
	Sonchus oleraceus	Common Sow-thistle
	Sporobolus africanus	Rat-tail Grass
	Trifolium subterraneum	Subterranean Clover
	Vicia spp.	Vetch
	Vinca major	Blue Periwinkle
	Vulpia spp.	Fescue
	Watsonia spp.	Watsonia
	Zantedeschia aethiopica	White Arum-lily

A1.2 Listed flora species

The following table includes threatened flora species that have potential to occur within the project area. The list of threatened species is sourced from the VBA and PMST (accessed on 2 December 2021). Where years are specified for the most recent database records, these refer to records from the VBA unless otherwise specified. Where no year is specified, the PMST has predicted that the species has potential to occur. A proportion of the flora habitat descriptions have been reproduced with permission from the Royal Botanic Gardens Victoria (RBGV 2020).

Table A1.2 Threatened flora species recorded or predicted to occur within 10 km of the project area

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
National significance								
Amphibromus fluitans	River Swamp Wallaby-grass	VU			PMST	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	**Low**	No local records with 5 km of project area, however suitable swampy/riparian habitat present.
Glycine latrobeana	Clover Glycine	VU	v		PMST	Grasslands and grassy woodlands, particularly those dominated by Kangaroo Grass.	**Negligible**	No current records nearby, no suitable habitat.
Grevillea infecunda	Anglesea Grevillea	VU	e	2019	PMST	Dry sclerophyll forest and woodland, primarily on sandy or gravelly soils.	**Medium**	Recent record near Fairhaven, suitable habitat present However not observed during field assessment.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Lachnagrostis adamsonii	Adamson's Blown-grass	EN	e		PMST	Low-lying, seasonally wet or swampy areas of plains communities, often in slightly saline conditions.	**Low**	Swampy habitats within project area. However, no records nearby.
Leiocarpa gatesii	Wrinkled Buttons	VU	cr	2021	PMST	Typically within dry open forest on hillsides in association with Messmate Eucalyptus obliqua.	**Recorded**	Recorded, occasionally in abundance, within EVC 45 Shrubby Dry Forest along GTR1 between Fairhaven and Cumberland River.
Lepidium hyssopifolium s.s.	Basalt Peppercress	EN	e		PMST	Basalt plains grassland and woodland communities.	**Negligible**	No records within the local catchment, no suitable habitat.
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	cr		PMST	Primarily grasslands featuring a moderate diversity of other native species and inter-tussock spaces, although also recorded in grassland dominated by introduced perennial grasses.	**Negligible**	No records within the local catchment, no suitable habitat.
Prasophyllum correctum	Gaping Leek-orchid	EN	cr	1995		Well-drained sandy soils in Central Gippsland Plains Grassland, Forest Red Gum Grassy Woodland, and She-oak Grassy Woodland communities.	**Low**	Suitable habitat in Health Woodland around Fairhaven, however the

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
								record is very old.
Prasophyllum frenchii	Maroon Leek-orchid	EN	e	1934		Grassland and grassy woodland environments on sandy or black clay loam soils that are generally damp but well drained.	**Low**	Suitable habitat in shrubby dry forest near Fairhaven. However, the record is very old.
Prasophyllum spicatum	Dense Leek-orchid	VU	cr	2001	PMST	Heath and heathy woodlands.	**Low**	Suitable coastal heath habitat however, closest record is > 10 km from assessment area and over 20 years old.
Pterostylis chlorogramma	Green-striped Greenhood	VU	e	2010	PMST	Heathy woodland; more specific habitat requirements are poorly known.	**Medium**	Suitable heath/shrubby vegetation communities around Fairhaven, recent records from that area. Concept trail is aligned nearby.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Pterostylis cucullata	Leafy Greenhood	VU			PMST	Sand dune scrubs in coastal areas, and inland on slopes and river flats in moist foothill and montane forests.	**Low**	Suitable Teatree / Coastal Moonah scrub within trail alignment. However, records are >30 km away, towards Apollo Bay.
Senecio macrocarpus	Large-headed Fireweed	VU	cr		PMST	Grassland, shrubland and woodland habitats on heavy soils subject to waterlogging and/or drought conditions in summer.	**Negligible**	No suitable habitat, no recent records within catchment.
Senecio psilocarpus	Swamp Fireweed	VU			PMST	Seasonally inundated herb-rich swamps, growing on peaty soils or volcanic clays.	**Negligible**	No suitable habitat, no records within catchment.
Thelymitra matthewsii	Spiral Sun-orchid	VU	e	2016	PMST	Typically on well-drained soils on slightly elevated sites, but also on coastal sandy flats. Often in open situations following disturbance.	**Medium**	Recent records north of Fairhaven, suitable habitat within Heathy Woodland EVC around locality.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Xerochrysum palustre	Swamp Everlasting	VU	cr		PMST	Sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils.	**Low**	Limited suitable habitat within impact area, however no recent records within project area.
State significance								
Acacia howittii	Sticky Wattle		v	2013		Moist forest. Natural occurrences are confined to South Gippsland and Central Highlands.	**N/A**	Outside of natural range, local plants are likely to be derived from planted specimens.
Acacia nanodealbata	Dwarf Silver-wattle		v	2013		A range of vegetation communities including wet forests, dry forests, heathy woodlands and grassy woodlands.	**High**	Recent records around Lorne and Kennett River.
Acacia verticillata subsp. *ruscifolia*	Broad-leaf Prickly Moses		e	2020		Mostly recorded in the Wilsons Promontory area with isolated records around Apollo Bay. Specific habitat requirements are poorly known.	**Low**	Suitable habitat in project area, however closest records are > 30 km away from round Apollo Bay.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Asplenium appendiculatum subsp. *appendiculatum*	Ground Spleenwort		cr	1988		Largely co-extensive in Victoria with Asplenium aethiopicum, i.e. sandstone in the Victoria Range and basalt in southwest Victoria. A. appendiculatum also grows on granite on Mt Mueller (near Mt Baw Baw) and on Wilsons Promontory.	**Low**	Old nearby records, and none within coastal habitat types.
Asterophora mirabilis	Grey Jockey		e	2013		A small parasitic fungus, that inhabits the cooler gullies of cool temperate rainforest.	**Low**	Recent records in the local area, however mostly recorded in the higher slopes of the Otway Range.
Billardiera scandens s.s.	Velvet Apple-berry		e	1983		Common in heathland, woodland and forests from near sea level to the subalps.	**Low**	No recent records within catchment.
Bossiaea cordigera	Wiry Bossiaea		e	2011		Moist habitats in heathland, heathy woodland and open-forest.	**Medium**	Recent records nearby, suitable habitat adjoining trail alignment.
Burnettia cuneata	Lizard Orchid		e	1983		Usually on acidic, low-nutrient soils which are frequently waterlogged and dominated by Scented Paperbark Melaleuca squarrosa.	**Negligible**	No recent records within the Otway Range.
Caladenia flavovirens	Christmas Spider-orchid		cr	1980		Heathy woodland and moist foothill forest.	**Negligible**	Old records within project area, possibly extinct around Lorne.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Caladenia maritima	Angahook Pink-fingers		cr	2020		Coastal woodland dominated by Messmate Eucalyptus obliqua, with a heathy understorey.	**Medium**	Suitable heathy habitat around Fairhaven
Caladenia oenochila	Wine-lipped Spider-orchid		cr	1997		Foothill forest and heathy woodland in low hills.	**Low**	Species is now considered restricted to foothills around Melbourne
Caladenia valida	Robust Spider-orchid		cr	2011		Coastal or near coastal heaths and heathy woodland.	**Medium**	Suitable heathy habitat around Fairhaven, recent nearby records.
Caladenia venusta	Large White Spider-orchid		e	2018		Heath and heathy woodlands primarily in coastal areas, extending inland in Western Victoria.	**Medium**	Suitable heathy habitat around Fairhaven, recent nearby records.
Caladenia vulgaris	Slender Pink-fingers		v	2011		Scattered across southern Victoria where sometimes locally common in heathland and coastal scrub on moisture-retentive sandy soils.	**High**	Suitable heathy habitat around Fairhaven and along concept alignment, recent records.
Callitriche brachycarpa	Short Water-starwort		e	1903		Sites subject to inundation.	**Low**	No recent records nearby.
Calochilus imberbis	Naked Beard-orchid		cr	2002		Mainly found in heath, heathy woodlands and lowland forests.	**Medium**	Recent records around Lorne. Suitable Heathy habitat within project area.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Calyptrochaeta brownii	Brown's Mitre-moss		e	2002		An uncommon moss that can occupy soil, rocks, tree ferns and tree trunks. Prefers wet sclerophyll forest and cool-temperate rainforest.	**Low**	Recent records within project area however, no suitable rainforest habitat in project area.
Calystegia soldanella	Sea Bindweed		e	2008		Coastal sand dunes.	**Low**	One, recent record near Apollo Bay
Chaetospora turbinata	Top Bog-sedge		v	2011		Of localised occurrence in its 4 disjunct localities in Victoria (Grampians, Anglesea, Cape Liptrap and Howe Range east of Mallacoota), occurring on moist, usually coarse, sandy soils, in open woodland and heath.	**Medium**	Recent records from Anglesea. Suitable habitat within the heathy EVCs around Fairhaven.
Chlorovibrissea bicolor	Two-tone Vibrissea		e	2014		Small fungus that grows on logs, in running water. Prefers wet forests.	**Low**	Recent record west of Lorne, but limited suitable habitat within assessment area.
Convolvulus crispifolius	Silver Bindweed		v	2006		In Victoria, apparently confined to the far north-west where found on sand-dunes, often only appearing after fire. A more easterly record from near Shepparton needs checking.	**Low**	One record nearby, habitat most suitable is the heathy EVCs around Fairhaven.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Corybas fordhamii	Swamp Pelican-orchid		e	1991		Scattered distribution across Victoria, usually found in swampy Melaleuca squarrosa heathland and swamps.	**Low**	Suitable habitat present, however, records within project area are old.
Corymbia maculata	Spotted Gum		v	2002		In Victoria, naturally confined to a small population near Mt Tara in the east of the state.	**N/A**	Outside of natural range, local plants are likely to be derived from planted specimens.
Cyathea cunninghamii	Slender Tree-fern		cr	2015		Deep loamy humus soils on the banks of sheltered gullies in wet, hilly regions.	**Low**	Limited suitable habitat, not associated with coastal habitats.
Dipodium pardalinum	Spotted Hyacinth-orchid		e	2017		Scattered in higher rainfall parts of western Victoria.	**Low**	Suitable habitat around Fairhaven. Old records within project area, primarily around Anglesea.
Echinodium hispidum	Madeira Moss		v	2005		Found in the Antarctica/subantarctic or Southern Ocean. On mainland Australia, it occurs on soil, wet rocks and wood.	**Medium**	Recent records in project area, suitable gully habitat throughout project area.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Eucalyptus brookeriana	Brooker's Gum		e	2015		Moist forest communities in valleys and on hills and ridges, often in association with E. obliqua.	**Recorded**	Recent records around Lorne, suitable habitat within project area.
Eucalyptus diversifolia subsp. *megacarpa*	Coast Gum		v	1999		Restricted to the Cape Nelson area in Victoria.	**Low**	Suitable habitat along concept route, however old record north of Fairhaven.
Eucalyptus falciformis	Western Peppermint		v	2007		Sandy soils in forest, woodland or heath communities on hillslopes and plains.	**High**	Recent records within project area, Fairhaven to Lorne. Suitable coastal heathy habitat present.
Eucalyptus globulus subsp. *globulus*	Southern Blue-gum		e	2018		Damp forest communities. Restricted to South Gippsland and the Otway Ranges.	**Recorded**	Recorded along GTR1 between Eastern View and Kennett River.
Eucalyptus litoralis	Otway Grey-gum		e	2019		Apparently restricted to coastal areas from Anglesea to Aireys Inlet, growing on shallow, sandy soils on low ridges and slopes.	**Low**	Suitable habitat around Fairhaven. However population is largely restricted to outside project area.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Eucalyptus yarraensis	Yarra Gum		cr	1997		Valley flats and along stream on soils subject to periodic inundation or waterlogging.	**Low**	Not associated with coastal habitats, limited suitable habitat along concept alignment. Old records within area.
Euryomyrtus ramosissima subsp. *prostrata*	Nodding Baeckea		e	2011		Confined to heath and heathy woodlands in coastal environments, with disjunct occurrences in the Grampians.	**Medium**	Suitable coastal heathy habitat, recent records north of Fairhaven.
Fissidens dealbatus	Nerveless Pocket-moss		e	1952		A genus of moss that usually occur in wet fern gullies.	**Low**	Very old record in project area, limited suitable habitat within impact area.
Gratiola pumilo	Dwarf Brooklime		e	2003		Seasonally inundated depressions, typically river flats and lake margins, on alluvial soils.	**Low**	Suitable habitat present along watercourses, few records from local area. However, record in local area is > 20 years old.
Hymenodontopsis bifaria	Umbrella Thyme-moss		cr	1975		Found in the Antarctica/subantarctic or Southern Ocean. In Victoria, the genus grows in tufts or mats on soil, rocks, dead logs, tree bases and fern trunks.	**Low**	Very old record in the project area, limited suitable habitat within impact area.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Lachnagrostis rudis subsp. *rudis*	Rough Blown-grass		e	1974		Uncommon, occurs in moist, shaded forests and swamp margins near the coast.	**Low**	Suitable habitat within project area, however the record is very old.
Lastreopsis hispida	Bristly Shield-fern		e	2007		Shaded, wet mountain gullies occurring on deep loamy and organic soils or rotting logs.	**Low**	Few records in local area, mainly around Lorne. Limited suitable habitat in project area.
Lawrencia spicata	Salt Lawrencia		e	2013		Fringe habitats of coastal saltmarsh communities.	**Medium**	Recent record around Fairhaven, limited suitable coastal saltmarsh habitat in project area.
Lepidosperma canescens	Hoary Rapier-sedge		e	2013		Sandy heaths and woodland.	**Medium**	Suitable heathy habitat around Fairhaven. However, majority of records are > 20 years.
Leptospermum turbinatum	Shiny Tea-tree		e	1995		Rocky terrain, particularly sandstone and granitic outcrops, over sandy or gravelly soils.	**Low**	Outside of natural range. Very few records from the local area, > 20 years.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Lobelia beaugleholei	Showy Lobelia		v	1974		Black loamy soils (rarely red clays) on waterlogged sites near swamps and other wetlands.	**Low**	Not associated with coastal habitats, limited suitable habitat within project area. Old records within project area.
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle		e	2020		Near coastal heath/scrub, rocky coast and foothill outcrops.	**N/A**	Outside of natural range for this species. Specimens likely to be planted or progeny form cultivated stock.
Monotoca glauca	Currant-wood		e	2018		High rainfall areas on infertile sandy soils in open-forest, heathy woodland, wet closed scrub and on the margins of cool-temperate rainforest.	**Low**	Suitable habitat within project area, however all records are > 10 km from project area.
Nematolepis squamea subsp. *squamea*	Satinwood		v	2017		Primarily in wet tall forest and damp gullies of the Otways, but with isolated occurrences in drier forests elsewhere in the State.	**Medium**	Recent records in local area, suitable habitat in gullies within project area, particularly between Lorne and Apollo Bay.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Notogrammitis angustifolia subsp. *nothofageti*	Beech Finger-fern		e	1987		Wet forests in sheltered mountain gullies. Grows on rocks, logs or trunks of trees and shrubs (but rarely on tree ferns).	**Low**	Old records within local area around Apollo Bay. Limited suitable habitat.
Olearia pannosa subsp. *cardiophylla*	Velvet Daisy-bush		e	1906		Coastal woodland and inland in dry open-forest on shallow rocky soil.	**Low**	Old records around Anglesea. Suitable habitat around Fairhaven.
Pellaea nana	Dwarf Sickle-fern		e	1980		Occurs in moist forest, often among rocks or on rock faces.	**Low**	Limited suitable habitat, not associated with coastal habitats. Old records around the Apollo Bay area.
Phlegmariurus varius	Long Clubmoss		cr	1987		Tall erect, branching moss to 30 cm high. Victorian specimens primarily growing out of rocky crevices.	**Low**	Very old records within project area, west of Apollo Bay. Limited suitable habitat within impact area.
Pimelea hewardiana	Forked Rice-flower		e	1906		Rocky ground in gullies and mallee shrubland; only recorded in the western half of the State.	**Low**	Very old record from Anglesea area. Limited suitable habitat along concept alignment.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Poa billardierei	Coast Fescue		e	2009		Coastal dune systems, across the state.	**Medium**	Recent records in the local area, suitable sandy habitat within coastal dune systems.
Poa poiformis var. *ramifer*	Dune Poa		e	2010		Scattered areas along the coast.	**Medium**	Few records in local area, however suitable sandy habitat present within coastal dune systems.
Prasophyllum barnettii	Elegant Leek-orchid		e	2001		Apparently endemic to Victoria where confined to the Otway Ranges and adjacent coastal areas between Anglesea and Princetown. Grows in dense shrubby or heathy forest on well-drained sandy soils.	**Medium**	Recent records from Anglesea area. Suitable habitat around Fairhaven.
Prasophyllum lindleyanum	Green Leek-orchid		e	1995		Fertile soils in woodland or scrubby heath.	**Low**	Old records > 20 years around Anglesea and Apollo Bay. Suitable heathy habitat present around Fairhaven.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Pteris epaleata	Netted Brake		e	1770		Deep, loamy soils in damp, shaded mountain gullies.	**Low**	Very old records around Apollo Bay. Limited suitable habitat (Beech forests) along concept trail alignment.
Pterostylis sp. aff. *plumosa (Anglesea)*	Large Plume-orchid		cr	2011		Endemic to Victoria where apparently confined to heathland and heathy woodland in the Anglesea area, on well-drained sandy soils.	**Medium**	Suitable heathy habitat around Fairhaven. Recent records in the Anglesea area.
Pultenaea canaliculata	Coast Bush-pea		e	1909		Coastal dunes and limestone cliffs.	**Negligible**	Suitable habitat long the coastal dune systems, however old records from the Otway region.
Pultenaea dargilensis	Dargile Bush-pea		cr	1989		Box-ironbark forest in the Heathcote-Graytown National Park.	**Negligible**	No suitable habitat, old record > 20 years from the Anglesea area.
Pultenaea prolifera	Otway Bush-pea		e	1979		Restricted to eastern Victoria in dry or moist forests.	**Low**	Suitable heathy habitat in the project area, however the record is > 20 years, south of Fairhaven.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Pultenaea reflexifolia	Wombat Bush-pea		v	1770		Restricted to a few small areas of dry forest west of Melbourne in Gisborne, Barkstead and Lerderderg areas with an isolated, very old record from Apollo Bay.	**Negligible**	Very old isolated record from Apollo Bay. Limited suitable habitat.
Roepera billardierei	Coast Twin-leaf		e	2018		Dunes and limestone cliffs in scrubby vegetation.	**Low**	Very few records in the project area. Recent record from Anglesea. Suitable coastal dune habitat in project area.
Schoenus melanostachys	Black Bog-sedge		v	1980		Occurs in damp areas fringing springs and watercourses, often openings in near-coastal or lowland forest, from about Cann River eastwards.	**Low**	Suitable habitat along watercourses present, however the record is old >20 years and the species occurs primarily in far eastern Victoria.
Sticherus tener s.s.	Tasman Fan-fern		e	1960		Deep loamy soils of gullies, riverbanks and shaded, mountain slopes. Also disturbed sites, such as road cuttings and eroded banks in wetter areas.	**Low**	Limited suitable habitat along the concept trail. Very old record from the Apollo Bay area.
Tetraphidopsis pusilla	Arc Moss		e	1956		Moss species preferring cool temperate rainforest gullies.	**Low**	Very old record south of Apollo

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
								Bay. Limited suitable habitat within project area.
Thelymitra benthamiana	Blotched Sun-orchid		e	2020		Found mostly in heathland, heathy woodlands and open forests on well-drained sand and clay loams.	**High**	Recent record, south of Fairhaven. Suitable habitat within the project area.
Thelymitra hiemalis	Winter Sun-orchid		cr	2002		Brown Stringybark Eucalyptus baxteri or Promontory Peppermint E. willisii woodland, typically with a heathy understorey.	**Medium**	Old records, >20 years, north of Fairhaven. Suitable heathy habitat within project area.
Thelymitra pallidiflora	Pallid Sun-orchid		cr	2011		Apparently endemic to south-central Victoria in grassy and heathy woodlands on sandy soils.	**Medium**	Recent records from the Anglesea area. Suitable heathy habitat within the project area.
Thelymitra X merraniae	Merran's Sun-orchid		cr	2002		Heathlands, woodlands and open forests, commonly in depressions or low-lying areas around swamps.	**High**	Records from the Fairhaven area are all > 20 years. Suitable heathy habitat along concept trail.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Thismia rodwayi	Fairy Lanterns		e	2010		Damp humus and leaf-litter in deeply shaded tall forests and fern gullies.	**Low**	Recent, single record inland ranges from Lorne. However, limited suitable habitat within concept trail alignment.
Thomasia petalocalyx	Paper Flower		e	2019		In Victoria scattered in drier forests, heathy woodland and coastal heaths west of Port Phillip Bay, apparently restricted to Wilsons Promontory in the east.	**Recorded**	Recent record around Fairhaven. Recorded in Heathy Woodland near Moggs Creek.
Trachyloma planifolium	Trachyloma		e	2002		Growing on tree trunks, predominantly in cool temperate rainforest and in wet fern gullies.	**Low**	Recent records within project area, however, limited suitable habitat within impact area.
Xanthorrhoea caespitosa	Tufted Grass-tree		v	2011		Sandy and sometimes rocky soils in mallee and heathland communities.	**High**	Recent records from Anglesea. Suitable heathy habitat around Fairhaven.
Xanthosia leiophylla	Parsley Xanthosia		e	1983		Sandy heathland and heathy woodland.	**Medium**	Suitable habitat in the heathy vegetation around Fairhaven. However, the

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
								records are old > 20 years.
Xanthosia tasmanica	Southern Xanthosia		e	2013		Occurring mainly in coastal areas, on sandy soil in heathlands.	**High**	Recent records from around Anglesea. Suitable habitat in the heathlands around Fairhaven.

A1.3 Threatened ecological communities

The following table includes the threatened ecological communities that have potential to occur within the project area. The list of threatened ecological communities has been compiled with reference to characteristics of FFG Act threatened communities (SAC 2013) and predictive output from the PMST (accessed on 2 December 2021).

Table A1.3 Threatened ecological communities predicted to occur within 5 km of the project area.

