BMNGH-PER-REP-2007-02-Preliminary Onshore Ecology Desktop Assessment

Blue Mackerel Offshore Wind Farm

Blue Mackerel North Pty Ltd

22 December 2025

Project name		Blue Mackerel Offshore Wind Farm EIA and Approvals					
Document title		BMNGH-PER-REP-2007-02-Preliminary Onshore Ecology Desktop Assessment | Blue Mackerel Offshore Wind Farm					
Project number		12656248					
File name		BMNGH-PER-REP-2007-02-Preliminary Onshore Ecology Desktop Assessment.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	[redacted]