Community Name	Conservation status	Source	Description
National significance			
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	PMST	Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community is listed as an endangered ecological community under the EPBC Act. The community includes dynamic salt-wedge estuary systems occurring within the temperate climate, microtidal regime (<2 m), high wave energy coastline of western and central Victoria. The ecological community is characterised by the assemblage of native plants, animals and micro-organisms associated with dynamic salt wedge estuaries found under the conditions listed above. There are 25 river estuaries which are currently included in this ecological community, those that may be impacted by the concept trail are: - Painkalac Creek (Fairhaven) - Erskene River (Lorne) - Saint George River (Lorne) - Wye River - Kennet River It is concluded that this community is likely to be present within the project area. However, GTR1 uses existing bridges to cross the river systems and estuaries where the proposed trail intersects this ecological community. Providing construction methodologies implement and follow a project CEMP, this ecological community is not likely to be impacted by the project.
Giant Kelp Marine Forests of South East Australia	Endangered	PMST	Giant kelp forests are found in temperate south-eastern waters on rocky reefs where conditions are cool and relatively nutrient rich. The Victorian ecological community typically grows at depths greater than 8 metres below sea level, and forms a closed (or semi-closed) surface. This structure that extends from the sea floor to the

Community Name	Conservation status	Source	Description
			surface is provided by a single species of kelp: Giant Kelp *Macrocystis pyrifera* that form a 'forest'. The project is unlikely to impact this ecological community.
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	PMST	Natural Damp Grassland of the Victorian Coastal Plains a grassland community that occurs in the South East Coastal Plain IBRA bioregion, generally on heavy grey silty-loamy soils. They are poorly drained, often damp and waterlogged, which are influenced from overflows from local creeks, rainfall or run-off from surrounding landscape, and occasionally ground water. The vegetation is generally dominated by tussock grasses, such as Kangaroo Grass *Themeda triandra* or Common Tussock-grass *Poa labillardierei.* Graminoids and forbs associated with damp sites also occur. Trees, when present, are usually sparse and include Eucalypt species such as Manna Gum *Eucalyptus viminalis* and Swamp Gum *E. ovata*. It is associated with the FFG Act community: 'Plains Grassland (South Gippsland) Community. No grassland communities were recorded within the assessment area, this ecological community is therefore not likely to be impacted by the project.
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	PMST	This community occurs as a narrow margin along the coastline within the South East Coastal Plain IBRA bioregion. These communities are usually under regular or intermittent tidal influence, usually in association with estuaries. The vegetation consists primarily of halophytes (salt-tolerant) plants including grasses, herbs, sedges, rushes, and shrubs. In Victoria, these communities are dominated by two genera: *Tecticornia* and *Sarcocornia*. This community is likely to occur within the project area. It is concluded that this community is likely to be present within the project area. However, GTR1 uses existing bridges to cross the river systems and estuaries where the proposed trail intersects this ecological community. Providing construction methodologies implement and follow a project CEMP, this ecological community is not likely to be impacted by the project.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	PMST	Occurring as a woodland or derived grassland, the tree layer is dominated by White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland where the canopy species still occur. The ground stratum consists of native tussock grasses and herbs, and scattered shrubs. The key canopy species that comprise this community are not modelled to occur in the Otway Ranges and Otway Plain bioregions. This TEC is therefore not likely to occur within the project area.
State significance			

Community Name	Conservation status	Source	Description
Cool Temperate Rainforest Community	Threatened		This vegetation community occurs in the wettest and most fire protected niches such as montane plateaus and gully systems of mountain ranges. In the Otway Ranges it occurs along south facing gullies, from 10 metres in elevation. The dominant floristic species include Myrtle Beech *Nothofagus cunninghamii*, Southern Sassafras *Atherosperma moschatum*, Black Olive-berry *Elaeocarpus holopetalus* and Blackwood *Acacia melanoxylon*. Shrubs and other small trees such as Musk Daisy-bush *Olearia argophylla*, Austral Mulberry *Hedycarya angustifolia* dominate the understorey with tree-ferns, and the ground stratum consisting primarily of ferns. This threatened community was not recorded within the assessment corridor of GTR 1.
Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland Community	Threatened		This community is dominated by Moonah *Melaleuca lanceolata* subsp. *lanceolata*. Other characteristic species that occur in the understorey are: Small-leaved Clematis *Clematis microphylla*, Coast Wirilda *Acacia retinodes* var. *uncifolia,* Coast Swainson-Pea *Swainsona lessertiifolia*, Thyme Rice-flower *Pimelea serpyllifolia* subsp. *serpyllifolia,* Coast Tea-tree *Leptospermum laevigatum*, Coast Beard-heath *Leucopogon parviflorus* and Kidney-weed *Dichondra repens.* Associated EVCs include EVC 1 - Coastal Dune Scrub/Coastal Dune Grassland Mosaic that is modelled to occur within the project area. This community is therefore likely to be present in the project area. However, GTR 1uses exiting trails where this community occurs. Furthermore, it was not recorded within the assessment corridor of GTR 1, this community is not likely to be further impacted by this project.

Appendix 2 Fauna

The following abbreviations and symbols are relevant to this Appendix:

Code	Meaning	Reference
National listings (EPBC Act)		
EX	Extinct	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
CR	Critically endangered	
EN	Endangered	
VU	Vulnerable	
NT	Near threatened	
CD	Conservation dependent	
PMST	Protected Matters Search Tool	
State listings (FFG Act and DELWP Advisory List)[2]		
x	Extinct	Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
cr	Critically endangered	
e	Endangered	
v	Vulnerable	
t	Threatened	
P	Protected (fish only)	

[2] The DELWP Advisory Lists for Threatened Terrestrial and Invertebrate Fauna were revoked in 2021 and are superseded by the current list of threatened species under the FFG Act 1988.

A2.1 Fauna species recorded in the project area

Table A2.1 Incidental vertebrate fauna recorded in the project area

Status	Scientific Name	Common Name
Indigenous species		
	Acanthiza lineata	Striated Thornbill
	Acanthiza pusilla	Brown Thornbill
	Acanthiza reguloides	Buff-rumped Thornbill
	Acanthorhynchus tenuirostris	Eastern Spinebill
e	*Accipiter novaehollandiae*	Grey Goshawk
	Acritoscincus duperreyi	Eastern Three-lined Skink
	Anas superciliosa	Pacific Black Duck
	Anthochaera carunculata	Red Wattlebird
	Anthochaera chrysoptera	Little Wattlebird
	Cacatua galerita	Sulphur-crested Cockatoo
	Cacomantis flabelliformis	Fan-tailed Cuckoo
	Caligavis chrysops	Yellow-faced Honeyeater
EN	*Callocephalon fimbriatum*	Gang-gang Cockatoo
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo
	Chenonetta jubata	Australian Wood Duck
	Chroicocephalus novaehollandiae	Silver Gull
	Colluricincla harmonica	Grey Shrike-thrush
	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Cormobates leucophaea	White-throated Treecreeper
	Corvus tasmanicus	Forest Raven
	Dacelo novaeguineae	Laughing Kookaburra
v	*Dasyornis broadbenti caryochrous*	Rufous Bristlebird (Otway)
	Eolophus roseicapilla	Galah
	Eopsaltria australis	Eastern Yellow Robin
	Eulamprus tympanum tympanum	Southern Water Skink
	Gavicalis virescens	Singing Honeyeater

Status	Scientific Name	Common Name
	Geocrinia victoriana	Victorian Smooth Froglet
	Grallina cyanoleuca	Magpie-lark
	Gymnorhina tibicen	Australian Magpie
e	*Haliaeetus leucogaster*	White-bellied Sea-Eagle
	Macropus giganteus	Eastern Grey Kangaroo
	Malurus cyaneus	Superb Fairy-wren
	Melithreptus brevirostris	Brown-headed Honeyeater
	Microeca fascinans	Jacky Winter
	Neochmia temporalis	Red-browed Finch
	Neophema chrysostoma	Blue-winged Parrot
	Nesoptilotis leucotis	White-eared Honeyeater
	Notamacropus rufogriseus banksianus	Red-necked Wallaby
	Pachycephala olivacea	Olive Whistler
	Pachycephala pectoralis	Golden Whistler
	Pardalotus punctatus	Spotted Pardalote
	Petrochelidon nigricans	Tree Martin
	Phalacrocorax fuscescens	Black-faced Cormorant
	Phascolarctos cinereus	Koala
	Phylidonyris niger	White-cheeked Honeyeater
	Phylidonyris novaehollandiae	New Holland Honeyeater
	Phylidonyris pyrrhopterus	Crescent Honeyeater
	Platycercus elegans	Crimson Rosella
	Podargus strigoides	Tawny Frogmouth
	Pseudechis porphyriacus	Red-bellied Black Snake
	Ptilonorhynchus violaceus	Satin Bowerbird
	Ptilotula fusca	Fuscous Honeyeater
	Rhipidura albiscapa	Grey Fantail
	Rhipidura rufifrons	Rufous Fantail
	Sericornis frontalis	White-browed Scrubwren

Status	Scientific Name	Common Name
	Strepera graculina	Pied Currawong
	Strepera versicolor	Grey Currawong
	Trichosurus vulpecula	Common Brush-tailed Possum
	Vanellus miles	Masked Lapwing
	Wallabia bicolor	Black-tailed Wallaby
	Zoothera lunulata	Bassian Thrush
	Zosterops lateralis	Silvereye

Table A3.1 Vertebrate fauna recorded during nocturnal surveys within the Ground truthed route 1 project area

Status	Scientific Name	Common Name
	Macropus giganteus	Eastern Grey Kangaroo
	Ninox boobook	Southern Boobook
v	*Ninox strenua*	Powerful Owl
VU	*Petaurus australis*	Yellow-bellied Glider
	Petaurus breviceps	Sugar Glider
	Podargus strigoides	Tawny Frogmouth
	Trichosurus vulpecula	Common Brush-tailed Possum

Table A4.1 Bird species recorded during bird surveys within the Ground truthed route 1 Project Area

Status	Scientific Name	Common Name
	Acanthiza pusilla	Brown Thornbill
	Acanthorhynchus tenuirostris	Eastern Spinebill
	Anthochaera carunculata	Red Wattlebird
	Anthochaera chrysoptera	Little Wattlebird
	Cacomantis flabelliformis	Fan-tailed Cuckoo
	Caligavis chrysops	Yellow-faced Honeyeater
EN	*Callocephalon fimbriatum*	Gang-gang Cockatoo
	Chroicocephalus novaehollandiae	Silver Gull
	Colluricincla harmonica	Grey Shrike-thrush

Status	Scientific Name	Common Name
	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Cormobates leucophaea	White-throated Treecreeper
	Corvus tasmanicus	Forest Raven
en	*Dasyornis broadbenti caryochrous*	Rufous Bristlebird (Otway)
	Eolophus roseicapilla	Galah
	Eopsaltria australis	Eastern Yellow Robin
	Gymnorhina tibicen	Australian Magpie
vu	*Haliaeetus leucogaster*	White-bellied Sea-Eagle
	Malurus cyaneus	Superb Fairy-wren
	Melithreptus brevirostris	Brown-headed Honeyeater
	Microeca fascinans	Jacky Winter
	Nesoptilotis leucotis	White-eared Honeyeater
	Pachycephala pectoralis	Golden Whistler
	Pardalotus punctatus	Spotted Pardalote
	Phalacrocorax fuscescens	Black-faced Cormorant
	Phylidonyris novaehollandiae	New Holland Honeyeater
	Phylidonyris pyrrhopterus	Crescent Honeyeater
	Platycercus elegans	Crimson Rosella
	Rhipidura albiscapa	Grey Fantail
	Sericornis frontalis	White-browed Scrubwren
	Strepera versicolor	Grey Currawong
	Zoothera lunulata	Bassian Thrush

Table A5.1 Fauna recorded on remote cameras deployed within the Ground truthed route 1 project area.

Status	Scientific name	Common name
Native species		
	Antechinus agilis	Agile Antechinus
	Zoothera lunulata	Bassian Thrush
	Trichosurus vulpecula	Common Brushtail Possum
	Rattus fuscipes	Bush Rat
	Macropus giganteus	Eastern Grey Kangaroo
	Strepera versicolor	Grey Currawong
	Phascolarctos cinereus	Koala
VU, v	*Potorous tridactylus trisulcatus*	Long-nosed Potoroo
	Turnix varius	Painted Button-quail
	Macropus rufogriseus	Red-necked Wallaby
	Pachycephala rufiventris	Rufous Whistler
	Tachyglossus aculeatus	Short-beaked Echidna
	Wallabia bicolor	Swamp Wallaby
	Malurus cyaneus	Superb Fairy-wren
	Sericornis frontalis	White-browed Scrubwren
Introduced species		
	Felis catus	Cat
	Vulpes vulpes	Red Fox

A2.2 Listed fauna species

The following table includes a list of threatened fauna species that have potential to occur within the project area. The list of threatened species is sourced from the VBA and PMST (accessed on 24 May 2022). Where years are specified for the most recent database records, these refer to records from the VBA unless otherwise specified. Where no year is specified, the PMST has predicted that the species has potential to occur.

Table A2.3 Threatened fauna species recorded or predicted to occur within 10 km of the project area

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
National significance								
Rostratula australis	Australian Painted-snipe	EN	cr		PMST	Shallows of well-vegetated freshwater wetlands.	**Low**	Limited suitable habitat present within assessment corridor.
Botaurus poiciloptilus	Australasian Bittern	EN	cr	2007	PMST	Shallow freshwater and brackish wetlands with abundant emergent aquatic vegetation.	**Low**	Limited suitable habitat present within assessment corridor.
Falco hypoleucos	Grey Falcon	VU	v		PMST	Lightly timbered plains and Acacia scrub.	**Negligible**	Predominantly recorded in arid and semi-arid zones.
Callocephalon fimbriatum	Gang-gang Cockatoo	EN		2020	PMST	S Vic to E NSW. Forests and woodlands from coast to alpine areas. Autumn-winter dispersal from highlands to lower elevations. Forages in eucalypts, acacias and some exotic garden trees and shrubs.	**Recorded**	Heard within Shrubby Foothill Forest nearby assessment corridor during present assessment.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Neophema chrysogaster	Orange-bellied Parrot	CR	cr		PMST	Coastal vegetation including saltmarshes, dunes, pastures, shrublands, sewage plants, saltworks, islands, and beaches.	**Negligible**	No suitable habitat present within assessment corridor.
Lathamus discolor	Swift Parrot	CR	cr	2017	PMST	A range of forests and woodlands, especially those supporting nectar-producing tree species. Also well-treed urban areas.	**Low**	Individuals or flocks may forage on flowering eucalypts within the assessment corridor on occasion. However, the assessment corridor is not within the species core overwintering range.
Hirundapus caudacutus	White-throated Needletail	VU	v	2019	PMST	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas.	**High**	Numerous and recent observations recorded within Ground Truthed Alignment 1 project area. Individuals or flocks likely to fly over assessment on regular occasion.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Thalassarche bulleri platei	Northern Buller's Albatross	VU			PMST	Buller's Albatross breeds in New Zealand and is a seasonal visitor to Victorian coastal waters where it occurs in pelagic and inshore waters.	**Negligible**	No suitable habitat present within assessment corridor.
Pachyptila turtur subantarctica	Fairy Prion (southern)	VU			PMST	Open ocean over continental shelves and slopes, and rarely coming close to shore except at breeding islands and during rough weather.	**Negligible**	No suitable habitat present within assessment corridor.
Pterodroma leucoptera leucoptera	Gould's Petrel	EN			PMST	The Gould's Petrel is a marine pelagic spending the majority of its time at sea. It has breeding colonies on Cabbage Tree Island and Boondelbah Island.	**Negligible**	No suitable habitat present within assessment corridor.
Pterodroma mollis	Soft-plumaged Petrel	VU			PMST	A marine, oceanic species that breeds on islands including islands off Tasmania. Burrows among tussock grass and ferns on slopes and valleys.	**Negligible**	No suitable habitat present within assessment corridor.
Halobaena caerulea	Blue Petrel	VU			PMST	A marine species, usually pelagic but sometimes observed over shallow waters. A regular visitor to southern Australian waters.	**Negligible**	No suitable habitat present within assessment corridor.
Diomedea exulans	Wandering Albatross	VU	cr	1989	PMST	Occurs from Antarctic to subtropical areas in the southern hemisphere. In Australia, observed over continental shelves often in areas of continental upwellings. Regularly recorded feeding in	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
						sheltered harbours, often gathering at sewerage outfalls.		
Thalassarche melanophris	Black-browed Albatross	VU		2019	PMST	Breeds in antarctic and sub-antarctic islands, but commonly occurs in pelagic waters off the coast of Victoria.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche carteri	Indian Yellow-nosed Albatross	VU	e	2016	PMST	Sub-Antarctic to subtropical waters off southern Australia, mostly in winter. Often close inshore. Breeds on Indian Ocean sub-Antarctic islands.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche chrysostoma	Grey-headed Albatross	EN	e	1987	PMST	Occurs in warmer areas over winter, its breeding grounds are found in the Antarctic and subantarctic islands. Generally, forages over the open oceans. There have been a small number of records over inshore and offshore areas along the Victorian coast.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche cauta	Shy Albatross	EN	e	2019	PMST	Sub-Antarctic to temperate waters off southern Australia, in all months. Often close inshore. Breeds on Albatross Is. (Bass Strait); the Mewstone & Pedra Branca Is. (S. Tas.).	**Negligible**	No suitable habitat present within assessment corridor.
Phoebetria fusca	Sooty Albatross	VU	cr		PMST	Subantarctic and subtropical marine waters.	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Macronectes giganteus	Southern Giant-Petrel	EN	e	2019	PMST	Adults of this species are present all year round at Antarctic breeding colonies, from where immature birds disperse, some as far north as subtropical areas.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche bulleri	Buller's Albatross	VU	e		PMST	Pelagic sub-antarctic to subtropical waters off SE Australia, mostly Mar - June. Infrequent in Bass Strait. Breeds on NZ islands.	**Negligible**	No suitable habitat present within assessment corridor.
Macronectes halli	Northern Giant-Petrel	VU	e		PMST	Breeds in coastal habitats on subantarctic islands. Dispersal movements of juveniles are poorly known but have been observed along temperate coastal areas of Australia. Often seen around sewer outfalls or seal and penguin colonies.	**Negligible**	No suitable habitat present within assessment corridor.
Diomedea epomophora	Southern Royal Albatross	VU	cr		PMST	Pelagic sub-antarctic to temperate waters off SE Australia, may occur in all months but mostly Jul - Oct. Breeds on NZ islands.	**Negligible**	No suitable habitat present within assessment corridor.
Diomedea sanfordi	Northern Royal Albatross	EN			PMST	Pelagic sub-antarctic to temperate waters off SE Australia, may occur in all months but mostly May - Sept. Breeds Chatham Is. and single mainland site in NZ.	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Diomedea antipodensis	New Zealand Wandering Albatross	VU			PMST	A marine, pelagic species that ranges widely throughout the Pacific region of the Southern Ocean. It visits off-shore waters of southern Australia.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche salvini	Salvin's Albatross	VU			PMST	Infrequent occurrence in pelagic sub-antarctic to temperate waters off southern Australia. Breeds on Indian Ocean and NZ islands.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche steadi	White-capped Albatross	VU			PMST	Infrequent occurrence in pelagic sub-antarctic to temperate waters off southern Australia. May be more common off southern NSW. Breeds on Auckland Is group, NZ.	**Negligible**	No suitable habitat present within assessment corridor.
Thalassarche impavida	Campbell Albatross	VU			PMST	Antarctic to subtropical waters from pelagic to shelf-break water including off-shore waters of southern and eastern Australia, mostly in winter. Breeds on Campbell Is. (NZ).	**Negligible**	No suitable habitat present within assessment corridor.
Sternula nereis nereis	Australian Fairy Tern	VU		2018	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 present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Limosa lapponica baueri	Bar-tailed Godwit (baueri)	VU		1977	PMST	Bar-tailed Godwits inhabit estuarine mudflats, beaches and mangroves. They are common in coastal areas around Australia. They are social birds and are often seen in large flocks and in the company of other waders.	**Negligible**	No suitable habitat present within assessment corridor.
Thinornis cucullatus	Hooded Plover	VU	v	2020	PMST	Year-round resident. Sandy ocean beaches, margins of estuaries and coastal lakes.	**Negligible**	No suitable habitat present within assessment corridor.
Charadrius leschenaultii	Greater Sand Plover	VU	v		PMST	Intertidal mudflats and sandbanks of sheltered bays and estuaries.	**Negligible**	No suitable habitat present within assessment corridor.
Numenius madagascariensis	Eastern Curlew	CR	cr		PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	**Negligible**	No suitable habitat present within assessment corridor.
Calidris ferruginea	Curlew Sandpiper	CR	cr	1978	PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	**Negligible**	No suitable habitat present within assessment corridor.
Calidris canutus	Red Knot	EN	e	2016	PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Grantiella picta	Painted Honeyeater	VU	v		PMST	Dry open woodlands and forests. Typically forages for fruit and nectar in mistletoes and in tree canopies.	**Low**	Predominantly recorded on inland slopes of the Great Dividing Range. May occasionally and seasonally use coastal forests.
Anthochaera phrygia	Regent Honeyeater	CR	cr	1893	PMST	A range of dry woodlands and forests dominated by nectar-producing tree species.	**Negligible**	Outside species current recognised range.
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll	EN	e	2000	PMST	Rainforest and wet and dry sclerophyll forests and woodlands.	**Low**	Most recent records within last 20 years have been recorded outside project area (nearby Conservation Ecology Centre; scat detected in 2012 by Parks Victoria).

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Antechinus minimus maritimus	Swamp Antechinus	VU	v	2015	PMST	Dense wet heath and heathy woodland, sedgeland and dense tussock grassland.	**Medium**	May be present within Riparian Forest (at lower elevations), Coastal Dune Scrub, Sand Heathland or Heathy Woodland intercepted by the assessment corridor.
Perameles gunnii	Eastern Barred Bandicoot	EN	e	1933		Natural temperate grasslands and grassy woodlands.	**Negligible**	Outside species current recognised range.
Petaurus australis	Yellow-bellied Glider	VU			PMST	Forest and woodland habitats at a range of altitudes.	**Recorded**	Recorded multiple times during nocturnal surveys within tall forest with dense shrubby understorey habitat.
Potorous tridactylus trisulcatus	Long-nosed Potoroo	VU	v	2016	PMST	Forest, heathy woodlands and heathlands.	**Recorded**	Recorded at camera trap site 58. Likely to be present throughout the project area.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Mastacomys fuscus mordicus	Broad-toothed Rat	VU	v	2018	PMST	Sub-alpine Woodland, Heathland, Sedgeland, and sedge-dominated areas within forest.	**Medium**	May be present within sedge or grass dominated drainage lines within wetter forest types intercepting the assessment corridor.
Pseudomys novaehollandiae	New Holland Mouse	VU	e	1981	PMST	Coastal heathland, heathy woodland and dry sclerophyll forest.	**Low**	Species has not been detected at known sites within the eastern side of the Great Otway NP since 2003 by Deakin University.
Pseudomys fumeus	Smoky Mouse	EN	e	1933	PMST	Coastal heath and heathy woodland, wet forest, sub-alpine heath and dry sclerophyll forest.	**Negligible**	Outside species current recognised range.
Mirounga leonina	Southern Elephant Seal	VU		2015		Occurs in antarctic and subantarctic areas. Victorian records likely to be of vagrants, which have been found on rare occasions along the entire Victorian coast, including Port Phillip and Hobsons Bay.	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Eubalaena australis	Southern Right Whale	EN	e	2019	PMST	Migrates between summer feeding grounds in the Southern Ocean to warmer northern waters over winter, where it can be found along the Victorian coastline. The coast 8 km east of Warrnambool is a locally important calving and nursing site until late October or early November.	**Negligible**	No suitable habitat present within assessment corridor.
Balaenoptera musculus	Blue Whale	EN	e	1992	PMST	Found throughout the Southern Ocean, though migration paths appear to be diffuse and widespread. Often enters coastal waters, including Victoria (particularly the smaller subspecies Balaenoptera physalus).	**Negligible**	No suitable habitat present within assessment corridor.
Balaenoptera physalus	Fin Whale	VU			PMST	Occurs worldwide with populations in the southern hemisphere undergoing extensive north-south migrations. Only one record in Victoria.	**Negligible**	No suitable habitat present within assessment corridor.
Megaptera novaeangliae australis	Southern Humpback Whale	VU	cr	2019	PMST	Migrate between summer feeding grounds in the Southern Ocean to Northern waters where birthing and mating occurs. Increasingly recorded along the Victorian coast, occasionally entering Port Phillip and Western Port.	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Balaenoptera borealis schlegelii	Southern Sei Whale	VU			PMST	An oceanic species recorded in Australian waters.	**Negligible**	No suitable habitat present within assessment corridor.
Arctophoca tropicalis	Subantarctic Fur Seal	EN		2018		Near coastal and offshore waters.	**Negligible**	No suitable habitat present within assessment corridor.
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	e	2019	PMST	Heathland, shrubland, sedgeland, heathy open forest and woodland; also exotic vegetation, such as blackberry thickets and rank grasses where native vegetation has been removed.	**Medium**	May occur within Coastal Dune Scrub, Sand Heathland or Heathy Woodland intercepted by the assessment corridor.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	v	2014	PMST	Rainforest, wet and dry sclerophyll forest, woodland and urban areas.	**Medium**	May forage of flowering Eucalypts within project area on occasion.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Miniopterus orianae bassanii	Southern Bent-winged Bat (southern ssp.)	CR	cr		PMST	Woodlands, grasslands, pasture especially near wetlands. Roosts in caves, crevices in cliff faces and in mines.	**High**	May forage over western sections of the assessment corridor on regular occasion. However, maternity and/or roosting caves are not present within the assessment corridor.
Chelonia mydas	Green Turtle	VU			PMST	Marine species with a pan-tropical distribution throughout the world. More abundant along the tropical coasts of Australia and the Great Barrier Reef. Green Turtles spend their first five to ten years drifting on ocean currents.	**Negligible**	No suitable habitat present within assessment corridor.
Lepidochelys olivacea	Pacific (Olive) Ridley	EN		1999		Marine species predominantly observed in tropical and sub-tropical regions of the Pacific and Indian Oceans.	**Negligible**	No suitable habitat present within assessment corridor.
Dermochelys coriacea	Leathery Turtle	EN	cr	2011	PMST	Marine species usually sighted along the eastern seaboard often in bays, estuaries and rivers. No major nesting events have been recorded in Australia.	**Negligible**	No suitable habitat present within assessment corridor.
Delma impar	Striped Legless Lizard	VU	e		PMST	Natural temperate grassland, grassy woodland and exotic grassland.	**Negligible**	Outside current distributional range.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Caretta caretta	Loggerhead Turtle	EN			PMST	Loggerhead Turtles forage widely in the waters of coral and rocky reefs, seagrass beds and muddy bays throughout eastern, northern and western Australia. Nesting occurs in coastal environments of northern WA, NT and QLD.	**Negligible**	No suitable habitat present within assessment corridor.
Litoria raniformis	Growling Grass Frog	VU	v	1788	PMST	Still or slow-flowing waterbodies and surrounding terrestrial vegetation.	**Low**	No recent observations recorded within Ground Truthed Alignment 1 project area. Not known from the Otway Region.
Thunnus maccoyii	Southern Bluefin Tuna	CD	cd		PMST	The species is highly migratory, occurring globally in waters between 30-50 degrees Celsius.	**Negligible**	No suitable habitat present within assessment corridor.
Carcharodon carcharias	Great White Shark	VU	e		PMST	Near coastal and offshore waters.	**Negligible**	No suitable habitat present within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Prototroctes maraena	Australian Grayling	VU	e	1999	PMST	Adults inhabit cool, clear, freshwater streams.	**Medium**	Diadromous species recorded within the estuaries of a number of rivers and creeks intercepted by the assessment corridor.
Galaxiella pusilla	Dwarf Galaxias	VU	e		PMST	Slow-flowing or still freshwater wetlands such as swamps, drains and backwaters of streams.	**Negligible**	Outside current recognised range.
Macquaria australasica	Macquarie Perch	EN	e	1981		Streams with clear water and deep, rocky holes with abundant cover.	**Negligible**	Occurs naturally north of the Great Dividing Range in tributaries of the Murray-Darling system.
Nannoperca obscura	Yarra Pygmy Perch	VU	v		PMST	Lakes, pools and slow-flowing streams with abundant aquatic vegetation.	**Negligible**	Outside current recognised range.
Seriolella brama	Blue Warehou	CD	cd		PMST	The species occurs predominantly in coastal shelf, upper continental slope and seamount waters offshore from New South Wales, Tasmania, Victoria and South Australia. The species occurs at depths between 3 and 550 m.	**Negligible**	No suitable habitat present within assessment corridor.
Galeorhinus galeus	School Shark	CD			PMST	School Shark is most abundant in cold to temperate continental	**Negligible**	No suitable habitat present within

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
						seas, from the surf line and very shallow water to well offshore. Females and juveniles utilise inshore coastal areas around Victoria, Tasmania and parts of South Australia for nursery areas.		assessment corridor.
Synemon plana	Golden Sun Moth	VU	v		PMST	Natural temperate grassland, grassy woodland and pasture supporting spear grasses and wallaby grasses and exotic grassland dominated by Chilean needle grass.	**Negligible**	Outside current recognised range.
State significance								
Turnix pyrrhothorax	Red-chested Button-quail		e	1957		Grassland, grassy woodland and crops.	**Negligible**	No known recent records, with project area outside of present known range.
Geopelia cuneata	Diamond Dove		v	1985		Drier woodlands and scrub, spinifex and mulga.	**Negligible**	Predominantly observed in arid and semi-arid environments.
Lewinia pectoralis	Lewin's Rail		v	2019		Swamps, dense riparian vegetation and saltmarsh.	**Low**	May occur Limited suitable habitat present within the assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Burhinus grallarius	Bush Stone-curlew		cr	1893		Open woodland, treed farmland.	**Negligible**	Predominantly recorded within the Northern Plains, in area bounded by Wodonga, Seymour and Kerang.
Antigone rubicunda	Brolga		e	2014		Shallow freshwater and brackish wetlands, crops, grassland and pasture.	**Low**	Limited suitable habitat present within the assessment corridor.
Egretta garzetta	Little Egret		e	2019		Swamps, billabongs, floodplain pools, mudflats, mangroves and channels; breeds in trees standing in water.	**Low**	Limited suitable habitat present within the assessment corridor.
Ardea intermedia plumifera	Plumed Egret		cr	1999		Densely-vegetated freshwater wetlands including lakes, swamps and billabongs. Breeds in trees standing in water.	**Low**	Limited suitable habitat present within the assessment corridor.
Ardea alba modesta	Eastern Great Egret		v	2016		Flooded crops, pasture, swamps, lagoons, saltmarsh, sewage ponds, estuaries, dams, roadside ditches. Breeds in trees standing in water.	**Low**	Limited suitable habitat present within the assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Ixobrychus dubius	Australian Little Bittern		e	1972		Freshwater swamps, lakes and rivers with dense reedbeds, saltmarsh and coastal lagoons.	**Low**	Limited suitable habitat present within the assessment corridor.
Spatula rhynchotis	Australasian Shoveler		v	2019		Large freshwater wetlands, generally with dense vegetation.	**Low**	Limited suitable habitat present within the assessment corridor.
Stictonetta naevosa	Freckled Duck		e	2019		Large freshwater wetlands, generally with dense vegetation.	**Low**	Limited suitable habitat present within the assessment corridor.
Aythya australis	Hardhead		v	2019		Large freshwater wetlands, generally with dense vegetation.	**Low**	Limited suitable habitat present within the assessment corridor.
Oxyura australis	Blue-billed Duck		v	2017		Open or densely vegetated wetlands.	**Low**	Limited suitable habitat present within the assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Biziura lobata	Musk Duck		v	2019		Open or densely vegetated wetlands.	**Low**	Limited suitable habitat present within the assessment corridor.
Accipiter novaehollandiae	Grey Goshawk		e	2019		Rainforest, gallery forest, tall wet forest and woodland. Also partially cleared agricultural land.	**Recorded**	Recorded within riparian forest within Ground Truthed Alignment 2 during present assessment. May occur within wetter forest types intercepted by the assessment corridor (e.g. Wet Forest, Shrubby Foothill Forest, Riparian Forest, etc.).
Hieraaetus morphnoides	Little Eagle		v	2014		Woodland and open areas. Rabbits are a key component of their diet. Nesting occurs in mature trees in open woodland or riparian vegetation.	**Negligible**	No suitable habitat. Individuals may fly over project area in

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
								reach of suitable habitat.
Haliaeetus leucogaster	White-bellied Sea-Eagle		e	2019		Coastal areas such as beaches and estuaries, inland wetlands and major inland streams.	**Recorded**	Recorded within Ground Truthed Alignment 1 project area, foraging above Coastal Dune Scrub.
Falco subniger	Black Falcon		cr	2019		Woodlands, open country and around terrestrial wetlands areas, including rivers and creeks. Mostly hunts over open plains and undulating land with large tracts of low vegetation. 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.	**Low**	Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria.
Ninox connivens	Barking Owl		cr	2007		Eucalypt forests and woodlands.	**Medium**	Scattered and sporadic records around Airey's Inlet. May occur within dry forest and woodland types, including Heathy Woodland,

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
								within the eastern sections of the assessment corridor.
Ninox strenua	Powerful Owl		v	2019		Eucalypt forests and woodlands, well-treed urban areas.	**Recorded**	Male recorded within wetter forest types in Ground Truthed Alignment 2 project area during assessment. May roost or nest in large old trees throughout assessment corridor.
Tyto novaehollandiae	Masked Owl		cr	2019		A variety of lowland forests and woodlands.	**High**	Some records within project area, predominantly concentrated around Lorne. May roost or nest in large old trees throughout assessment corridor.
Neophema elegans	Elegant Parrot		v	1987		Woodlands, open woody grasslands, partially cleared farmlands and the fringes of clearings in forests, tree-lined	**Negligible**	No suitable habitat. Predominantly

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
						watercourses and Mallee environments.		observed in western Victoria.
Pezoporus wallicus	Ground Parrot		e	1978		Coastal heathland and swamps.	**Low**	May occur within sand heathland within assessment on occasion.
Pelagodroma marina	White-faced Storm-Petrel		e	2019		Coastal in pelagic and inshore waters; breeding colonies on Mud and South Channel Islands in Port Phillip Bay.	**Negligible**	No suitable habitat within assessment corridor.
Gelochelidon macrotarsa	Australian Gull-billed Tern		e	1978		Floodplains, saltmarsh, claypans and flooded pasture.	**Negligible**	No suitable habitat within assessment corridor.
Hydroprogne caspia	Caspian Tern		v	2018		Estuaries, inlets, bays, lagoons, inland lakes, flooded pasture, sewage ponds.	**Negligible**	No suitable habitat within assessment corridor.
Arenaria interpres	Ruddy Turnstone		e	2019		Mainly found on coastal beaches, exposed reefs, and rock platforms.	**Negligible**	No suitable habitat within assessment corridor.
Pluvialis squatarola	Grey Plover		v	2018		Mudflats, saltmarsh, tidal reefs and estuaries.	**Negligible**	No suitable habitat within assessment corridor.
Pluvialis fulva	Pacific Golden Plover		v	2018		A range of coastal habitats including mudflats, sandflats rocky shores and saltmarsh.	**Negligible**	No suitable habitat within assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Tringa glareola	Wood Sandpiper		e	1881		Well-vegetated shallow freshwater wetlands with emergent aquatic plants and dense fringing vegetation.	**Negligible**	No suitable habitat within assessment corridor.
Actitis hypoleucos	Common Sandpiper		v	2018		Migrates to Australia from Eurasia in August where it inhabits a wide variety of coastal and inland wetlands with muddy margins before departing north in March.	**Negligible**	No suitable habitat within assessment corridor.
Tringa nebularia	Common Greenshank		e	2018		A variety of ephemeral and permanent inland wetlands and sheltered coastal wetlands.	**Negligible**	No suitable habitat within assessment corridor.
Melanodryas cucullata	Hooded Robin		v	1996		Woodlands of eucalypt, Mallee, semi-cleared farmland.	**Negligible**	No suitable habitat within assessment corridor.
Calamanthus pyrrhopygius	Chestnut-rumped Heathwren		v	2019		Woodland habitat with a dense, shrubby understorey.	**Medium**	May occur within Heathy Woodland present within the eastern sections of the assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Stagonopleura guttata	Diamond Firetail		v	2017		Open forests and woodlands with a grassy ground layer.	**Medium**	May occur within drier woodlands and heaths such as Heathy Woodland present within the eastern sections of the assessment corridor.
Dasyornis broadbenti caryochrous	Rufous Bristlebird (Otway)		v	2019		Dense coastal heathlands and undergrowth of wet forests.	**Recorded**	Recorded within Coastal Dune Scrub and Shrubby Foothill Forest within the assessment corridor. May occur throughout a variety of EVCs intercepting the project area, where dense undergrowth is present.
Sminthopsis leucopus	White-footed Dunnart		v	2017		Lowland heathy woodland and forest, coastal scrub and coastal grasslands.	**Medium**	May occur within Sand Heathland, Heathy Woodland, Coastal Dune Scrub or Lowland Forest intercepted by the assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Thylogale billardierii	Rufous-bellied Pademelon		t	1979		Extinct on the mainland, occurs in Tasmania. Rainforest and wet forest is the preferred habitat, although wet gullies in dry open eucalypt forest are also used.	**Negligible**	Outside species current recognised range.
Arctophoca forsteri	Long-nosed Fur Seal		v	2019		Breeds on islands off the southern Australian coast.	**Negligible**	No suitable habitat
Ornithorhynchus anatinus	Platypus		v	2021		A variety of freshwater waterbodies, particularly those with stable banks suitable for burrows, and shallow waters for foraging.	**Medium**	May be present within numerous creeks and streams intercepted by the assessment corridor.
Canis lupus dingo	Dingo		v	1865		Virtually all terrestrial environments but range reduced by exclusion fencing, persecution and hybridisation with domestic dogs.	**Low**	No recent records within or surrounding assessment corridor.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Miniopterus orianae oceanensis	Eastern Bent-winged Bat		cr	2004		A variety of treed and treeless habitats. Roosts in caves and man-made structures.	**Medium**	The distribution of the Southern Bent-wing Bat and the Eastern Bent-wing Bat overlap in western Victoria. The species may forage over treed environments within the assessment corridor on occasion.
Lissolepis coventryi	Swamp Skink		e	1993		Densely vegetated swamps and associated watercourses, and adjacent wet heaths, sedgelands and saltmarshes.	**Low**	No suitable habitat identified within the assessment corridor in Coastal Dune Scrub or in areas adjacent to streams and creeks.
Pseudemoia pagenstecheri	Tussock Skink		e	2003		On the ground in a range of grasslands or sparse grassy woodlands from alps to coast.	**Low**	Limited suitable habitat present within the assessment corridor, within the extent of the species current recognised range (e.g. Airey's Inlet).

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Pseudophryne bibronii	Brown Toadlet		e	1971		A wide variety of woodland, forest and grassland habitats, where it shelters under leaf litter and other debris in moist soaks and depressions. Breeds in swamps and inundated habitats, and along creek lines.	**Medium**	May occur within open forests and woodland types within the eastern sections of the assessment corridor, such as Lowland Forest, Heathy Woodland and Sand Heathland.
Pseudophryne semimarmorata	Southern Toadlet		e	2011		A wide variety of woodland, forest and grassland habitats, where it shelters under leaf litter and other debris in moist soaks and depressions. Breeds in swamps and inundated habitats, and along creek lines.	**Medium**	Recorded in forest inland of Lorne, although predominantly recorded around Anglesea. May be present throughout the assessment corridor, within damp areas in Heathy Woodland, Shrubby Foothill Forest, Lowland Forest and Wet Forest.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Neochanna cleaveri	Australian Mudfish		e	2012		Freshwater habitats with abundant aquatic vegetation such as streams, backwaters, billabongs and floodplain wetlands.	**Medium**	May occur within a number of streams and creeks which intercept the assessment corridor on occasion.
Victaphanta compacta	Otway Black Snail		e	2019		Wet forests and cool temperate rainforests in the Otway Ranges, Victoria.	**High**	Recorded on numerous occasions in Wet Forest within the Ground Truthed Alignment 2 project area during assessment. May occur within gullies intercepting the assessment corridor.
Pasma tasmanica	Two-spotted Grass-skipper Butterfly		e	1960		Mountainous areas containing tussock grass species such as Microlaena stipoides	**Low**	One observation recorded near Lorne within the project area. Predominantly known from mountainous areas east of Melbourne.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Geocharax tasmanicus	Otway Bush Yabby		e	2008		Poorly known species with limited distribution within and in the vicinity of the Otway Coast Basin.	**Medium**	May be present within a number of streams and creeks intercepted by the assessment corridor.
Engaeus fultoni	Otway Burrowing Crayfish		v	1983		Wet sclerophyll forest at altitudes above 100m in the Otway Ranges, although some records exist from areas at sea level. Burrows are usually found adjacent to water courses, although not connected to areas of surface water.	**High**	Burrows detected in drainage line associated with Grey River during assessment. May occur throughout wetter forest types (e.g. Wet Forest, Riparian Forest, etc.) intercepted by the assessment corridor >100m in altitude.
Engaeus sericatus	Hairy Burrowing Crayfish		v	1982		Burrows are connected to the water table, typically adjacent to creeks or on floodplains. Although it is widespread in Victoria, most records are found in an area extending from the Otways, west to Port Fairy and north to Ballarat.	**Negligible**	Outside species current recognised range.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in project area	Rationale for likelihood ranking
		EPBC	FFG					
Apsolidium densum	Sea Cucumber 5251		e	1985		Poorly known species. Marine environments with predominantly sandy substrates.	**Negligible**	No suitable habitat present within the assessment corridor.

A2.3 Migratory species (EPBC Act listed)

Table A2.4 Migratory fauna species recorded or predicted to occur within 10 km of the project area

Scientific name	Common name	Most recent record
Migratory species		
Gallinago hardwickii	Latham's Snipe	2019
Pandion cristatus	Eastern Osprey	2014
Hirundapus caudacutus	White-throated Needletail	2019
Apus pacificus	Fork-tailed Swift	2016
Pandion haliaetus	Osprey	PMST
Ardenna grisea	Sooty Shearwater	1987
Ardenna tenuirostris	Short-tailed Shearwater	2016
Ardenna carneipes	Flesh-footed Shearwater	PMST
Procellaria cinerea	Grey Petrel	1984
Diomedea exulans	Wandering Albatross	1989
Thalassarche melanophris	Black-browed Albatross	2019
Thalassarche carteri	Indian Yellow-nosed Albatross	2016
Thalassarche chrysostoma	Grey-headed Albatross	1987
Thalassarche cauta	Shy Albatross	2019
Phoebetria fusca	Sooty Albatross	PMST
Fregata minor	Great Frigatebird	1987
Stercorarius parasiticus	Arctic Jaeger	2016
Calonectris leucomelas	Streaked Shearwater	1987
Procellaria aequinoctialis	White-chinned Petrel	1980
Macronectes giganteus	Southern Giant-Petrel	2019
Thalassarche bulleri	Buller's Albatross	PMST
Macronectes halli	Northern Giant-Petrel	PMST
Stercorarius pomarinus	Pomarine Jaeger	2014
Sterna hirundo	Common Tern	2000
Diomedea epomophora	Southern Royal Albatross	PMST
Diomedea sanfordi	Northern Royal Albatross	PMST
Diomedea antipodensis	New Zealand Wandering Albatross	PMST
Thalassarche salvini	Salvin's Albatross	PMST
Thalassarche steadi	White-capped Albatross	PMST
Thalassarche impavida	Campbell Albatross	PMST
Hydroprogne caspia	Caspian Tern	2018
Thalasseus bergii	Crested Tern	2019
Sternula albifrons	Little Tern	PMST
Arenaria interpres	Ruddy Turnstone	2019
Pluvialis squatarola	Grey Plover	2018
Pluvialis fulva	Pacific Golden Plover	2018

Scientific name	Common name	Most recent record
Charadrius bicinctus	Double-banded Plover	2017
Charadrius leschenaultii	Greater Sand Plover	PMST
Numenius madagascariensis	Eastern Curlew	PMST
Limosa lapponica	Bar-tailed Godwit	1977
Tringa glareola	Wood Sandpiper	1881
Actitis hypoleucos	Common Sandpiper	2018
Tringa nebularia	Common Greenshank	2018
Calidris ferruginea	Curlew Sandpiper	1978
Calidris ruficollis	Red-necked Stint	2016
Calidris acuminata	Sharp-tailed Sandpiper	1988
Calidris canutus	Red Knot	2016
Calidris alba	Sanderling	2017
Calidris subminuta	Long-toed Stint	1978
Calidris melanotos	Pectoral Sandpiper	PMST
Motacilla flava	Yellow Wagtail	PMST
Rhipidura rufifrons	Rufous Fantail	2020
Myiagra cyanoleuca	Satin Flycatcher	2019
Monarcha melanopsis	Black-faced Monarch	2016
Lagenorhynchus obscurus	Dusky Dolphin	PMST
Eubalaena australis	Southern Right Whale	2019
Caperea marginata	Pygmy Right Whale	2015
Balaenoptera musculus	Blue Whale	1992
Balaenoptera physalus	Fin Whale	PMST
Megaptera novaeangliae australis	Humpback Whale	2019
Physeter macrocephalus	Sperm Whale	2020
Orcinus orca	Killer Whale	2013
Balaenoptera borealis schlegelii	Southern Sei Whale	PMST
Chelonia mydas	Green Turtle	PMST
Lepidochelys olivacea	Pacific (Olive) Ridley	1999
Dermochelys coriacea	Leathery Turtle	2011
Caretta caretta	Loggerhead Turtle	PMST
Lamna nasus	Porbeagle	PMST
Carcharodon carcharias	Great White Shark	PMST

Appendix 3 Flora species - EPBC Significant Impact Criteria assessments

Anglesea Grevillea *Grevillea infecunda* (Vulnerable)

Occurrence in the project area

No individual plants or populations of Anglesea Grevillea were recorded along the proposed trail alignment. While the distribution of this species is endemic to Victoria around Anglesea and Aireys Inlet, there is the potential for it to occur within the project area. The nearest recorded population occurs off Gentle Annie Track, north of Eastern View. Suitable habitat throughout the project area occurs on high to medium quality heathy woodland at the eastern extremity of the alignment, particularly as it winds through Eastern View, Moggs Creek and Fairhaven. Suitable trails of GTR 1 where it will most likely occur include:

- Trail 4 (EVC 48 – Heathy Woodland of moderate quality)
- Trail 6 (EVC 48 – Heathy Woodland of high quality)
- Trail 12 (EVC 48 – Heathy Woodland of moderate to high quality)
- Trail 15 (EVC 48 – Heathy Woodland of moderate to high quality)
- Trail 19 (EVC 48 – Heathy Woodland of high quality)

Table 12 Anglesea Grevillea: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	The national recovery plan (Oberon 2006a) and the FFG Act Action Plan (DSE 2008) list 11 important or key populations for this species. All populations are confined to the Anglesea area, the closest of which occurs near Gentle Annie Track, Eastern View, within 2.5 kms of the proposed trail alignment. No plants were recorded along the trail alignment, therefore, it is not anticipated that any significant numbers of plants or populations will be destroyed that could lead to a decline in the size of an important population.
Reduce the area of occupancy of an important population	Unlikely	No plants were recorded on the proposed trail alignment, therefore, it is not anticipated that any significant numbers of plants or populations will be destroyed, or that habitat or area of occupancy will be reduced significantly.
Fragment an existing important population into two or more populations	Unlikely	No plants were recorded on the proposed trail alignment and the existing known populations will not be fragmented by the walking tracks and any resultant disturbance will be a permeable narrow barrier that will not affect physical or functional connectivity between populations.

Significant impact criteria	Likelihood of significant impact	Justification
Adversely affect habitat critical to the survival of the species	Possible	Critical habitat has not been declared for Anglesea Grevillea. Construction and operation of the trail may adversely impact its habitat through the spread of pathogens. weeds and diseases. Of particular concern is Cinnamon Fungus that is likely to impact its habitat through vegetation loss. These risks will be managed appropriately during construction and operation of the trail. Targeted surveys for this species are required to determine if populations of Anglesea Grevillea occupy the habitat adjoining the trail alignment.
Disrupt the breeding cycle of an important population	Unlikely	The trails and any resultant disturbance will be a permeable narrow barrier in a discrete location that is unlikely to affect pollination, seed dispersal, gene flow or vegetative reproduction.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The availability and quality of habitat will not decline significantly as a result of the works. Impacts to habitat are likely to be restricted to the trail edge, providing that weeds, diseases, and pathogens are managed appropriately. Therefore, Anglesea Grevillea is not likely to decline due to the reduction in extent or quality of habitat caused by the operation or construction of the trail network.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Soil disturbance and subsequent weed invasion will be minimised through construction management and follow up weed control. The project CEMP will specifically deal with controlling the introduction and spread of weed species, especially those species associated with walking track edges. Ongoing monitoring will be required to manage the establishment of weeds once the trails are operational.
Introduce disease that may cause the species to decline	Possible	The project is unlikely to introduce new diseases or pathogens to the project area providing hygiene protocols are adhered to in the CEMP. Cinnamon Fungus is already present along the proposed trail alignment, the operation and construction of the trail may spread the fungus. This risk requires mitigation through the project CEMP to include the use of uncontaminated soil during construction, and the implementation of cleaning stations to reduce the risk of walkers spreading the disease. Further surveys are required to determine whether Anglesea Grevillea occurs along the trail alignment.
Interfere substantially with the recovery of a species	Unlikely	There are no known recovery programs operational within the project area. The trail is therefore unlikely to interfere with the recovery of Anglesea Grevillea.

Conclusion for Anglesea Grevillea

There is the potential for the project to result in a significant impact on Anglesea Grevillea based on an assessment against the significant impact criteria for vulnerable species. Further surveys are required to determine whether the species is present within the assessment corridor. If present, management of Cinnamon Fungus would be required to prevent the degradation of habitat. Micro-siting of the trail by an Ecologist within areas of Heathy Woodland would also be required to further reduce direct impacts upon the species.

Wrinkled Buttons *Leiocarpa gatesii* (Vulnerable)

Occurrence in the project area

Multiple populations of Wrinkled Buttons were recorded within the assessment area. The largest population was recorded on the trails south-east of Cumberland River. Approximately 30 plants were recorded at that location, however the population is likely to be much larger. Most often, this species was recorded on the drier slopes within EVC 21 – Shrubby Dry Forest. On occasion, individual plants were recorded on more sheltered slopes where the vegetation community transitions from EVC 21 – Shrubby Dry Forest to EVC 45 – Shrubby Foothill Forest. As the species is rhizomatous, it is difficult to determine the population size within a group of plants. For the purposes of this assessment, it is assumed that a patch of uninterrupted plants without a clear break was considered as a single individual, however that is likely to be underrepresenting the population size. The largest populations of Winkled Buttons were recorded at the following locations:

- Trails optional 8, optional 9 and 61, east of Cumberland River campground
  - **Vegetation type**: EVC 21 – Shrubby Dry Forest, beneath a canopy of Scent Bark, and an understorey comprised of Prickle Bush-tree and Common Heath.
  - **Population size**: 30 - 50 plants
- Trail 19, near Eastern View
  - **Vegetation type**: EVC 48 - Heathy Woodland. Beneath a canopy of Red Ironbark and an understorey of Varnish Wattle and Silver-top Wallaby Grass.
  - **Population size**: 5 - 10 plants
- Trail 42, Lorne 61
  - **Vegetation type**: EVC 21 – Shrubby Dry Forest, beneath a canopy of Scent Bark, and an understorey comprised of Hop Wattle and Common Heath.
  - **Population size**: 10 - 20 plants

Table 13 Wrinkled Buttons: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Possible	The recovery plan (Oberon 2006b) lists 10 populations of this species, however there are many more recorded since the publishing of that report. There are no important populations specified in the recovery plan, however, given the species is endemic to Victoria with a restricted distribution between Lorne and Fairhaven, all populations are likely to be considered important. The proposed trail is unlikely to lead to a reduction in an important population, particularly along trail alignments specifically mentioned above through direct clearing and removal of suitable habitat. The recovery plan also suggests that disturbance may be beneficial for the species, evidence of which was seen along trail 19, an established trail, of which Wrinkle Buttons was persisting along its edge. There may be some initial

Significant impact criteria	Likelihood of significant impact	Justification
		short-term reduction in population size, however the species is likely to recover and benefit over the long term. Targeted surveys are required to determine the distribution of the species within critical habitat types (EVC 21 – Shrubby Dry Forest). An assessment against this criterion would then be possible.
Reduce the area of occupancy of an important population	Possible	The trail can be micro-sited around populations of Wrinkled Buttons to reduce direct impacts. The species has been observed occupying trail edges of established walking trails and colonising management vehicle trails, sometimes occurring in the centre of operational vehicle trails. This suggests that the species can tolerate, and may in fact benefit from, low to moderate levels of disturbance. Providing the trail can be constructed in a way that prevents direct removal of the species, the proposed trail is unlikely to result in significantly reducing the area of occupation of an important population. This conclusion is subject to further survey work.
Fragment an existing important population into two or more populations	Unlikely	The proposed works will result in a narrow trail network in discrete locations and would not present a major barrier for the movement of the species, retaining population scale connectivity. The species tolerance to disturbance suggests it will not be adversely affected by low impact, small-scale fragmentation such as walking trails as the species has the ability to respond and establish in that circumstance.
Adversely affect habitat critical to the survival of the species	Unlikely	Critical habitat has not been declared for Wrinkled Buttons. It was recorded almost exclusively on the drier slopes of the project area, on occasion along sheltered aspects. The proposed trail alignment is not likely to significantly alter habitat whee Wrinkled Buttons occurs.
Disrupt the breeding cycle of an important population	Unlikely	The trails and any resultant disturbance will be a permeable narrow barrier in a discrete location that is unlikely to affect pollination, seed dispersal, gene flow or vegetative reproduction.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The availability and quality of habitat will not decline significantly as a result of the works. As discussed above the species is known to grow along walking tracks and colonise disturbed areas in, demonstrating its ability to respond to site-scale fragmentation.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Soil disturbance and subsequent weed invasion will be minimised through construction management and follow up weed control. The project CEMP will specifically deal with controlling the introduction and spread of weed species, especially those species associated with walking track edges.

Significant impact criteria	Likelihood of significant impact	Justification
		Ongoing monitoring will be required to manage the establishment of weeds once the trails are operational.
Introduce disease that may cause the species to decline	Unlikely	The project is unlikely to introduce diseases to the project area providing hygiene protocols are adhered to in the CEMP.
Interfere substantially with the recovery of a species	Unlikely	There are no known recovery programs operational within the project area. The trail is therefore unlikely to interfere with the recovery of Wrinkled Buttons.

Conclusion for Wrinkled Buttons

There is a possibility that the project will result in a significant impact on Wrinkled Buttons based on an assessment against the significant impact criteria for vulnerable species. Micro-siting should be used during construction to prevent plants being directly impacted by the alignment. Furthermore, targeted surveys over spring should be conducted in key locations to determine populations sizes and extents. Key locations include drier slopes where the assessment corridor intersects with EVC 21 – Shrubby Dry Forest from the area west of the Cumberland River to Fairhaven.

Green-striped Greenhood *Pterostylis chlorogramma* and Spiral Sun-orchid *Thelymitra matthewsii* (both Vulnerable)

Occurrence in the project area

These two orchid species have been assessed together against significant impact criteria as they are likely to be supported by similar habitat types and they are both listed as Vulnerable species under the EPBC Act. Neither of them were recorded during the vegetation surveys as the timing of the surveys did not correspond with flowering time. Similarly, the above ground parts of the plants would not have developed enough for identification. Database records indicate nearby records at the following locations:

- **Green-striped Greenhood**: the VBA database has recent records of this species within EVC 48 - Heathy Woodland near Moggs Creek. GTR 2 is proposed to pass adjacent to using existing vehicle management trails.
- **Spiral Sun-orchid**: this species has been recorded predominately in the heathland communities around Anglesea. There are no local records near the proposed trail alignment however, suitable high quality occurs in EVC 48 – Heathy Woodland of Moggs Creek and Fairhaven.

Table 14 Green-striped Greenhood and Spiral Sun-orchid: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Possible	Further surveys are required to ascertain whether these species occur within the assessment corridor of the proposed trail. • Green-striped Greenhood The recovery plan for Green-striped Greenhood (Duncan, Pritchard, & Coates 2009) identifies nine populations across Victoria. The population near Moggs Creek is not listed in the recovery plan and should be considered an important population as records are more recent than the report. • Spiral Sun-orchid The recovery plan for Spiral Sun-orchid (Duncan 2010) lists 31 populations across Victoria and South Australia, most of which are along the coastline. All remaining populations are small in size.
Reduce the area of occupancy of an important population	Unlikely	Further surveys are required to ascertain whether these species occur within the assessment corridor of the proposed trail. However, small scale clearing of habitat is unlikely to result in the reduction of an important population.
Fragment an existing important population into two or more populations	Unlikely	The proposed works will result in a narrow trail network in discrete locations and would not present a major barrier for the movement of the species, retaining population scale connectivity.
Adversely affect habitat critical to the survival of the species	Unlikely	Critical habitat has not been declared for Green-striped Greenhood and Spiral Sun-orchid.

Significant impact criteria	Likelihood of significant impact	Justification
		• Green-striped Greenhood Green-striped Greenhood has a broad distribution across Victoria and diverse habitat requirements that include a shrubby understorey in forests and woodlands. The trail alignment plans to use existing trail networks that pass adjacent to a population of this species. Further modifications to habitat on existing trails are not anticipated or are expected to be minimal, and restricted to the existing trail footprint. The amount of habitat removal proposed for construction of the walking trail is unlikely to jeopardize the long-term survival of the species. • Spiral Sun-orchid The habitat requirements for Spiral Sun-orchid are poorly known however appear to be heath woodland and forested communities (Duncan 2010). There is also an association with disturbance, whereby the species can occupy trail edges and fuel breaks. The amount of habitat removal proposed for construction of the walking trail is unlikely to jeopardize the long-term survival of the species.
Disrupt the breeding cycle of an important population	Unlikely	The trails and any resultant disturbance will be a permeable narrow barrier in a discrete location that is unlikely to affect pollination, seed dispersal, gene flow or vegetative reproduction.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The availability and quality of habitat will not decline significantly as a result of the works. High quality habitat suitable for these two species occurs within EVC 48 – Heathy Woodland along the proposed trail alignment. It is considered unlikely that the quality will be reduced or modified significantly that would cause a decline in the species providing the project CEMP is adhered to during constriction.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Soil disturbance and subsequent weed invasion will be minimised through construction management and follow up weed control. The project CEMP will specifically deal with controlling the introduction and spread of weed species, especially those species associated with walking track edges. Ongoing monitoring will be required to manage the establishment of weeds once the trails are operational.
Introduce disease that may cause the species to decline	Unlikely	This is considered to be an unlikely impact. To ensure this does not occur, trail construction material to be used will be sourced from a weed and disease free locations and hygiene protocols will be in place for construction activities. Pathogens associated with orchid species include various fungal diseases which may be spread on the shoes and clothes of trail users. Wash-down stations will assist in reducing the impact on these species and their habitat.

Significant impact criteria	Likelihood of significant impact	Justification
Interfere substantially with the recovery of a species	Possible	The local community group ANGAIR (Anglesea, Aireys Inlet Society for the Preservation of Flora and Fauna) monitors populations of Green-striped Greenhood at Moggs Creek. It is possible that the trail alignment will provide greater access to these populations, even if the trail network includes the use of existing trails. Greater foot traffic along existing trails may provide greater access to these plants and conservation efforts

Conclusion for Green-striped Greenhood and Spiral Sun-orchid

There is the potential for the trail to have a significant impact on Green-striped Greenhood and Spiral Sun-orchid. Further surveys are required to determine if there are populations that may be directly impacted by the construction or operation of the trail.

Appendix 4 Fauna species - EPBC Significant Impact Criteria assessments

Gang-gang Cockatoo *Callocephalon fimbriatum* (Endangered)

Occurrence in the project area

This species is listed as an Endangered species under the EPBC Act and was recorded during the fauna assessment within the assessment corridor in the foothills behind Moggs Creek. Suitable habitat is present throughout the project area, with numerous observations recorded across the project area.

Table 15 Gang-gang Cockatoo: self-assessment against Significant Impact Criteria (CoA 2013)

Significant Impact Criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of a population of a species.	Unlikely	While the proposal may result in the removal of potential foraging and breeding habitat for Gang-gang Cockatoo, the total area of habitat being removed is small in relation to the amount of retained, and non-impacted habitat within the broader forested landscape and surrounding areas. Furthermore, the works will be sited to avoid large trees with hollows and likely to become hollow-bearing in future years within forest that provides primary breeding habitat for this species. Given the impact will predominantly affect the understorey and the scale of proposed impact is small compared to the available habitat in the region, it is unlikely that impacts will lead to a long-term decrease in the size of a Gang-gang Cockatoo population.
Reduce the area of occupancy of the species.	Unlikely	Gang-gang Cockatoo is a seasonal altitudinal migrant and spends the winter months in drier woodlands and forest types and the summer months in sub-alpine and montane forests (DAWE 2022). The species is capable of occupying vegetation throughout this range and utilises a range of vegetation types and habitats. The proposed works will occur in intact forests that have a history of road/track construction, logging and bushfire and the majority of works will be restricted to understorey vegetation and small tree removal. As such the works area and the surrounding habitat will remain suitable for this species during and post construction. As such, while some habitat disturbance will occur during construction, the overall area of occupancy of the species will remain unchanged.

Significant Impact Criteria	Likelihood of significant impact	Justification
Fragment an existing population into two or more populations.	Unlikely	Gang-gang Cockatoo is capable of dispersing between summer habitat in the Australian alpine area and winter habitat at lower elevations (DAWE 2022). It is also capable of dispersing and foraging within urban environments. As such the trail works will not act as a barrier to this highly mobile avian species.
Adversely affect habitat critical to the survival of the species.	Unlikely	Critical habitat is defined by DAWE (2022) as all foraging habitat in both breeding and non-breeding seasons and stands of suitable hollow-bearing trees, for breeding and nesting. Also important are stands of trees within or adjacent to known breeding areas, that are likely to become hollow-bearing in future years. Hollow-bearing trees are expected to be avoided during construction works by locating trails around large trees. Vegetation to be removed or impacted includes potential foraging habitat, however the scale and type of vegetation to be disturbed is not critical to the species survival in the location or nationally.
Disrupt the breeding cycle of a population.	Unlikely	Gang-gang Cockatoo breeds during the summer months between October and January. Given the extent of habitat available in the surrounding landscape, the spatially restricted nature of works and that hollow-bearing trees are expected to be avoided during construction, with the proposed trail unlikely to disrupt the breeding cycle of a population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely	The project will likely impact a small amount of the habitat available in the broader landscape. The proposed trail is not likely to isolate populations as the trail will not constitute a barrier to movement. While the works will result in the removal of understorey vegetation and small trees within forests that are likely to be used by the species, this level of loss is not likely to result in the decline of the species at a local or national scale.
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat.	Unlikely	Feral animals and plants are established in the project area. Some of these are known to negatively impact Gang-gang Cockatoo including cats, and to a lesser extent, foxes. Some native species are also likely to compete with Gang-gang Cockatoo for hollow resources. However, it is unlikely that the trail would result in the establishment of new pest species.
Introduce disease that may cause the species to decline.	Unlikely	Psittacine beak and feather disease (PBFD) is known to impact Gang-gang Cockatoo and is generally transmitted via contact with infected birds or water sources. It is unlikely that the trail would exacerbate or introduce this disease into the area.

Significant Impact Criteria	Likelihood of significant impact	Justification
Interfere substantially with the recovery of a species.	Unlikely	DAWE (2022) contains a number of recovery items aimed at halting the decline of Gang-gang Cockatoo. While some aspects of the trail are counter to the objectives of the recovery actions, specifically halting land clearing in known Gang-gang Cockatoo habitat areas, the scale and type of disturbance proposed is unlikely to interfere substantially with the recovery of the species, particularly given the avoidance of hollow-bearing trees.

Conclusion for Gang-gang Cockatoo

Gang-gang Cockatoo will likely forage and nest within the assessment corridor. However, there will unlikely be a significant impact to the species due to avoiding the removal of hollow-bearing trees and the high availability of foraging resources in the surrounding landscape. The assessment corridor comprises a small component of resources for the Gang-gang Cockatoo and will not result in a long-term decline in species.

Yellow-bellied Glider *Petaurus australis* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act and was recorded during the nocturnal surveys of the fauna assessment. Suitable habitat is present throughout the project area.

Table 16 Yellow-bellied Glider: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	Yellow-bellied Glider was recorded during nocturnal surveys and likely present along the assessment corridor and broader local area. Impacts associated with the project are to be restricted to understorey vegetation, therefore it is unlikely that this impact would lead to a broader decline in the population.
Reduce the area of occupancy of an important population	Unlikely	The area of occupancy for Yellow-bellied Glider will remain unchanged as the trail alignments will be a discrete narrow disturbance and the canopy will remain effectively contiguous in the context of this species dispersal and movement patterns.
Fragment an existing important population into two or more populations	Unlikely	The disturbance associated with trail construction will be a discrete narrow disturbance that will not act as a barrier for dispersal for this species as the canopy will remain effectively contiguous in the context of this species dispersal and movement patterns.
Adversely affect habitat critical to the survival of the species	Unlikely	Habitat critical to the survival of this species includes areas dominated by winter-flowering and smooth-barked eucalypts, with living hollow-bearing trees and sap trees. Several trees with evidence of sap extraction were observed in areas of Yellow-bellied Glider observations. Impacts associated with the project will be restricted to mostly understorey vegetation, therefore it is unlikely that this impact would lead to impacts that would adversely affect the survival of the species. Furthermore, all hollow-bearing trees will be avoided and as such critical breeding habitat will not be impacted. Sap trees should also be avoided to prevent an impact to a local food resource.
Disrupt the breeding cycle of an important population	Unlikely	The project will predominantly remove understorey vegetation and will avoid direct impacts to breeding sites by avoiding removal of hollow-bearing trees during construction. If operation of the trails is restricted to daylight hours when the species is inactive, any potential disturbance from noise and lighting at night will be avoided. It is therefore unlikely that impacts of the trail construction and operation will disrupt the breeding cycle of Yellow-bellied Gliders.

Significant impact criteria	Likelihood of significant impact	Justification
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The project will remove understorey vegetation only and will avoid direct impacts to breeding sites by avoiding removal of hollow-bearing trees during construction. This level of disturbance in the context of available habitat will not lead to a broader species decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Invasive fauna species are already present within the project area (e.g. cats and foxes), it is highly unlikely that other invasive species harmful to Yellow-bellied Glider will become established within the project area.
Introduce disease that may cause the species to decline	Unlikely	The project will not result in the introduction of a disease that is harmful to the Yellow-bellied Glider.
Interfere substantially with the recovery of a species	Unlikely	There is no accepted or adopted recovery plan associated for Yellow-bellied Glider. The conservation advice outlines maintaining and protecting habitat from threats such as high severity bushfires and restoring habitat connectivity (DPE 2017). Considering the above factors, the project will not interfere with the recovery of Yellow-bellied Glider.

Conclusion for Yellow-bellied Glider

The project is considered unlikely to result in a significant impact on Yellow-bellied Glider based on an assessment against the significant impact criteria for vulnerable species. This conclusion has been reached on the basis that vegetation removal in forested areas will be restricted to understorey species and all hollow-bearing trees will be avoided. If any treatment of large or hollow-bearing trees, that are deemed hazardous, is required then this will be done in consultation with the land manager, project ecologist and arboriculture specialist.

Australian Grayling *Prototroctes maraena* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act. Aquatic surveys were not undertaken during the fauna assessment, therefore the species was not recorded. Areas of suitable habitat within the project area occur in the number of streams that are intercepted by the assessment corridor. This species has been recorded within estuaries of rivers and creeks within the GTR 1 project area.

Table 17 Australian Grayling: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	This species has previously been recorded within estuaries of rivers and creeks intercepted by the assessment corridor, with last known records in Erskine River in 1999. The development of a trail is not likely to lead to a long-term decrease in the size of a population of Australian Grayling if instream works are avoided and a site-specific Construction Environmental Management Plan (CEMP) implementing suitable erosion and pollutant control measures are applied during construction.
Reduce the area of occupancy of an important population	Unlikely	Known locations are limited and the overall area of species occupancy is in decline. The proposed works would result in a narrow trail network in discrete locations and would not reduce the area of occupancy for the species within the project area. Proven effective measures should be implemented in a project CEMP, e.g. single span bridges, sustainable trail design and sediment controls.
Fragment an existing important population into two or more populations	Unlikely	The proposed works will result in a narrow trail network in discrete locations and would not present a major barrier for the movement of the species.
Adversely affect habitat critical to the survival of the species	Unlikely	Critical habitat is not defined to particular locations; however, all rivers and streams where this species is found are considered important to the species' survival, due to the limited understanding of reproductive success. Habitat is unlikely to be affected by trail construction in the project area, as river and creek systems will not be altered and indirect impacts through sedimentation will be managed appropriately.
Disrupt the breeding cycle of an important population	Unlikely	The proposed works are unlikely to disturb or create a barrier to stream and river connectivity. Breeding cycles will not be adversely affected by the project.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The proposed works are unlikely to affect the quality of habitat available if instream works are avoided and effective erosion and pollutant control measures are applied during construction.

Significant impact criteria	Likelihood of significant impact	Justification
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	It is unlikely that the construction of the trail would cause the establishment of invasive species. Hygiene controls to reduce the risk of the spread or introduction of aquatic weeds, pathogens and predators should be included in a project CEMP.
Introduce disease that may cause the species to decline	Unlikely	The project will not result in the introduction of a disease that is harmful to Australian Grayling.
Interfere substantially with the recovery of a species	Unlikely	Threats to Australian Grayling include barriers to movements, river regulation, poor water quality, siltation, impact of introduced fish, climate change, disease and fishing, angling and whitebaiting. The project is not considered likely to substantially interfere with the recovery of the species due to the localised area of potential impacts.

Conclusion for Australian Grayling

It is considered a low likelihood that the project would result in a significant impact on these species within or downstream of the assessment corridor, as long as instream works are avoided and a site-specific Construction Environmental Management Plan (CEMP) implementing suitable erosion and pollutant control measures are applied during construction.

Broad-toothed Rat *Mastacomys fuscus mordicus* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act and was not recorded during the fauna assessment. Suitable habitat is present in areas of high ground cover of sedges and grasses and may persist in gullies throughout the project area.

Table 18 Broad-toothed Rat: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unknown	Broad-toothed Rat has a highly fragmented distribution, with the population at the Otway Ranges persisting at a small number of sites. The proposed works will consist of a narrow trail through suitable habitat and the use of the assessment corridor by this species is unknown. Targeted surveys would assist in determining presence and understanding impact to this species. Where species is detected and areas of potential habitat, works should avoid these areas to prevent habitat loss to this sensitive species.
Reduce the area of occupancy of an important population	Unknown	This species has low dispersal capacity and is already restricted in distribution in the Otway Ranges. Targeted surveys should be undertaken to determine species presence. The trail should avoid all areas where the species is recorded or potential habitat is located, such as high grass and sedge ground cover. It may also be necessary to micro-site the trail to avoid areas for potential nesting and high connectivity (identified by tracks and tunnels through understorey vegetation).
Fragment an existing important population into two or more populations	Unlikely	The proposed works would result in a narrow trail in discrete locations and would not present a major barrier for the movement of the species. Whisson et al. (2015) demonstrates that Broad-toothed Rats in alpine environments freely disperse through and around significantly fragmented and disturbed landscapes and utilises drains, pipes and introduced vegetation to move through inhospitable landscapes.
Adversely affect habitat critical to the survival of the species	Unknown	The proposed works will remove understorey vegetation, which is a key component of habitat for this species. Targeted surveys would assist in determining presence and understanding impact to this species. In areas where the species is recorded, suitable habitat should be avoided to mitigate impacts on this species.
Disrupt the breeding cycle of an important population	Unlikely	The proposed works will result in a narrow trail that would not affect the movement or dispersal of the species. However, targeted surveys should be undertaken to determine species presence within the assessment. In areas where the species is recorded or potential habitat, the trail should be micro-sited to avoid areas for potential nesting and evidence of high connectivity (identified by tracks and tunnels through

Significant impact criteria	Likelihood of significant impact	Justification
		understorey vegetation). Construction in suitable habitat should avoid the breeding season (October to March) to mitigate impacts on breeding success.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unknown	The proposed works will consist of a narrow trail that will allow dispersal to suitable surrounding habitat. However, the use of the assessment corridor by this species is unknown. Due to the limited distribution and low dispersal ability, targeted surveys would assist in determining presence and understanding impact to this species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Invasive fauna species are already present within the project area; however, the trail may assist dispersal of predators and increase predation pressure within the project area. Implementing a comprehensive pest animal program targeting foxes, cats and deer may reduce the risk of predation and habitat destruction. Additionally, invasive weeds species can modify or simplify vegetation structure that may indirectly influence Broad-toothed Rat habitat through altered structure and/or hydrology. Soil disturbance and subsequent weed invasion should be minimised through construction management and follow up weed control. With the above effective mitigation measures in place, it is highly unlikely that an invasive species harmful to Broad-toothed Rat will become established within the project area.
Introduce disease that may cause the species to decline	Unlikely	The project will not result in the introduction of a disease that is harmful to Broad-toothed Rat.
Interfere substantially with the recovery of a species	Unknown	The Conservation Advice for the species (TSSC 2016) identifies the key threats to Broad-toothed Rat to include predation, fire, climate change, habitat loss and fragmentation and the reduction in the extent and quality of habitat due to weeds, die-back and damage caused by livestock and feral herbivores. Key conservation actions are identified as controlling predators and maintaining and protecting habitat. Areas of suitable Broad-toothed Rat habitat have been identified within the project area and the species is considered to have a medium likelihood of occurrence. The project may cause habitat loss, increase predation risk and increase the spread of dieback if threats are not managed effectively. Other impacts associated with constructing a trail includes the likelihood of human traffic walking off track and trampling potential Broad-toothed Rat habitat. To understand if interference to species recovery will occur, it is recommended targeted surveys are undertaken to determine species presence and use of habitat within the assessment corridor.

Conclusion for Broad-toothed Rat

It is unknown if this project will result in a significant impact on Broad-toothed Rat based on the assessment against the significant impact criteria for vulnerable species. This conclusion has been reached based on the likelihood of species presence and the unknown presence within the assessment corridor. Targeted surveys are recommended to determine species presence and to inform micro-siting of the trail to avoid key habitat for Broad-toothed Rat.

Southern Bent-winged Bat *Miniopterus orianae bassanii* (Critically Endangered)

Occurrence in the project area

This species is listed as a Critically Endangered species under the EPBC Act. Known records have been located south of Lorne and near Wye River.

Table 19 Southern Bent-winged Bat: self-assessment against Significant Impact Criteria (CoA 2013)

Significant Impact Criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of a population	Unlikely	The proposed works are unlikely to contribute to the long-term decrease in a population of Southern Bent-wing Bat.
Reduce the area of occupancy of the species	Unlikely	The project is unlikely to lead to a reduction in the area occupancy of this species as there are no maternal or roost caves within the assessment corridor.
Fragment an existing population into two or more populations	Unlikely	The proposed works are unlikely to fragment the population the species is highly mobile and the project area does not contain maternal or roost caves.
Adversely affect habitat critical to the survival of a species	Unlikely	The project will not adversely affect habitat critical to the survival of the species as the project area does not contain maternal or roost caves.
Disrupt the breeding cycle of a population	Unlikely	The project is not likely to affect the breeding cycle of the species as it is not located in close proximity to a maternity site or on a known movement route between breeding and non-breeding habitats.
Modify destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The project has no potential to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Unlikely	The proposed works are unlikely to establish invasive species that are not already present in the environment.

Significant Impact Criteria	Likelihood of significant impact	Justification
Introduce disease that may cause the species to decline	Unlikely	The project does not include any known mechanism that would result in introduction of any disease that is not already present in the environment.
Interfere with the recovery of the species	Unlikely	The scale and type of disturbance proposed is unlikely to interfere with the recovery of the species.

Conclusion for Southern Bent-winged Bat

Whilst Southern Bent-wing Bats are capable of long distance flights; both during nightly foraging and in broader movements between roosts, the project will not impact on a roost or maternity cave of either species. Ground based activities proposed by the project are therefore considered unlikely to have any impact on the species.

Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act and was not recorded during the fauna assessment. Foraging habitat present throughout the project area.

Table 20 Grey-headed Flying-fox: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	The closest camp of Grey-headed Flying-fox is located in Colac approximately 54 km north-west of the project area. Another camp is also located in Geelong approximately 65 km north-east of the project area.
Reduce the area of occupancy of an important population	Unlikely	Grey-headed Flying-fox are likely to forage across the region with individuals able to travel over 50 kilometres from camps in a night. Due to the extent of large contiguous habitat surrounding the project area, it is unlikely that the proposed works will reduce habitat critical for survival.
Fragment an existing important population into two or more populations	Unlikely	The species is highly mobile and as there are no known roost sites within the project area, the proposed works are unlikely to fragment an existing population.
Adversely affect habitat critical to the survival of the species	Unlikely	Whilst the species may visit the project area on occasion, suitable trees located within the project area are unlikely to provide habitat critical to the survival of the species given the large extent of other available food sources and the species high mobility.
Disrupt the breeding cycle of an important population	Unlikely	No breeding population occurs within the project area, and the project will not result in the disruption of the species during their breeding period.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The potential habitat located within the project area is not critical to the survival of the species and is unlikely to cause a decline in this species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	The proposed works will not result in the establishment or introduction of an invasive species or disease that could cause the species to decline.
Introduce disease that may cause the species to decline	Unlikely	The project will not introduce disease that may cause any impact on the species.
Interfere substantially with the recovery of a species	Unlikely	The small scale of proposed works and the removal of vegetation primarily in the understorey is unlikely to interfere with the recovery of the species.

Conclusion for Grey-headed Flying-fox

Grey-headed Flying-fox is likely to forage on flowering Eucalypts within the assessment corridor. However, as these trees form a very small component of a much larger network of foraging habitat utilised across much of Victoria and parts of South Australia, New South Wales and Queensland the proposed removal of any trees within the assessment corridor is considered unlikely to result in a significant impact on this species.

Long-nosed Potoroo *Potorous tridactylus tridactylus* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act and was recorded during the fauna assessment during the remote camera trap survey. Several records located across the project area and nearby the assessment corridor.

Table 21 Long-nosed Potoroo: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	The population located at the Otway Ranges is considered an important population. Long-nosed Potoroo was recorded during the remote camera trap survey at site 58, located off the existing Cumberland Track and along the proposed Alternate Trail 4. Known records of Long-nosed Potoroo are within close proximity to existing tracks and walking trails, therefore it is unlikely the proposed trail will cause a long-term decrease in the population.
Reduce the area of occupancy of an important population	Unlikely	Long-nosed Potoroo exist throughout the Otway Ranges where there are existing networks of roads, maintenance tracks and informal trails. The removal of understorey vegetation will reduce cover and decrease the connectivity and amount of suitable habitat available. If proposed works predominantly utilise existing tracks where Long-nosed Potoroos are known or expected to occur, the area of occupancy for this population is unlikely to be reduced.
Fragment an existing important population into two or more populations	Unlikely	Prominent roads and vehicle tracks are present throughout the Otway Ranges, therefore the proposed works are unlikely to cause the fragmentation of the overall population. However, at a local scale, proposed works may cause barriers to dispersal from loss of connectivity to suitable habitat. Long-nosed Potoroo prefer dense understorey vegetation and canopy cover. The proposed works will predominantly remove understorey vegetation. Possible mitigation measures to reduce impact include utilising existing tracks and avoiding new construction in areas of known and expected Long-nosed Potoroo occupancy.
Adversely affect habitat critical to the survival of the species	Unlikely	Habitat critical to the survival of Long-nosed Potoroo includes occupied forested habitats larger than 0.1 km^2. Unoccupied forested areas (larger than 0.1 km^2) may also be considered critical if they are adjacent or proximal to extant subpopulations, as they can provide future habitat. Also, areas of habitat that once supported Long-nosed Potoroo are critical habitat for reintroductions in the future. The proposed works are unlikely to affect critical habitat if habitat patches are not reduced to less than 0.1 km^2.

Significant impact criteria	Likelihood of significant impact	Justification
Disrupt the breeding cycle of an important population	Unlikely	Long-nosed Potoroos breed through-out the year but have had seasonal peaks recorded in late winter to early spring. Disruption to breeding may occur after vegetation removal, as dispersal between individuals may be impacted. However, as breeding occurs year-round, the capacity for breeding is unlikely to be impacted upon.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The proposed works will remove and decrease suitable habitat, however recent records near existing roads and tracks suggest the proposed works will not cause a decline in the population.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Invasive species, such as Red Fox and Feral Cat, are already established throughout the project area. The removal of dense understorey vegetation may increase exposure to predation. Foxes are known to utilise tracks and roads for dispersal, the proposed works may facilitate greater dispersal throughout the landscape.
Introduce disease that may cause the species to decline	Unlikely	The presence and spread of forest dieback from *Phytophthora cinnamomi* may affect the abundance of the preferred food source (underground fungi) and alter the vegetation composition preferred by Long-nosed Potoroo. Maintaining clean equipment during construction and providing cleaning stations along the trail will reduce the likelihood of dieback from spreading and impacting the project area.
Interfere substantially with the recovery of a species	Unlikely	It is unlikely that this species will substantially affect the national recovery of the southern subpopulation of Long-nosed Bandicoot, as this species has population strongholds in other areas of south-eastern Australia.

Conclusion for Long-nosed Potoroo

Long-nosed Potoroo were recorded nearby the assessment corridor and are expected to regularly occur within the assessment corridor. The species is sensitive to fragmentation within suitable habitat, however recent records of the species adjacent to existing tracks suggest this species is unlikely to be impacted by the creation of a new trail. The proposed removal of any vegetation within the assessment corridor is considered unlikely to result in a significant impact, as long as a site-specific Fauna Management Plan implementing suitable salvage techniques and mitigation measures are applied during construction. Mitigation measures include utilizing existing tracks, avoiding canopy removal and preventing fragmentation of habitat between tracks.

Swamp Antechinus *Antechinus minimus maritimus* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act and was not recorded during the fauna assessment, however has been previously recorded throughout the project area.

Table 22 Swamp Antechinus: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unknown	Overall species distribution is highly fragmented and population size is likely to be continually declining due to ongoing habitat loss, degradation and fragmentation, as well as feral predators and fire. Therefore, the remaining small and isolated populations are vulnerable to local extinction. The proposed works may impact the population found in the Otways Ranges and it is recommended that a targeted survey using remote camera traps is undertaken. The results of the targeted survey would provide a greater understanding of species presence within the project area.
Reduce the area of occupancy of an important population	Unknown	Recent targeted surveys of small mammals in the Otways by Corangamite CMA have expanded the known range of Swamp Antechinus in the Otways, in areas near Airey's Inlet and Grey River (unpublished data). There may be additional unknown areas occupied by this species within the assessment corridor, therefore targeted surveys along the assessment corridor would provide greater insight into species occupancy and potential impacts.
Fragment an existing important population into two or more populations	Unknown	The limited dispersal capacity of this species increases the risk of fragmentation. Mitigation measures include utilising existing tracks and limiting the construction of new trail in suitable habitat. Targeted surveys would assist in determining fragmentation impact.
Adversely affect habitat critical to the survival of the species	Unknown	There is no habitat listed as critical to the survival of Swamp Antechinus. However due to their limited and isolated distribution, the areas currently occupied and adjacent are important to the species. Preferred habitat includes dense wet heathlands, tussock grasslands, sedgelands, damp gullies, swamps and shrubby woodlands. The proposed construction of new trails includes suitable habitat, therefore targeted surveys in these areas are recommended to determine potential impacts.
Disrupt the breeding cycle of an important population	Unknown	Construction may impact breeding if it were to occur prior to and during annual breeding season in Autumn. Disturbance would likely impact dispersal of males. Due to males dying post-breeding, any disturbance to breeding could have subsequent impacts on the breeding success in the area for following years.

Significant impact criteria	Likelihood of significant impact	Justification
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unknown	The proposed removal of vegetation will affect predominantly the understorey. This will reduce cover and connectivity for Swamp Antechinus. As mentioned previously, the level of impact is not known due to limited understanding of the species distribution throughout the assessment corridor.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	Invasive species, such as Red Fox and Feral Cat, are already established throughout the project area. The removal of dense understorey vegetation may increase exposure to predation.
Introduce disease that may cause the species to decline	Unlikely	The proposed works will not result in the introduction of a disease that is harmful to Swamp Antechinus. However, there is an increased risk of the spread of forest dieback from *Phytophthora cinnamomi*. Maintaining clean equipment during construction and providing cleaning stations along the trail will reduce the likelihood of dieback from spreading and impacting the project area.
Interfere substantially with the recovery of a species	Unknown	The level of impact of this project on Swamp Antechinus is unknown. It is recommended that targeted surveys are undertaken to better understand how the proposed works might affect this species.

Conclusion for Swamp Antechinus

There is potential for the project to significantly impact on this species due to their relatively defined habitat requirements, small home ranges and the nature of the proposed activities, which may involve habitat loss and disturbance. It is recommended that targeted surveys for these species are undertaken where impacts to their habitat are unable to be avoided. Outcomes of the surveys should inform the requirement of a referral in order to consider impacts proposed by the project on Swamp Antechinus.

Southern Brown Bandicoot *Isodon obesulus* (Endangered)

Occurrence in the project area

This species is listed as a Endangered species under the EPBC Act and was not recorded during the fauna assessment during the remote camera trap survey. Several records located across the project area and nearby the assessment corridor.

Table 23 Southern Brown Bandicoot: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of a population	Unlikely	All populations of Southern Brown Bandicoot are considered important. Known records for Southern Brown Bandicoot are concentrated within the north-east of the Otway Ranges, mostly north of Painkalac Creek. These records are nearby or adjacent to existing roads and tracks, therefore it is unlikely that the proposed works will lead to a long-term decrease to the Otways population.
Reduce the area of occupancy of the species	Unlikely	The permanent removal of potentially suitable habitat will reduce the area of available habitat within the project area, however surrounding habitat may still be utilised by Southern Brown Bandicoot. As such the overall area of occupancy will remain unchanged post construction.
Fragment an existing population into two or more populations	Unlikely	Likely to occupy a small-medium home range (<10 ha) with local scale movement patterns. Loss of dense understorey cover can fragment habitat. The habitat in the project area will not be extensively fragmented by the proposed works and any resultant disturbance will consist of permeable narrow trails in discrete locations that will not affect physical or functional connectivity between populations or breeding individuals.

Significant impact criteria	Likelihood of significant impact	Justification
Adversely affect habitat critical to the survival of the species	Unlikely	There is no declared critical habitat for Southern Brown Bandicoot. The species inhabits areas of dense vegetation, primarily dense ground cover greater than 50 per cent average foliage density within the 0.2-1 m height range. The proposed works will predominantly remove understorey vegetation, however the large extent of surrounding suitable habitat will enable this species survival.
Disrupt the breeding cycle of a population	Unlikely	Impacts likely to disrupt the breeding cycle of Southern Brown Bandicoot include direct mortality, disturbance to breeding sites, loss of breeding and sheltering habitat, loss and fragmentation of foraging habitat and fragmentation of movement corridors. Southern Brown Bandicoots typically breed from winter to late summer. Avoiding construction during this time will prevent any disruptions to the breeding cycle.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The habitat in the project area will not be extensively fragmented by the proposed trails and any resultant disturbance will consist of permeable narrow trails in discrete locations that will not affect physical or functional connectivity between populations or breeding individuals. The habitat in the project area will not be modified or destroyed to the point that the species is likely to decline, given the extent and quality of adjacent habitats.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Unlikely	Invasive fauna species are already present within the project area (e.g. cats and foxes). The removal of dense understorey vegetation may increase exposure to predation.
Introduce disease that may cause the species to decline	Unlikely	The project will not result in the introduction of a disease that is harmful to Southern Brown Bandicoot.

Significant impact criteria	Likelihood of significant impact	Justification
Interfere with the recovery of a species	Unlikely	The removal of suitable habitat is counter to the recovery of this species, however, the extent and nature of the vegetation removal in the context of available suitable habitat within the broader local area will not interfere with the recovery of this species.

Conclusion for Southern Brown Bandicoot

The project is considered unlikely to result in a significant impact on Southern Brown Bandicoot due to the small footprint of proposed works, in comparison to the large extent of suitable habitat in the surrounding landscape. This species is known to occur in areas with existing tracks and roads, therefore it is unlikely that the proposed trail will affect the recovery or population status of this species. Effective mitigation measures, including a comprehensive pest animal program targeting foxes, cats and deer are recommended to be implemented throughout the duration of the project. These measures will assist in addressing potential changes to local movements of pest animals and their potential impacts on this species.

White-throated Needletail *Hirundapus caudacutus* (Vulnerable)

Occurrence in the project area

This species is listed as a Vulnerable species under the EPBC Act and was not recorded during the fauna assessment. There are several records located across the project area and nearby the assessment corridor.

Table 24 White-throated Needletail: self-assessment against Significant Impact Criteria (CoA 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	White-throated Needletails are considered to function as one single migratory population when present in Australia, therefore the entire population is considered to be an important population for the purpose of this assessment. White-throated
Reduce the area of occupancy of an important population	Unlikely	Needletails are almost exclusively aerial when present in Australia, however some birds have been recorded roosting in hollows and canopy foliage of tall trees in forest and woodland (DAWE 2021). The species may therefore occasionally utilise tall trees in the project area for roosting. The use of roosting habitat in Australia is not well understood. Despite this, the project will not remove canopy trees and therefore the project is highly unlikely to result in a decrease in size of the population, nor reduce the area of occupancy for the species.
Fragment an existing important population into two or more populations	Unlikely	The White-throated Needletail occurs as a single, migratory non-breeding population when present in Australia (DAWE 2021), and as such the project has no capacity to result in fragmentation of the population.
Adversely affect habitat critical to the survival of the species	Unlikely	White-throated Needletails are almost exclusively aerial when present in Australia, however they may utilise tall trees within the project area for roosting on occasions. The project will not result in the removal of any canopy trees and therefore will not result in impacts that could affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Unlikely	White-throated Needletails do not breed in Australia, and the project will not result in impacts (e.g. via impacts to migration or mortality of adults) that could affect breeding success elsewhere. The project therefore has no capacity to disrupt the breeding cycle of White-throated Needletails.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	White-throated Needletails may utilise tall trees within the project area for roosting on occasions, however the project will avoid removal of all canopy trees. It is therefore considered highly unlikely that the project will result in any changes to availability or quality of habitat that could result in species decline.

Significant impact criteria	Likelihood of significant impact	Justification
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	The project will not result in the establishment or introduction of an invasive species or disease that could cause the species to decline.
Introduce disease that may cause the species to decline	Unlikely	
Interfere substantially with the recovery of a species	Unlikely	The project does not conflict with information regarding key threats to the species (DAWE 2021, DoE 2015). The species is described as having few threats in Australia or elsewhere. Collisions with tall structures such as overhead wires, buildings and wind farms are the only listed threats in Australia (DAWE 2021) and are not applicable to this project.

Conclusion for White-throated Needletail

White-throated Needle-tail has high likelihood to fly over the assessment corridor on occasion. There is also potential for individuals to roost within the assessment corridor on some occasions. However, as the species is predominantly considered an aerial species within Australia, ground-based activities proposed by the project are considered unlikely to have any impact on this species.

Appendix 5 Photos of the project area

Photo 1 EVC 21 – Shrubby Dry Forest

Photo 2 EVC 48 – Heathy Woodland

Photo 3 EVC 16 – Lowland Forest

Photo 4 EVC 18 – Riparian Forest

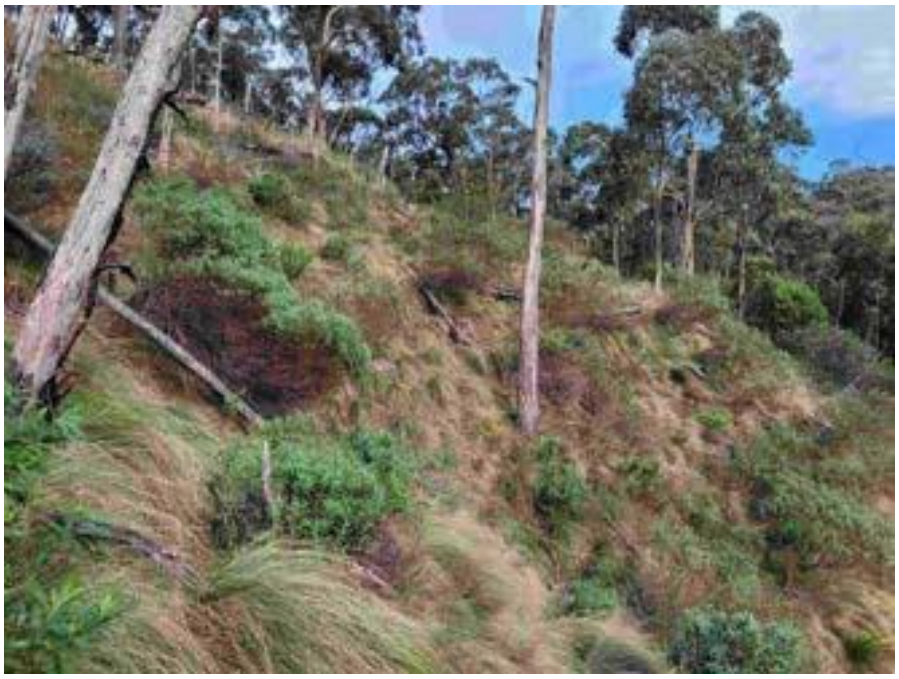


Photo 5 EVC 22 – Grassy Dry Forest

Photo 6 EVC 45 – Shrubby Foothill Forest

Photo 7 EVC 161 – Coastal Headland Scrub

Photo 8 EVC 201 – Shrubby Wet Forest

Photo 9 EPBC Act listed Wrinkle Buttons

Photo 10 Sweet Pittosporum infestation throughout gully near Eastern View

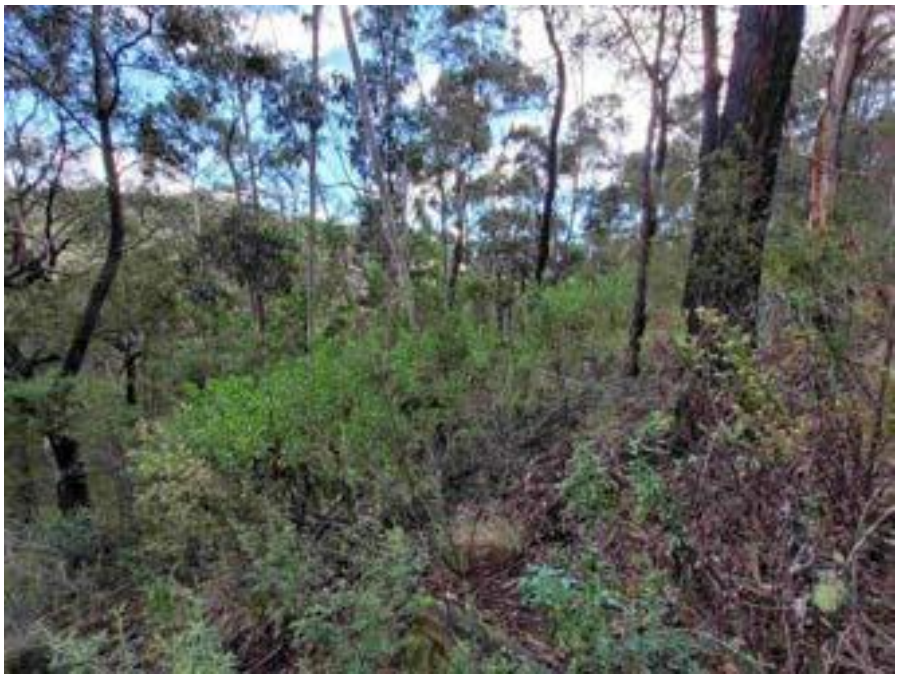


Photo 11 Dense Boneseed (bright green) infestation mid-forest

Photo 12 Austral Grass-tree senesced due to Cinnamon Fungus infection

Appendix 6 Vegetation impact assessment results

A6.1 Vegetation Quality Assessment results

Table A6.1 VQA results: Otway Plain Bioregion EVC condition states in the assessment corridor

Site ID			GORCT	GORCT	GORCT
Bioregion			Otway Plain	Otway Plain	Otway Plain
VQA #			SAH VQA1	STT VQA1	SAH VQA2
EVC #: Name			21 - Shrubby Dry Forest	48 - Heathy Woodland	48 - Heathy Woodland
Condition State			High	Moderate	High
		Max Score	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	3	0	4
	Canopy Cover	5	5	5	3
	Lack of Weeds	15	15	13	15
	Understorey	25	15	15	20
	Recruitment	10	10	10	10
	Organic Matter	5	5	3	5
	Logs	5	2	0	2
	Total Site Score		55	46	59
Landscape Value	Patch Size	10	8	8	8
	Neighbourhood	10	7	6	7
	Distance to Core	5	4	4	4
	Total Landscape Score		19	18	19
HABITAT SCORE		100	74	64	78
Habitat points = #/100		1	**0.74**	**0.64**	**0.78**

Table A6.2 VQA results: Otway Ranges Bioregion EVC condition states in the assessment corridor

Site ID			GORCT	GORCT	GORCT	GORCT	GORCT	GORCT
Bioregion			Otway Range	Otway Range	Otway Range	Otway Range	Otway Range	Otway Range
VQA #			STT VQA3	STT VQA4	SAH VQA3	SAH VQA4, STT VQA5, STT VQA6	SAH VQA5	SAH VQA10
EVC #: Name			16 - Lowland Forest	18 - Riparian Forest	18 - Riparian Forest	21 - Shrubby Dry Forest	21 - Shrubby Dry Forest	22 - Grassy Dry Forest
Condition State			High	High	Low	High	Moderate	Moderate
		Max Score	Score	Score	Score	Score	Score	Score
Site Condition	Large Old Trees	10	10	10	10	10	10	0
	Canopy Cover	5	5	3	3	5	3	3
	Lack of Weeds	15	13	13	7	13	7	9
	Understorey	25	15	25	5	20	15	15
	Recruitment	10	6	6	10	6	10	10
	Organic Matter	5	3	5	5	3	5	3
	Logs	5	5	5	2	5	5	4
	Total Site Score		57	67	42	62	55	44
Landscape Value	Patch Size	10	8	8	8	8	8	8
	Neighbourhood	10	8	8	7	8	7	6
	Distance to Core	5	4	4	4	4	4	4
	Total Landscape Score		20	20	19	20	19	18
HABITAT SCORE		100	77	87	61	82	74	62
Habitat points = #/100		1	**0.77**	**0.87**	**0.61**	**0.82**	**0.74**	**0.62**

Site ID			GORCT	GORCT	GORCT	GORCT	GORCT	GORCT
Bioregion			Otway Range	Otway Range	Otway Range	Otway Range	Otway Range	Otway Range
VQA #			STT VQA7, STT VQA8, STT VQA9	SAH VQA 6, STT VQA 10	STT VQA11	SAH VQA7	SAH VQA8	SAH VQA9, STT VQA15
EVC #: Name			45 - Shrubby Foothill Forest	45 - Shrubby Foothill Forest	45 - Shrubby Foothill Forest	48 - Heathy Woodland	48 - Heathy Woodland	201 - Shrubby Wet Forest
Condition State			High	Moderate	Low	High	Moderate	High
		Max Score	**Score**	**Score**	**Score**	**Score**		
Site Condition	Large Old Trees	10	10	10	10	10	0	8
	Canopy Cover	5	5	5	5	5	5	5
	Lack of Weeds	15	13	7	4	15	13	15
	Understorey	25	20	20	15	15	15	20
	Recruitment	10	10	10	6	10	10	10
	Organic Matter	5	5	5	5	5	5	5
	Logs	5	5	5	0	2	2	4
	Total Site Score		68	62	45	62	50	67
Landscape Value	Patch Size	10	8	8	8	8	8	8
	Neighbourhood	10	8	8	5	6	7	8
	Distance to Core	5	4	4	4	4	4	4
	Total Landscape Score		20	20	17	18	19	20
HABITAT SCORE		100	88	82	62	80	69	87
Habitat points = #/100		1	**0.88**	**0.82**	**0.62**	**0.8**	**0.69**	**0.87**

Site ID			GORCT	GORCT	GORCT
Bioregion			Otway Range	Otway Range	Otway Range
VQA #			STT VQA12	STT VQA13	STT VQA14
EVC #: Name			161 - Coastal Headland Scrub	161 - Coastal Headland Scrub	161 - Coastal Headland Scrub
Condition State			High	Moderate	Low
		Max Score	**Score**	**Score**	**Score**
Site Condition	Large Old Trees	10	na	na	na
	Canopy Cover	5	na	na	na
	Lack of Weeds	15	11	4	2
	Understorey	25	20	15	10
	Recruitment	10	10	10	3
	Organic Matter	5	3	3	4
	Logs	5	5	5	5
	Total Site Score		49	37	24
	EVC standardiser (x 75/55)		1.25	1.25	1.25
	Adjusted Site Score		61.25	46.25	30
Landscape Value	Patch Size	10	8	8	8
	Neighbourhood	10	6	6	3
	Distance to Core	5	4	4	4
	Total Landscape Score		18	18	15
HABITAT SCORE		100	79.25	64.25	45
Habitat points = #/100		1	**0.79**	**0.64**	**0.45**

A6.2 Tree data

Table A6.2.2 Large trees within patches within the assessment area identified as deemed lost due to TPZ encroachment

Scientific name	Common name	Circumference (cm)	Habitat zone/EVC	Tree retention zone (m)	Other attributes	Status
Eucalyptus globulus **subsp**. *globulus*	Southern Blue-gum	251		9.6		Removed
Eucalyptus globulus **subsp**. *globulus*	Southern Blue-gum	361		13.8		Removed
Eucalyptus globulus **subsp**. *globulus*	Southern Blue-gum	267		10.2		Removed
Eucalyptus globulus **subsp**. *globulus*	Southern Blue-gum	408		15.6	Has numerous hollows	Removed
Eucalyptus globulus	Southern Blue-gum	188		7.2		Removed
Eucalyptus globulus	Southern Blue-gum	195		7.44		Removed
Eucalyptus cypellocarpa	Mountain Grey-gum	346		13.2		Removed
Eucalyptus aromaphloia	Scentbark	204		7.8	Has numerous hollows	Removed

Appendix 7 Native Vegetation Removal Report

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **20/09/2022**
Time of issue: **5:03 pm**

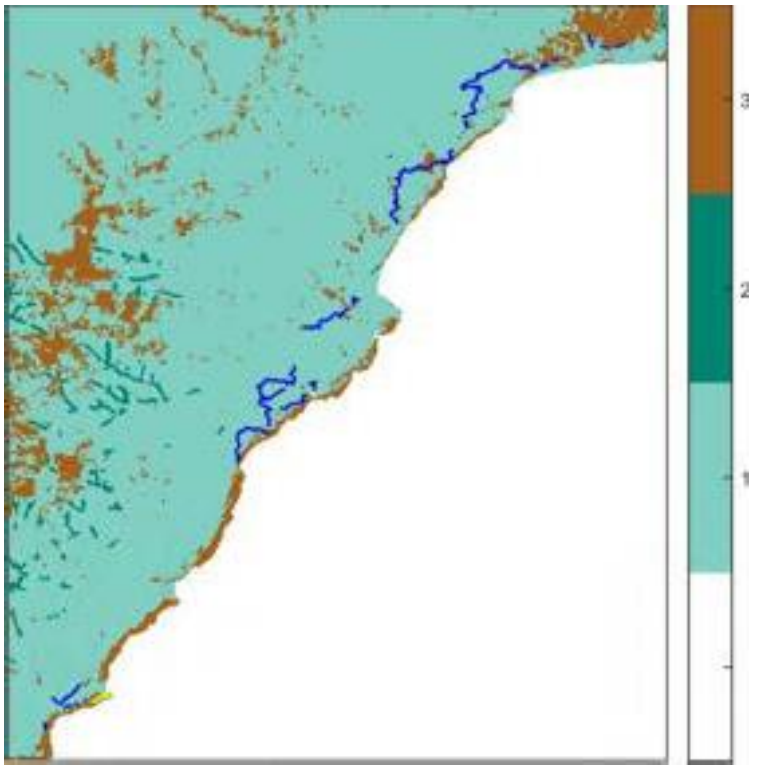
Report ID: BIO_2022_112

Project ID	Gort_ENSYM

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	9.929 ha
Extent of past removal	0.000 ha
Extent of proposed removal	9.929 ha
No. Large trees proposed to be removed	8
Location category of proposed removal	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.

1. Location map



Offset requirements if a permit is granted

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

General offset amount[1]	0.541 general habitat units
Vicinity	Corangamite Catchment Management Authority (CMA) or Surf Coast Shire Council
Minimum strategic biodiversity value score[2]	0.682
Large trees*	0 large trees
Species offset amount[3]	7.061 species units of habitat for Wrinkled Buttons, *Leiocarpa gatesii* 1.061 species units of habitat for Coast Correa, *Correa backhouseana var. backhouseana* 0.024 species units of habitat for Otway Black Snail, *Victaphanta compacta* 0.135 species units of habitat for Southern Blue-gum, *Eucalyptus globulus subsp. globulus*
Large trees*	8 trees
*** The total number of large trees that the offset must protect**	8 large trees to be protected in either the general, species or combination across all habitat units protected

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

Appendix 1 includes information about the native vegetation to be removed

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

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

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

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

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Next steps

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

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units= extent x condition x species landscape factor x 2, where the species landscape factor= 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units= extent x condition x general landscape factor x 1.5, where the general landscape factor= 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.020	0.020	0.950		0.009	General
2-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.060	0.060	0.985	0.830	0.035	501942 Wrinkled Buttons *Leiocarpa gatesii*
3-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.028	0.028	1.000	0.846	0.017	501942 Wrinkled Buttons *Leiocarpa gatesii*
4-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.000	0.000	0.950		0.000	General
6-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.095	0.095	0.935	0.400	0.043	501942 Wrinkled Buttons *Leiocarpa gatesii*
7-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.000	0.000	1.000	0.850	0.000	501942 Wrinkled Buttons *Leiocarpa gatesii*
8-HZ	Patch	otr_0048	Least Concern	0	yes	0.345	0.031	0.031	0.961		0.016	General
9-HZ	Patch	otr_0021	Least Concern	0	yes	0.370	0.040	0.040	0.850		0.020	General
10-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.004	0.004	0.850		0.002	General
11-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.029	0.029	0.883		0.017	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
12-HZ	Patch	otp_0048	Least Concern	0	yes	0.320	0.109	0.109	0.839	0.765	0.061	501942 Wrinkled Buttons *Leiocarpa gatesii*
13-HZ	Patch	otp_0021	Least Concern	0	yes	0.370	0.051	0.051	0.860		0.026	General
14-HZ	Patch	otp_0021	Least Concern	0	yes	0.370	0.078	0.078	0.888		0.041	General
15-HZ	Patch	otr_0048	Least Concern	0	yes	0.400	0.014	0.014	0.960		0.008	General
16-HZ	Patch	otr_0048	Least Concern	0	yes	0.400	0.080	0.080	0.866	0.787	0.057	501942 Wrinkled Buttons *Leiocarpa gatesii*
17-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.022	0.022	0.960	0.830	0.016	501942 Wrinkled Buttons *Leiocarpa gatesii*
18-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.184	0.184	0.957	0.847	0.140	501942 Wrinkled Buttons *Leiocarpa gatesii*
19-HZ	Patch	otr_0048	Least Concern	0	yes	0.345	0.025	0.025	0.980	0.760	0.015	501942 Wrinkled Buttons *Leiocarpa gatesii*
20-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.013	0.013	0.850		0.008	General
21-HZ	Patch	otp_0021	Least Concern	0	yes	0.370	0.000	0.000	0.960		0.000	General
22-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.035	0.035	0.960		0.020	General
23-HZ	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.036	0.036	0.888	0.780	0.028	501942 Wrinkled Buttons *Leiocarpa gatesii*
24-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.005	0.005	0.890		0.003	General
25-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.007	0.007	0.890		0.004	General
26-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.047	0.047	0.965	0.835	0.033	501942 Wrinkled Buttons *Leiocarpa gatesii*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
27-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.155	0.155	0.762	0.825	0.116	501942 Wrinkled Buttons *Leiocarpa gatesii*
28-HZ	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.018	0.018	0.690		0.010	General
29-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.023	0.023	0.890		0.014	General
30-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.168	0.168	0.980	0.828	0.135	501942 Wrinkled Buttons *Leiocarpa gatesii*
31-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.027	0.027	0.966	0.828	0.020	501942 Wrinkled Buttons *Leiocarpa gatesii*
33-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.079	0.079	0.988		0.048	General
34-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.018	0.018	0.812		0.010	General
35-HZ	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.011	0.011	0.840		0.007	General
36-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.023	0.023	0.799	0.760	0.018	501942 Wrinkled Buttons *Leiocarpa gatesii*
37-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.069	0.069	0.813		0.041	General
38-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.274	0.274	0.947	0.830	0.205	501942 Wrinkled Buttons *Leiocarpa gatesii*
39-HZ	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.041	0.041	0.961	0.825	0.033	501942 Wrinkled Buttons *Leiocarpa gatesii*
40-HZ	Patch	otr_0018	Least Concern	0	yes	0.435	0.013	0.013	0.890	0.760	0.010	501942 Wrinkled Buttons *Leiocarpa gatesii*
41-HZ	Patch	otr_0018	Least Concern	0	yes	0.435	0.003	0.003	0.830		0.002	General
42-HZ	Patch	otr_0018	Least Concern	0	yes	0.435	0.021	0.021	0.877	0.760	0.016	501942 Wrinkled Buttons *Leiocarpa gatesii*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
43-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.046	0.046	0.890		0.029	General
44-HZ	Patch	otr_0018	Least Concern	0	yes	0.435	0.020	0.020	0.890		0.012	General
49-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.156	0.156	0.899	0.820	0.116	501942 Wrinkled Buttons *Leiocarpa gatesii*
50-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.083	0.083	0.873	0.810	0.066	501942 Wrinkled Buttons *Leiocarpa gatesii*
51-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.004	0.004	0.880		0.002	General
52-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.106	0.106	0.881	0.814	0.085	501942 Wrinkled Buttons *Leiocarpa gatesii*
53-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.207	0.207	0.877	0.791	0.163	501942 Wrinkled Buttons *Leiocarpa gatesii*
54-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.002	0.002	0.830		0.001	General
55-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.049	0.049	0.852	0.766	0.038	501942 Wrinkled Buttons *Leiocarpa gatesii*
57-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.044	0.044	0.970	0.827	0.033	501942 Wrinkled Buttons *Leiocarpa gatesii*
58-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.022	0.022	0.910	0.810	0.018	501942 Wrinkled Buttons *Leiocarpa gatesii*
59-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.020	0.020	0.830		0.012	General
60-HZ	Patch	otr_0201	Least Concern	0	yes	0.435	0.020	0.020	0.888		0.012	General
61-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.061	0.061	0.947	0.743	0.047	501942 Wrinkled Buttons *Leiocarpa gatesii*
62-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.010	0.010	0.882	0.749	0.007	501942 Wrinkled Buttons *Leiocarpa gatesii*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.014	0.007	504369 Coast Correa *Correa backhouseana var. backhouseana*
63-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.041	0.041	0.880	0.800	0.033	501942 Wrinkled Buttons *Leiocarpa gatesii*
64-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.075	0.075	0.926	0.817	0.052	501942 Wrinkled Buttons *Leiocarpa gatesii*
65-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.040	0.040	0.939	0.850	0.029	501942 Wrinkled Buttons *Leiocarpa gatesii*
66-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.082	0.082	0.893	0.847	0.058	501942 Wrinkled Buttons *Leiocarpa gatesii*
67-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.072	0.072	0.999	0.855	0.054	501942 Wrinkled Buttons *Leiocarpa gatesii*
68-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.139	0.139	0.945	0.789	0.102	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.016	0.093	504369 Coast Correa *Correa backhouseana var. backhouseana*
74-HZ	Patch	otr_0016	Depleted	0	yes	0.385	0.061	0.061	0.960	0.840	0.043	501942 Wrinkled Buttons *Leiocarpa gatesii*
75-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.079	0.079	0.900	0.790	0.058	501942 Wrinkled Buttons *Leiocarpa gatesii*
76-B	Patch	otr_0045	Least Concern	1	no	0.880	0.067	0.067	0.820	0.810	0.106	501942 Wrinkled Buttons *Leiocarpa gatesii*
77-B	Patch	otr_0018	Least Concern	1	no	0.870	0.062	0.062	0.838	0.790	0.097	501942 Wrinkled Buttons *Leiocarpa gatesii*
78-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.031	0.031	0.804		0.017	General
79-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.089	0.089	0.965	0.830	0.067	501942 Wrinkled Buttons *Leiocarpa gatesii*
80-HZ	Patch	otr_0045	Least Concern	0	yes	0.310	0.065	0.065	0.695		0.026	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
81-HZ	Patch	otr_0201	Least Concern	0	yes	0.435	0.043	0.043	0.723		0.024	General
82-HZ	Patch	otr_0201	Least Concern	0	yes	0.435	0.043	0.043	0.890	0.804	0.034	501942 Wrinkled Buttons *Leiocarpa gatesii*
83-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.007	0.007	0.890		0.004	General
84-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.006	0.006	0.890		0.004	General
85-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.032	0.032	0.884	0.807	0.026	501942 Wrinkled Buttons *Leiocarpa gatesii*
86-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.132	0.132	0.903	0.813	0.105	501942 Wrinkled Buttons *Leiocarpa gatesii*
87-HZ	Patch	otr_0201	Least Concern	0	yes	0.435	0.050	0.050	0.800	0.801	0.040	501942 Wrinkled Buttons *Leiocarpa gatesii*
88-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.110	0.110	0.826	0.799	0.087	501942 Wrinkled Buttons *Leiocarpa gatesii*
89-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.128	0.128	0.908	0.834	0.103	501942 Wrinkled Buttons *Leiocarpa gatesii*
90-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.067	0.067	0.946	0.831	0.050	501942 Wrinkled Buttons *Leiocarpa gatesii*
91-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.016	0.016	0.950	0.833	0.012	501942 Wrinkled Buttons *Leiocarpa gatesii*
92-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.165	0.165	0.894	0.800	0.121	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.167	0.135	504491 Southern Blue-gum *Eucalyptus globulus subsp. globulus*
93-HZ	Patch	otr_0045	Least Concern	0	yes	0.440	0.137	0.137	0.809	0.701	0.102	501942 Wrinkled Buttons *Leiocarpa gatesii*
94-HZ	Patch	otr_0022	Depleted	0	yes	0.310	0.075	0.075	0.935	0.826	0.042	501942 Wrinkled Buttons *Leiocarpa gatesii*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
95-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.069	0.069	0.770	0.793	0.051	501942 Wrinkled Buttons *Leiocarpa gatesii*
96-HZ	Patch	otr_0018	Least Concern	0	yes	0.305	0.002	0.002	0.800		0.001	General
97-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.019	0.019	1.000	0.859	0.014	501942 Wrinkled Buttons *Leiocarpa gatesii*
98-HZ	Patch	otr_0021	Least Concern	0	yes	0.410	0.085	0.085	0.961	0.845	0.064	501942 Wrinkled Buttons *Leiocarpa gatesii*
99-HZ	Patch	otr_0045	Least Concern	0	yes	0.410	0.106	0.106	0.900	0.832	0.080	501942 Wrinkled Buttons *Leiocarpa gatesii*
2-A	Patch	otr_0018	Least Concern	0	yes	0.305	0.012	0.012	0.786		0.005	General
3-A	Patch	otr_0021	Least Concern	0	yes	0.370	0.039	0.039	0.888	0.810	0.026	501942 Wrinkled Buttons *Leiocarpa gatesii*
4-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.019	0.019	0.880	0.810	0.014	501942 Wrinkled Buttons *Leiocarpa gatesii*
5-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.032	0.032	0.880	0.810	0.024	501942 Wrinkled Buttons *Leiocarpa gatesii*
6-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.058	0.058	0.777		0.032	General
7-A	Patch	otr_0018	Least Concern	0	yes	0.435	0.002	0.002	0.940	0.790	0.001	501942 Wrinkled Buttons *Leiocarpa gatesii*
8-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.095	0.095	0.870	0.805	0.070	501942 Wrinkled Buttons *Leiocarpa gatesii*
9-A	Patch	otr_0018	Least Concern	0	yes	0.435	0.006	0.006	0.906	0.801	0.005	501942 Wrinkled Buttons *Leiocarpa gatesii*
10-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.002	0.002	0.770	0.780	0.001	501942 Wrinkled Buttons *Leiocarpa gatesii*
11-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.040	0.040	0.878	0.797	0.032	501942 Wrinkled Buttons *Leiocarpa gatesii*
12-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.097	0.097	0.776	0.800	0.076	501942 Wrinkled Buttons *Leiocarpa gatesii*
13-A	Patch	otr_0201	Least Concern	0	yes	0.435	0.036	0.036	0.843	0.809	0.029	501942 Wrinkled Buttons *Leiocarpa gatesii*
14-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.136	0.136	0.924	0.824	0.109	501942 Wrinkled Buttons *Leiocarpa gatesii*
15-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.027	0.027	0.930	0.819	0.022	501942 Wrinkled Buttons *Leiocarpa gatesii*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.643	0.024	15050 Otway Black Snail *Victaphanta compacta*
16-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.069	0.069	0.900	0.808	0.051	501942 Wrinkled Buttons *Leiocarpa gatesii*
17-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.041	0.041	0.909	0.809	0.031	501942 Wrinkled Buttons *Leiocarpa gatesii*
18-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.005	0.005	0.880	0.820	0.004	501942 Wrinkled Buttons *Leiocarpa gatesii*
19-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.062	0.062	0.814	0.815	0.046	501942 Wrinkled Buttons *Leiocarpa gatesii*
20-B	Patch	otr_0021	Least Concern	2	no	0.820	0.061	0.061	0.560	0.796	0.089	501942 Wrinkled Buttons *Leiocarpa gatesii*
21-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.051	0.051	0.633	0.810	0.041	501942 Wrinkled Buttons *Leiocarpa gatesii*
22-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.041	0.041	0.784	0.815	0.030	501942 Wrinkled Buttons *Leiocarpa gatesii*
23-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.071	0.071	0.701	0.811	0.056	501942 Wrinkled Buttons *Leiocarpa gatesii*
24-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.134	0.134	0.818	0.813	0.100	501942 Wrinkled Buttons *Leiocarpa gatesii*
25-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.056	0.056	0.600	0.814	0.045	501942 Wrinkled Buttons *Leiocarpa gatesii*
26-A	Patch	otr_0201	Least Concern	0	yes	0.435	0.047	0.047	0.572	0.804	0.037	501942 Wrinkled Buttons *Leiocarpa gatesii*
27-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.010	0.010	0.600	0.820	0.007	501942 Wrinkled Buttons *Leiocarpa gatesii*
28-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.156	0.156	0.652	0.805	0.115	501942 Wrinkled Buttons *Leiocarpa gatesii*
29-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.000	0.000	0.810	0.810	0.000	501942 Wrinkled Buttons *Leiocarpa gatesii*
30-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.051	0.051	0.812	0.806	0.038	501942 Wrinkled Buttons *Leiocarpa gatesii*
31-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.053	0.053	0.570	0.818	0.042	501942 Wrinkled Buttons *Leiocarpa gatesii*
32-B	Patch	otr_0021	Least Concern	0	no	0.820	0.062	0.062	0.670	0.808	0.093	501942 Wrinkled Buttons *Leiocarpa gatesii*
33-A	Patch	otr_0161	Depleted	0	no	0.640	0.056	0.056	0.854		0.050	General
34-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.066	0.066	0.663	0.813	0.049	501942 Wrinkled Buttons *Leiocarpa gatesii*
35-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.012	0.012	0.660	0.810	0.009	501942 Wrinkled Buttons *Leiocarpa gatesii*
36-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.183	0.183	0.626	0.808	0.135	501942 Wrinkled Buttons *Leiocarpa gatesii*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
37-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.024	0.024	0.643	0.810	0.019	501942 Wrinkled Buttons *Leiocarpa gatesii*
38-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.026	0.026	0.640	0.806	0.021	501942 Wrinkled Buttons *Leiocarpa gatesii*
39-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.063	0.063	0.656	0.812	0.050	501942 Wrinkled Buttons *Leiocarpa gatesii*
40-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.087	0.087	0.664	0.804	0.064	501942 Wrinkled Buttons *Leiocarpa gatesii*
41-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.094	0.094	0.584	0.815	0.075	501942 Wrinkled Buttons *Leiocarpa gatesii*
42-A	Patch	otr_0045	Least Concern	0	yes	0.410	0.299	0.299	0.775	0.801	0.221	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.010	0.220	504369 Coast Correa *Correa backhouseana var. backhouseana*
43-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.014	0.014	0.600	0.820	0.010	501942 Wrinkled Buttons *Leiocarpa gatesii*
44-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.040	0.040	0.716	0.811	0.032	501942 Wrinkled Buttons *Leiocarpa gatesii*
45-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.079	0.079	0.692	0.805	0.063	501942 Wrinkled Buttons *Leiocarpa gatesii*
46-B	Patch	otr_0045	Least Concern	1	no	0.880	0.064	0.064	0.842	0.813	0.102	501942 Wrinkled Buttons *Leiocarpa gatesii*
48-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.024	0.024	0.667	0.810	0.018	501942 Wrinkled Buttons *Leiocarpa gatesii*
49-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.040	0.040	0.610	0.810	0.032	501942 Wrinkled Buttons *Leiocarpa gatesii*
50-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.018	0.018	0.670	0.820	0.014	501942 Wrinkled Buttons *Leiocarpa gatesii*
51-A	Patch	otr_0201	Least Concern	0	yes	0.435	0.057	0.057	0.610	0.802	0.045	501942 Wrinkled Buttons *Leiocarpa gatesii*
52-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.022	0.022	0.605	0.811	0.016	501942 Wrinkled Buttons *Leiocarpa gatesii*
53-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.078	0.078	0.663	0.803	0.058	501942 Wrinkled Buttons *Leiocarpa gatesii*
54-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.132	0.132	0.684	0.809	0.098	501942 Wrinkled Buttons *Leiocarpa gatesii*
55-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.098	0.098	0.636	0.801	0.078	501942 Wrinkled Buttons *Leiocarpa gatesii*
56-A	Patch	otr_0045	Least Concern	0	yes	**0.440**	0.138	0.138	0.782	0.809	0.110	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.165	0.110	504369 Coast Correa *Correa backhouseana var. backhouseana*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
57-A	Patch	otr_0201	Least Concern	0	yes	0.435	0.021	0.021	0.623	0.800	0.016	501942 Wrinkled Buttons *Leiocarpa gatesii*
58-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.038	0.038	0.564	0.797	0.030	501942 Wrinkled Buttons *Leiocarpa gatesii*
59-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.026	0.026	0.860	0.823	0.021	501942 Wrinkled Buttons *Leiocarpa gatesii*
60-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.018	0.018	0.890	0.820	0.013	501942 Wrinkled Buttons *Leiocarpa gatesii*
61-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.100	0.100	0.702	0.802	0.079	501942 Wrinkled Buttons *Leiocarpa gatesii*
62-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.023	0.023	0.622	0.800	0.017	501942 Wrinkled Buttons *Leiocarpa gatesii*
63-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.039	0.039	0.860	0.825	0.032	501942 Wrinkled Buttons *Leiocarpa gatesii*
64-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.041	0.041	0.689	0.800	0.033	501942 Wrinkled Buttons *Leiocarpa gatesii*
65-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.088	0.088	0.931	0.810	0.070	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.203	0.069	504369 Coast Correa *Correa backhouseana var. backhouseana*
66-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.017	0.017	0.610	0.800	0.013	501942 Wrinkled Buttons *Leiocarpa gatesii*
67-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.045	0.045	0.961	0.719	0.034	504369 Coast Correa *Correa backhouseana var. backhouseana*
68-A	Patch	otr_0018	Least Concern	0	yes	0.435	0.002	0.002	0.860	0.790	0.002	501942 Wrinkled Buttons *Leiocarpa gatesii*
69-A	Patch	otr_0018	Least Concern	0	yes	0.435	0.013	0.013	0.860	0.790	0.010	501942 Wrinkled Buttons *Leiocarpa gatesii*
70-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.374	0.374	0.800	0.794	0.295	501942 Wrinkled Buttons *Leiocarpa gatesii*
71-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.012	0.012	0.770	0.800	0.009	501942 Wrinkled Buttons *Leiocarpa gatesii*
72-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.022	0.022	0.770	0.800	0.017	501942 Wrinkled Buttons *Leiocarpa gatesii*
74-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.062	0.062	0.693	0.804	0.049	501942 Wrinkled Buttons *Leiocarpa gatesii*
75-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.033	0.033	0.890	0.799	0.026	501942 Wrinkled Buttons *Leiocarpa gatesii*
76-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.104	0.104	0.803	0.794	0.082	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.017	0.082	504369 Coast Correa *Correa backhouseana var. backhouseana*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
77-A	Patch	otr_0161	Depleted	0	no	0.790	0.021	0.021	0.814	0.791	0.030	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.705	0.030	504369 Coast Correa *Correa backhouseana var. backhouseana*
78-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.039	0.039	0.813	0.784	0.031	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.365	0.031	504369 Coast Correa *Correa backhouseana var. backhouseana*
79-A	Patch	otr_0161	Depleted	0	no	0.640	0.103	0.103	0.968	0.763	0.116	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.765	0.116	504369 Coast Correa *Correa backhouseana var. backhouseana*
80-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.013	0.013	0.960	0.783	0.010	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.783	0.010	504369 Coast Correa *Correa backhouseana var. backhouseana*
81-A	Patch	otr_0161	Depleted	0	no	0.450	0.100	0.100	0.515	0.748	0.079	504369 Coast Correa *Correa backhouseana var. backhouseana*
82-A	Patch	otr_0161	Depleted	0	no	0.790	0.038	0.038	0.962	0.768	0.053	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.768	0.053	504369 Coast Correa *Correa backhouseana var. backhouseana*
83-A	Patch	otr_0161	Depleted	0	no	0.790	0.016	0.016	0.959	0.790	0.023	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.790	0.023	504369 Coast Correa *Correa backhouseana var. backhouseana*
84-A	Patch	otr_0161	Depleted	0	no	0.640	0.010	0.010	0.930	0.610	0.011	504369 Coast Correa *Correa backhouseana var. backhouseana*
85-A	Patch	otr_0018	Least Concern	0	yes	0.305	0.033	0.033	0.930	0.750	0.017	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.664	0.017	504369 Coast Correa *Correa backhouseana var. backhouseana*
86-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.089	0.089	0.876	0.770	0.069	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.159	0.069	504369 Coast Correa *Correa backhouseana var. backhouseana*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
87-A	Patch	otr_0018	Least Concern	0	yes	0.435	0.011	0.011	0.930	0.750	0.008	501942 Wrinkled Buttons *Leiocarpa gatesii*
										0.012	0.008	504369 Coast Correa *Correa backhouseana var. backhouseana*
88-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.005	0.005	0.860	0.770	0.004	501942 Wrinkled Buttons *Leiocarpa gatesii*
20-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.004	0.004	0.560	0.810	0.003	501942 Wrinkled Buttons *Leiocarpa gatesii*
21-B	Patch	otr_0045	Least Concern	0	no	0.880	0.003	0.003	0.560	0.810	0.005	501942 Wrinkled Buttons *Leiocarpa gatesii*
22-B	Patch	otr_0045	Least Concern	0	no	0.880	0.003	0.003	0.560	0.810	0.004	501942 Wrinkled Buttons *Leiocarpa gatesii*
32-A	Patch	otr_0021	Least Concern	0	yes	0.410	0.002	0.002	0.670	0.810	0.002	501942 Wrinkled Buttons *Leiocarpa gatesii*
46-A	Patch	otr_0045	Least Concern	0	yes	0.440	0.004	0.004	0.890	0.820	0.003	501942 Wrinkled Buttons *Leiocarpa gatesii*
56-B	Patch	otr_0045	Least Concern	3	no	0.880	0.070	0.070	0.810	0.805	0.112	501942 Wrinkled Buttons *Leiocarpa gatesii*
75-B	Patch	otr_0021	Least Concern	0	no	0.820	0.002	0.002	0.890		0.002	General

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

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

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Southern Blue-gum	*Eucalyptus globulus subsp. globulus*	504491	Rare	Highly Localised Habitat	Habitat importance map ; special site	0.0844
Otway Black Snail	*Victaphanta compacta*	15050	Endangered	Highly Localised Habitat	Habitat importance map ; special site	0.0353
	Correa backhouseana var. backhouseana	504369	Vulnerable	Dispersed	Top ranking map	0.0152
	Correa backhouseana var. backhouseana		Vulnerable	Dispersed	Habitat importance map	0.0131
Wrinkled Buttons	*Leiocarpa gatesii*	501942	Vulnerable	Dispersed	Top ranking map; special site	0.0070
Currant-wood	*Monotoca glauca*	503859	Rare	Dispersed	Top ranking map	0.0035
Angahook Pink-fingers	*Caladenia maritima*	505500	Endangered	Highly Localised Habitat	Habitat importance map	0.0033
Wrinkled Buttons	*Leiocarpa gatesii*	501942	Vulnerable	Dispersed	Habitat importance map ; special site	0.0031
Broad-leaf Prickly Moses	*Acacia verticillata subsp. ruscifolia*	504211	Rare	Dispersed	Habitat importance map	0.0025
Coast Twin-leaf	*Zygophyllum billardierei*	503615	Rare	Dispersed	Top ranking map	0.0025
Dune Poa	*Poa poiformis var. ramifer*	504826	Rare	Dispersed	Habitat importance map	0.0019
Otway Grey-gum	*Eucalyptus litora/is*	504557	Vulnerable	Dispersed	Habitat importance map	0.0018
Currant-wood	*Monotoca glauca*	503859	Rare	Dispersed	Habitat importance map	0.0016
Brooker's Gum	*Eucalyptus brookeriana*	501256	Rare	Dispersed	Habitat importance map ; special site	0.0016
Southern Xanthosia	*Xanthosia tasmanica*	504088	Rare	Dispersed	Habitat importance map	0.0014
Slender Pink-fingers	*Caladenia vulgaris*	504449	Rare	Dispersed	Habitat importance map	0.0014
Coast Twin-leaf	*Zygophyllum billardierei*	503615	Rare	Dispersed	Habitat importance map	0.0012

Dwarf Sickle-fern	*Pellaea nana*	504812	Rare	Dispersed	Habitat importance map	0.0012
Dwarf Silver Wattle	*Acacia nano-dealbata*	500064	Rare	Dispersed	Habitat importance map	0.0011
Wiry Bossiaea	*Bossiaea cordigera*	500435	Rare	Dispersed	Habitat importance map	0.0011
Coast Bush-pea	*Pultenaea canaliculata*	502839	Rare	Dispersed	Top ranking map	0.0011
Coast Bush-pea	*Pultenaea canaliculata*	502839	Rare	Dispersed	Habitat importance map	0.0011
Bog Gum	*Eucalyptus kitsoniana*	501290	Rare	Dispersed	Habitat importance map	0.0010
Sea Bindweed	*Calystegia soldanella*	500606	Vulnerable	Dispersed	Top ranking map	0.0010
Southern Bent-wing Bat	*Miniopterus schreibersii bassanii*	61343	Critically endangered	Dispersed	Habitat importance map	0.0008
Hoary Rapier-sedge	*Lepidosperma canescens*	501915	Rare	Dispersed	Habitat importance map	0.0008
Long Clubmoss	*Huperzia varia*	502084	Vulnerable	Dispersed	Habitat importance map	0.0008
Green-striped Greenhood	*Pterostylis chlorogramma*	504728	Vulnerable	Dispersed	Habitat importance map	0.0008
Coast Ballart	*Exocarpos syrticola*	501354	Rare	Dispersed	Habitat importance map	0.0007
Western Peppermint	*Eucalyptus falciformis*	505358	Rare	Dispersed	Habitat importance map	0.0007
Coast Ballart	*Exocarpos syrticola*	501354	Rare	Dispersed	Top ranking map	0.0007
Tufted Club-sedge	*Isolepis wakefieldiana*	501789	Rare	Dispersed	Habitat importance map	0.0007
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0006
Parsley Xanthosia	*Xanthosia leiophylla*	504562	Rare	Dispersed	Habitat importance map	0.0006
Sea Bindweed	*Ca/ystegia so/danella*	500606	Vulnerable	Dispersed	Habitat importance map	0.0006
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	12922	Critically endangered	Dispersed	Habitat importance map	0.0006
Swamp Skink	*Lisso/epis coventryi*	12407	Vulnerable	Dispersed	Habitat importance map	0.0006
Australian Grayling	*Prototroctes maraena*	4686	Vulnerable	Dispersed	Habitat importance map	0.0006
Satinwood	*Nemato/epis squamea subsp. squamea*	504814	Rare	Dispersed	Habitat importance map	0.0006
Nodding Baeckea	*Euryomyrtus ramosissima subsp. prostrata*	504258	Rare	Dispersed	Habitat importance map	0.0006

Australian Mudfish	*Neochanna cleaveri*	4703	Critically endangered	Dispersed	Habitat importance map	0.0006
Anglesea Grevillea	*Grevillea infecunda*	503744	Vulnerable	Dispersed	Habitat importance map	0.0005
Coast Needlewood	*Hakea decurrens subsp. platytaenia*	505072	Rare	Dispersed	Habitat importance map	0.0005
River Hook-sedge	*Carex nemoralis*	503473	Rare	Dispersed	Habitat importance map	0.0005
Slender Fork-fern	*Tmesipteris elongata*	503403	Vulnerable	Dispersed	Habitat importance map	0.0005
Leafy Twig-sedge	*Cladium procerum*	500786	Rare	Dispersed	Habitat importance map	0.0005
Port Campbell Guinea-flower	*Hibbertia truncata*	505441	Rare	Dispersed	Habitat importance map	0.0004
Bristly Shield-fern	*Lastreopsis hispida*	501878	Rare	Dispersed	Habitat importance map	0.0004
Strzelecki Gum	*Eucalyptus strzeleckii*	504558	Vulnerable	Dispersed	Habitat importance map	0.0004
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0003
Bog Gum	*Eucalyptus kitsoniana*	501290	Rare	Dispersed	Top ranking map	0.0003
Tall Astelia	*Astelia australiana*	500296	Vulnerable	Dispersed	Habitat importance map	0.0003
Leafy Greenhood	*Pterostylis cucullata subsp. cucul/ata*	505911	Endangered	Dispersed	Top ranking map	0.0003
Hoary Rapier-sedge	*Lepidosperma canescens*	501915	Rare	Dispersed	Top ranking map	0.0003
Common Bent-wing Bat (eastern ssp.)	*Miniopterus schreibersii oceanensis*	61342	Vulnerable	Dispersed	Habitat importance map	0.0003
Southern Toadlet	*Pseudophryne semimarmorata*	13125	Vulnerable	Dispersed	Habitat importance map	0.0003
Slender Tree-fern	*Cyathea cunninghamii*	500896	Vulnerable	Dispersed	Habitat importance map	0.0003
Bellarine Yellow-gum	*Eucalyptus leucoxylon subsp. bellarinensis*	504891	Endangered	Dispersed	Habitat importance map	0.0003
Top Bog-sedge	*Schoenus turbinatus*	503057	Rare	Dispersed	Habitat importance map	0.0003
Naked Sun-orchid	*Thelymitra circumsepta*	503383	Vulnerable	Dispersed	Habitat importance map	0.0003
Strzelecki Gum	*Eucalyptus strzeleckii*	504558	Vulnerable	Dispersed	Top ranking map	0.0003
Lime Fern	*Pneumatopteris pennigera*	502578	Endangered	Dispersed	Habitat importance map	0.0002

Lacey River Buttercup	*Ranuncu/us amp/us*	505019	Rare	Dispersed	Top ranking map	0.0002
Peninsula Daisy-bush	*O/earia sp. 2*	502348	Rare	Highly Localised Habitat	Habitat importance map	0.0002
Swamp Diuris	*Diuris palustris*	501082	Vulnerable	Dispersed	Habitat importance map	0.0002
Tremont Bundy	*Eucalyptus aff. gonioca/yx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0002
Yarra Pygmy Perch	*Nannoperca obscura*	4882	Vulnerable	Dispersed	Habitat importance map	0.0002
Lacey River Buttercup	*Ranunculus amp/us*	505019	Rare	Dispersed	Habitat importance map	0.0002
Wine-lipped Spider-orchid	*Ca/adenia oenochila*	503694	Vulnerable	Dispersed	Habitat importance map	0.0002
Leafy Greenhood	*Pterostylis cucullata subsp. cucul/ata*	505911	Endangered	Dispersed	Habitat importance map	0.0002
Swamp Greenhood	*Pterosty/is tenuissima*	502819	Vulnerable	Dispersed	Habitat importance map	0.0002
Pallid Sun-orchid	*Thelymitra pallidiflora*	504009	Endangered	Highly Localised Habitat	Habitat importance map	0.0002
Wiry Bossiaea	*Bossiaea cordigera*	500435	Rare	Dispersed	Top ranking map	0.0002
Brooker's Gum	*Eucalyptus brookeriana*	501256	Rare	Dispersed	Top ranking map; special site	0.0002
Winter Sun-orchid	*Thelymitra hiemalis*	505006	Endangered	Dispersed	Habitat importance map	0.0002
Spot-tailed Quoll	*Dasyurus macu/atus maculatus*	11008	Endangered	Dispersed	Habitat importance map	0.0001
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0001
Dense Leek-orchid	*Prasophyllum spicatum*	504506	Endangered	Dispersed	Habitat importance map	0.0001
Dwarf Silver Wattle	*Acacia nano-dea/bata*	500064	Rare	Dispersed	Top ranking map	0.0001
Annual Fireweed	*Senecio glomeratus subsp. longifructus*	507144	Rare	Dispersed	Habitat importance map	0.0001
Dune Wood-sorrel	*Oxa/is rubens*	502390	Rare	Dispersed	Habitat importance map	0.0001
Large Plume-orchid	*Pterosty/is sp. aff. plumosa (Ang/esea)*	505482	Rare	Dispersed	Habitat importance map	0.0001
Grey-headed Flying-fox	*Pteropus poliocephalus*	11280	Vulnerable	Dispersed	Habitat importance map	0.0001
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0001
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0001

Showy Lobelia	*Lobelia beaug/eho/ei*	502733	Rare	Dispersed	Habitat importance map	0.0001
Spurred Helmet-orchid	*Corybas aconitiflorus*	500835	Rare	Dispersed	Habitat importance map	0.0001
Small Sickle Greenhood	*Pterostylis lustra*	504876	Endangered	Dispersed	Habitat importance map	0.0001
Beech Finger-fern	*Notogrammitis angustifolia subsp. nothofageti*	503742	Vulnerable	Dispersed	Habitat importance map	0.0001
Spiral Sun-orchid	*Thelymitra matthewsii*	503378	Vulnerable	Dispersed	Habitat importance map	0.0001
Hooded Plover	*Thinomis rubricollis rubricollis*	10138	Vulnerable	Dispersed	Habitat importance map	0.0001
Australasian Bittern	*Botaurus poici/optilus*	10197	Endangered	Dispersed	Habitat importance map	0.0001
Robust Spider-orchid	*Ca/adenia valida*	501022	Endangered	Dispersed	Habitat importance map	0.0001
Paper Flower	*Thomasia petaloca/yx*	503392	Rare	Dispersed	Habitat importance map	0.0001
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0001
Common Sandpiper	*Actitis hypoleucos*	10157	Vulnerable	Dispersed	Habitat importance map	0.0001
Green Leek-orchid	*Prasophyllum lindleyanum*	502702	Vulnerable	Dispersed	Habitat importance map	0.0001
Forked Rice-flower	*Pime/ea hewardiana*	502522	Rare	Dispersed	Habitat importance map	0.0001
Blotched Sun-orchid	*Thelymitra benthamiana*	503369	Vulnerable	Dispersed	Habitat importance map	0.0001
Ground Spleenwort	*Asplenium appendiculatum subsp. appendiculatum*	500293	Rare	Dispersed	Habitat importance map	0.0001
Swamp Fireweed	*Senecio psilocarpus*	504659	Vulnerable	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectora/is pectora/is*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Baillon's Crake	*Porzana pusil/a pa/ustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0000
Dwarf Boronia	*Boronia nana var. pubescens*	504278	Rare	Dispersed	Habitat importance map	0.0000
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0000
Chestnut-rumped Heathwren	*Ca/amanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0000
Brown's Mitre-moss	*Calyptrochaeta brownii*	506252	Rare	Dispersed	Habitat importance map	0.0000
Coast Fescue	*Paa billardierei*	501361	Rare	Dispersed	Habitat importance map	0.0000

White-bellied Sea-Eagle	*Haliaeetus /eucogaster*	10226	Vulnerable	Dispersed	Habitat importance map	0.0000
Blue-billed Duck	*Oxyura australis*	10216	Endangered	Dispersed	Habitat importance map	0.0000
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Grey Plover	*Pluvia/is squataro/a*	10136	Endangered	Dispersed	Habitat importance map	0.0000
Dwarf Brooklime	*Gratia/a pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0000
Metallic Sun-orchid	*Thelymitra epipactoides*	503367	Endangered	Dispersed	Habitat importance map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Spotted Hyacinth-orchid	*Dipodium pardalinum*	500324	Rare	Dispersed	Habitat importance map	0.0000
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0000
Velvet Daisy-bush	*O/earia pannosa subsp. cardiophylla*	502317	Vulnerable	Dispersed	Habitat importance map	0.0000
Fairy Lanterns	*Thismia rodwayi*	503390	Vulnerable	Dispersed	Habitat importance map	0.0000
Small-flower Mat-rush	*Lomandra micrantha subsp. tubercu/ata*	504711	Rare	Dispersed	Habitat importance map	0.0000
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000
Intermediate Egret	*Ardea intermedia*	10186	Endangered	Dispersed	Habitat importance map	0.0000
Ruddy Turnstone	*Arenaria interpres*	10129	Vulnerable	Dispersed	Habitat importance map	0.0000
Masked Owl	*Tyto novaehollandiae novaehollandiae*	10250	Endangered	Dispersed	Habitat importance map	0.0000
Eastern Great Egret	*Ardea modesta*	10187	Vulnerable	Dispersed	Habitat importance map	0.0000
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
Musk Duck	*Biziura lobata*	10217	Vulnerable	Dispersed	Habitat importance map	0.0000
Australian Little Bittern	*lxobrychus dubius*	10195	Endangered	Dispersed	Habitat importance map	0.0000
Ground Parrot	*Pezoporus wallicus wallicus*	10311	Endangered	Dispersed	Habitat importance map	0.0000
Snowdrop Wood-sorrel	*Oxalis magellanica*	502385	Rare	Dispersed	Habitat importance map	0.0000

Oval-leaf Logania	*Logania ovata*	502032	Rare	Dispersed	Habitat importance map	0.0000
Large White Spider-orchid	*Ca/adenia venusta*	500533	Rare	Dispersed	Habitat importance map	0.0000
Greater Sand Plover	*Charadrius /eschenaultii*	10141	Critically endangered	Dispersed	Habitat importance map	0.0000
Freckled Duck	*Stictonetta naevosa*	10214	Endangered	Dispersed	Habitat importance map	0.0000
Tufted Grass-tree	*Xanthorrhoea caespitosa*	505088	Rare	Dispersed	Habitat importance map	0.0000
Lesser Sand Plover	*Charadrius mongo/us*	10139	Critically endangered	Dispersed	Habitat importance map	0.0000
Little Egret	*Egretta garzetta nigripes*	10185	Endangered	Dispersed	Habitat importance map	0.0000

Habitat group

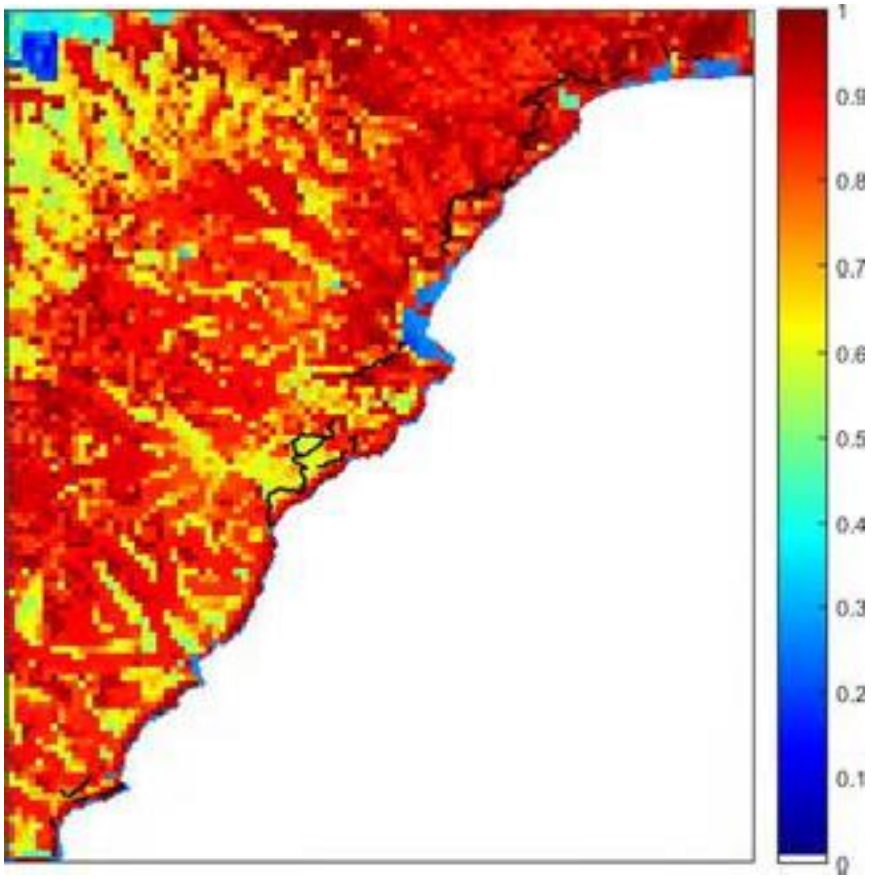
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

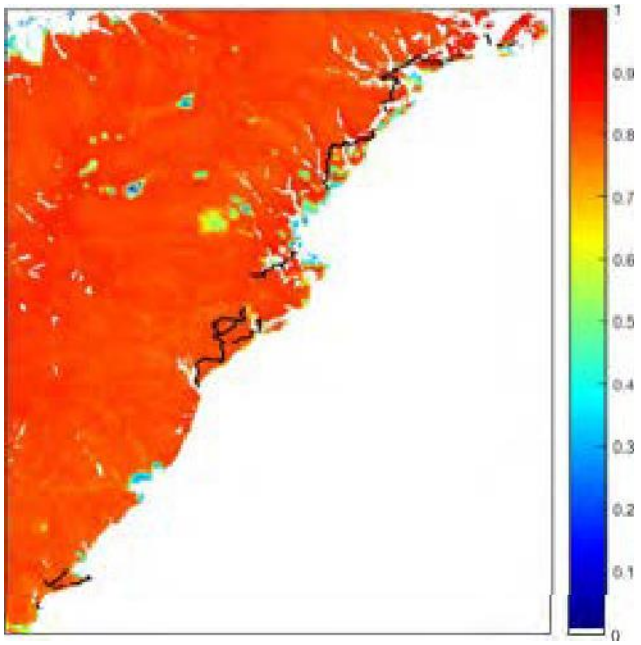
4. Map of the property in context

Yellow boundaries denote areas of proposed native vegetation removal.

Blue boundaries denote zones of partial removal with a halved condition score.

4. Habitat importance maps

Wrinkled Buttons
Leiocarpa gatesii
501942



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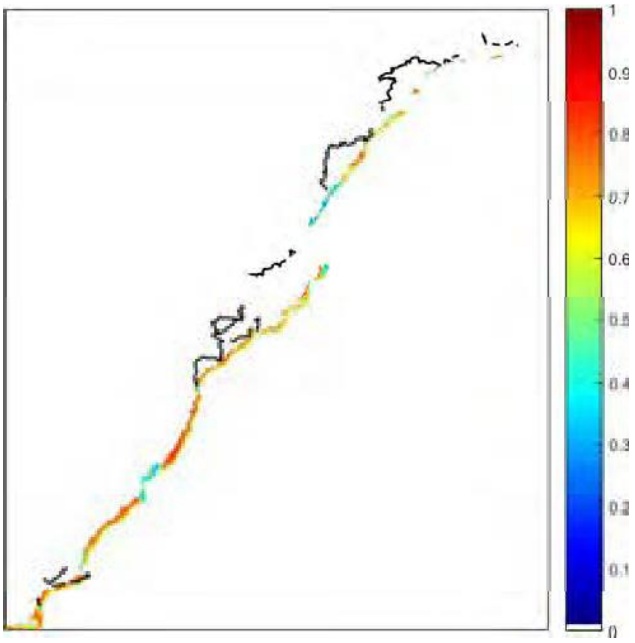
Correa backhouseana var. backhouseana
504369



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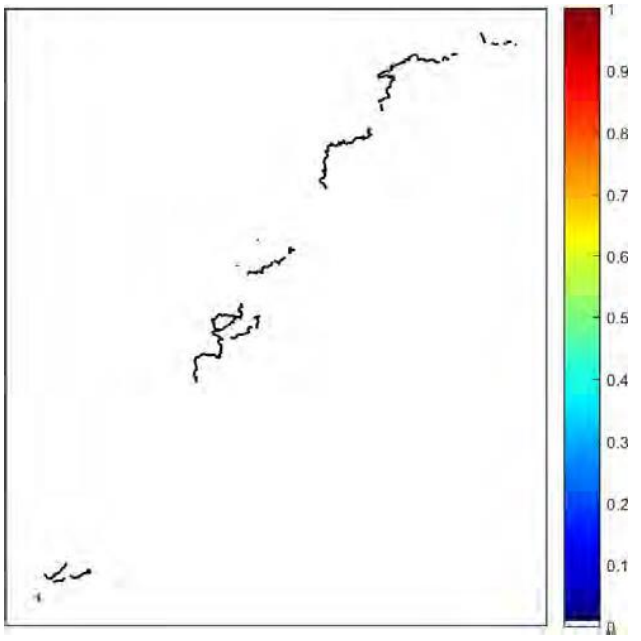

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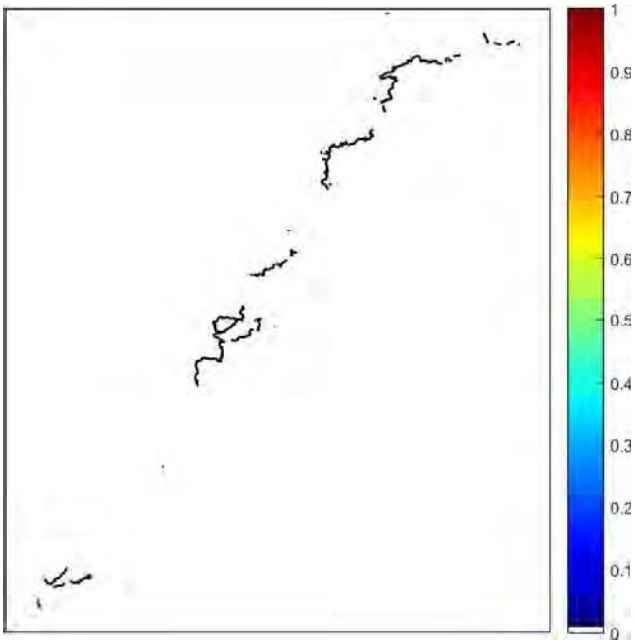

Appendix 8 Arborist Report

Arborist Report/Tree Management Plan

Great Ocean Road Walking Trail Project

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1 Introduction

Axiom Tree Management Pty Ltd has been engaged to provide advice on impacts to trees as part of the construction of the Great Ocean Road Coastal Trail (GORCT). The assessment was carried out in June 2022 and included assessment along selected section of new and existing walking trails. Locations include:

- McPhillamy Road (off Golf Links Rd), Eastern View
- Big Hill Track
- Allenvale Rd, Lorne
- Grey River Rd, Kennett River
- Cumberland River campground

The proposed walking trail includes a mixture of new and existing trails over approximately 90 km that provide a link between the Surf Coast Walk and the Great Ocean Walk. The State of Victoria requires projects on native bushland to obtain a Native Vegetation Removal (NVR) permit before progressing to construction. Approval of the permit requires the calculation and purchase of project specific NVR offset credits.

A standardized assessment method for calculating the impact of walking trail construction on native vegetation is not currently established. The existing standard (AS 4970-2009 Protection of Trees on Development Sites) is designed for the assessment of high-impact, deep, and/or broad-area excavations, typical of building developments, roads, pipelines etc. Due to its focus on excavation area without consideration of depth, undertaking tree loss assessments through a typical application of the Standard would result in inaccurately high NVR offset costs prohibitive to the progression of most projects. The shallow and comparatively low impact of trail construction necessitates an industry appropriate interpretation of the Standard, to be undertaken by suitably qualified and experienced arborists.

With the intent of designing a replicable, best-practice method of assessing and minimising vegetation loss, the following approach was guided by the principals of *avoid, minimise, and offset.* By employing the methods described in this plan, the Project will minimise tree impact from trail construction while accurately calculating NVR offset requirements. Several vegetation communities are present throughout the length of the trail that have the potential to be impacted by trail construction.

Documents viewed as part of the preparation of this report include:

- AS 4970 – 2009 – Protection of trees on development sites.
- AS 4373-2007 – Pruning of amenity trees.
- Assessors' handbook Applications to remove, lop or destroy native vegetation V1.1 October 2018; and
- Guidelines for the removal, destruction or lopping of native vegetation December 2017.
- Desktop ecological values and constraints assessment: Great Ocean Road Coastal Trail Prepared by Biosis 29 March 2022.

1.1 Existing Standard

AS 4970-2009 Protection of Trees on Development Sites provides guidance on the principles for protecting trees on land subject to development and follows, in sequence the stages of development from planning to implementation (AS 4970-2009). The standard is to be used by qualified Arborists (AQF level 5) who interpret and use the standard based on data collected on-site to inform and justify decisions in relation to protecting the tree (Moore, 2018).

AS 4970-2009 provides methods for calculating the approximate area that a tree requires to remain viable and upright. It was primarily developed for the protection of trees on development sites in urban areas and is commonly applied to determine tree impact during the construction of buildings, roads and various infrastructure and provide guidance for working within these areas.

1.1.1 Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) Specifications

The principal method of protecting trees throughout development is by establishing a tree protection zone (TPZ). TPZs have been calculated according to *Protection of Trees on Development Sites* (AS 4970-2009) for all trees to be retained calculating the TPZ as 12 times the trunk diameter at 1.4m above ground level (DBH). The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. This method is commonly used for trees in urban situations and is an effective way of protecting trees.

$$TPZ = DBH \times 12$$

The SRZ is the minimum volume of roots required by the tree to remain stable in the ground. If the SRZ is breached the chances of windthrow are increased. It is important to note that the SRZ is not related to tree health. It refers to the physical volume of roots required for the tree to remain stable in the ground. It is in no way related to the physiological requirements of the tree but is the minimum volume of roots required for the tree to remain standing.

$$\text{SRZ radius} = (D \times 50)^{0.42} \times 0.64$$

1.1.2 Encroachment

Encroachment into the TPZ of trees is allowed under certain circumstances depending on several factors including site and tree conditions. Encroachment of less than 10% of the TPZ and outside the SRZ is deemed to be minor encroachment provided construction proceeds with caution and standard tree protection measures are adhered to. Detailed root investigations should not be required but must be compensated with an extension to the TPZ elsewhere. Variations must be made by the project arborist considering other relevant factors including tree health, vigour, stability, species sensitivity and soil characteristics.

Encroachment of more than 10% of the TPZ or into the SRZ will require a qualified Arborist (AQF level 5) to demonstrate that the tree(s) will remain viable. This may require the Arborist to consider the following:

- Root investigation by non-destructive methods
- Location and distribution of the roots
- Tree species and tolerance to root disturbance.
- Lean and stability of the tree
- Root sensitive construction techniques and design
- The potential loss of root mass from encroachment
- Age, vigour, and size of the tree.
- Soil traits and volume, topography, and drainage.
- The presence of existing or past structures or obstacles affecting root growth (AS4970-2009).

1.1.3 Construction

Construction of the proposed trails will follow a flagged gps alignment, utilising natural features and minimising vegetation disturbance, in line with trail building practices and project specific construction requirements. Excavation equipment includes 1.7-ton and labourers using hand tools. Most of the trail will be 1m wide, relatively low impact with minimal excavation. However, in steep terrain deeper excavation may be required.

Given much of the construction of the trails will be low impact and determined on the day of construction the application of TPZs in accordance with AS4970-2009 throughout the site will not be practical. Development of guidelines for works close to trees for trail workers to follow in combination with periodic compliance checks to assess native vegetation offsets is proposed. This method is an effective way of reducing the impact on trees and cost effective and allow for the determination of native vegetation offsets in accordance with the legislation. Construction along existing trails will follow a similar method; however, impacts are likely to be significantly reduced due to previous impact and influence on roots.

1.2 Impacts from Walking Trail Construction and Use

Various impacts are likely to occur from the construction and subsequent use of walking trails associated with the completed Great Ocean Road walking trail. Impacts include compaction from various stakeholders accessing the site for assessment purposes, mechanical/hand excavation for construction of the trail (Trail, surface, steps, bridges and boardwalks), and ongoing compaction from normal use of the trails.

1.2.1 Construction Impacts

Walking trail construction will follow culturally, historically, ecologically and land manager approved, GPS mapped alignments and will be overseen by a dedicated Construction Manager. Where suitable trail design utilises existing geological features to reduce impact, while enhancing trail user experience.

Where possible, trail construction will require the removal of ground cover and understory vegetation only. Impacts to trees will vary depending on the proximity of the trail to trees and the depth of excavation. Trail builders will follow the established industry principals of sustainable trail building, constructing trail which passively sheds and drains water with minimal erosion and maintenance requirements.

Construction equipment typically includes a 1.7-ton excavator, followed by laborers using hand tools to perform the final shaping of the trail surface. Construction depth will vary depending on site-specific terrain and the style of the trail. Predominantly, the trail network will involve shallow, low impact construction, consisting of the removal of ground cover and organic matter, followed by minimal shaping of the mineral earth below. Potential construction impact to trees may include:

- Soil excavation resulting in damage or removal of roots.
    - Removal of small feeder roots reduce the amount of water and chemicals that are conducted throughout the tree for normal function. Although fibrous roots are highly regenerative, recovering from a loss of root mass requires additional energy.
    - Damage or removal of larger lateral roots removes the trees' ability to transport water and chemical from the feeder roots to the rest of the tree.
    - Removal or damage of large roots within the SRZ of the tree not only affects the transport of water and chemicals to the tree but may also impact the structural stability of the tree.
- Soil fills in the form of soil placement over roots:
    - Placement of soil over large areas of a tree root system create a layer that inhibits or completely prevents water infiltration and gas exchange with the soil that is required for normal tree function. In the long term, the placement soil fill can result in reduced tree function and growth and dieback of roots leading to tree death or complete failure in extreme cases.

1.2.2 Soil Compaction

Subsequent damage from soil compaction and the impact on tree roots is a major cause of decline in urban areas. Depending on land use, this can also occur in a bush or rural setting. Soil compaction can come in many forms including pedestrian traffic, vehicles, and construction equipment. Roots provide mechanical stability to a tree and are the organs which absorb water and nutrients required to carry out life processes such as photosynthesis, transpiration, and cell respiration. Compaction occurs when repeated mechanical pressure forces the air out of the soil, and reduces the space between soil particles (Harris, Matheny, and Clark, 2004) which would have been available for water and air to penetrate.

Trees can tolerate some degree of soil compaction over time and may adapt to certain amounts. Soil compaction is likely to result from trail construction equipment and labourers, normal use of trails and trail users stopping along the trails for rest stops

Activities that may cause soil compaction include:

- Trail construction equipment and labourers:
  - This type of soil compaction will occur during construction from excavation equipment and labourers walking through the site and is likely to be short term and for the period of construction.
  - Provided excavation equipment and pedestrian traffic is confined to the area of trail construction, the long-term impact to the tree's health is expected to be minor.
- Normal use of trails by walkers:
  - This type of compaction will occur within the footprint of the trail and will occur in already compacted soil over an extended period.
  - Provided periodic trail maintenance is carried out to avoid trail deviation from the accumulation of water and mud, the long-term impact to the tree's health is expected to be minor.
- Trail users stopping along the trails for rest stops:
  - Trail users stopping to rest and for may result in soil compaction from foot traffic outside the defined trail corridor.
  - To reduce soil compaction, rest stops should be constructed to provide space for multiple trail users to stop and rest.
  - Construction of rest stop surfaces should include clean gravel free from weed seed and pathogens to allow for water infiltration and to reduce compaction.

1.3 Method Reducing Impact to Trees

The proposed walking trail has been mapped within areas where native vegetation is present and have the potential to be impacted. The trail will be aligned to reduce the impact on adjoining trees, to avoid areas of significant ground cover and to allow for safe low maintenance trail design. Where impacts to trees have the potential to impact tree health and longevity, mitigation measures should be used. Where avoidance or mitigations options are not available, the tree may be required to be included in offset calculations. Sample Arborist assessments have been conducted along a variety of vegetation types and terrain to assess the impact on trees. Strategies for constructing the walking trail while accounting for impacts to trees include:

1. Trail is aligned to avoid trees and trees impacts with minimal excavation and soil fill.
   a. No preliminary Arborist assessment or supervision required.
   b. Tree impacts are minor within TPZ areas and no TPZ impacts will be included in the vegetation removal footprint.
   c. Follow up Arborist assessment following completion of the project to determine tree impacts that have not previously been accounted for.
2. Trail is aligned within steep terrain and excavation required for the installation of bridges/steps etc.
   a. Preliminary Design completed for the alignment of the trail and infrastructure used.
   b. Detailed Arborist assessment within these areas to determine the impact to the trees and TPZ impacts to be included in the vegetation removal footprint.

1.3.1 Planning and Pre-Construction

Under typical development conditions in urban areas, trees would be assessed, located and TPZ/SRZ areas applied as part of a preliminary tree assessment to assist in design purposes and to reduce potential impacts on trees and determine retention prior to plans being finalised. Given most of the trails will be through bushland areas with significant numbers of trees, carrying out detailed site survey is not feasible. In most cases the exact location of the trail will be determined at the time of construction, limiting the scope of preliminary assessments. Given most of the trails will consist of low impact construction, impacts to the tree TPZ will be minor. Where excavation is required in steep terrain for steps, retaining walls and rock armouring, detailed design and individual tree assessment may be required to determine the impact on the TPZ.

1.3.2 Engagement of the Project Arborist

A project Arborist should be engaged to advise on actions that are required to be undertaken during defined stages of construction. The project Arborist must be suitably qualified in Arboriculture and experienced in tree protection on development sites and hold minimum AQF level 5 in Arboriculture.

1.3.3 Trail Construction Inductions

Site inductions are to be carried out for all trail workers prior to being able to carry out trail works. Site inductions are to be conducted by the Site supervisor and project Arborist and will include:

- Basic tree function and the impact of damage from trail construction;
- Construction guidelines for working close to trees; and
- Procedure for when damage/removal occur to substantial roots requiring native vegetation offsets.

1.3.4 Construction Guidelines

Trail construction works close to trees have the potential to damage above and below ground parts of the trees. Specifications include:

- Trail construction works within proximity of trees should be carried out with care not to damage below and above ground parts of the tree;
- Excavation within a 1m radius of the main stem of the tree should be carried out by hand with no excavation equipment used;
- Where the alignment of the trail is close to the main stem of large trees, preference should be given for construction to the high side of the main stem where root growth may be reduced; and
- Where substantial roots are uncovered and not damaged/removed, soil fill should be used over the root, or the trail alignment moved;
- Where large numbers of substantial roots are uncovered and limited trail construction options exist, the project Arborist should be consulted.

1.3.4.1 Placement of Fill

The placement of fill may be used close the main stem of the tree provided the following specifications are adhered to including:

- Fill is not to extend greater than 50% of the circumference of the main stem;
- The placement of fill should not exceed 100mm in depth against the main stem;
- The composition of fill should include larger diameter gravel (>10mm) where possible to allow for water infiltration; and
- Damage to roots or the main stem should be avoided during the placement of fill.

1.3.4.2 Exposed Roots

Given the large population of trees and proximity to them, tree roots may be a feature within new trails. Specifications for incorporating exposed roots include:

- Where possible having exposed roots within the trail should be avoided. However, construction of trails may result in exposed roots over time through wear and erosion.
- Where exposed roots are required to be incorporated within the trail, gravel (diameter > 10mm) should be used to reduce erosion and wear over time.

1.3.4.3 Trail Construction through Riparian Areas

Most of the large significant trees are located along waterways and riparian areas. Trail construction works are likely to impact substantial roots in these areas. Review of trail design by the project Arborist and possible root investigations to assess the impact of the trail and to determine appropriate alignment of the trail through areas that do not impact substantial roots.

1.3.4.4 Native Vegetation Offset Requirements

Where substantial roots greater than a defined diameter are damaged or removed native vegetation offsets may be required. The size of substantial roots for different sized trees include:

- Trees with trunk diameters of <200mm - Substantial roots greater than 30mm;
- Trees with trunk diameters of between 200mm and 600mm - Substantial roots greater than 50mm;
- Trees with trunk diameters of between 600 and 1000mm - Substantial roots greater than 70mm; and
- Trees with trunk diameters greater than 1000mm - Substantial roots greater than 100mm

Where substantial roots are damaged or removed, the long-term health and structure of the tree may be significantly impacted, and native vegetation offsets will most likely be required. Where damage to substantial roots occur, the location and dimension of the tree are to be recorded and located for inspection by the project Arborist during routine compliance inspections. Suitably qualified arborist will determine if a tree is considered to be lost or retained.

1.3.5 Compliance Checks

Periodic compliance checks will be carried by the project Arborist to monitor construction methods and to assess the impact on trees that have been determined to be significantly impacted and may require native vegetation offsets. Arborist compliance will be required to be carried out at agreed intervals throughout the project. Compliance timeframes and actions are outlined in Table 1 below.

Table 1. Arborist compliance

Timeframe	Action
First day (induction)	Arborist will be onsite to induct trail workers regarding various tree impacts and recommended construction methods
First week (Induction and supervision)	Arborist will be onsite supervising construction for 2 days during the first week including initial induction
First month (Induction, supervision and compliance)	Arborist will be onsite for at least 1 day per week for supervision and compliance excluding first week
Every month following initial month (supervision and compliance)	Arborist will be onsite for at least 1 day per month primarily for compliance. Based on 10km per month. Where additional resources are used additional inspections will be required. Trees along the trail will be assessed based on damage/removal to substantial roots. Only trees considered to be significantly impacted and are likely to die within the next five years will be recorded photographed and DGPS located.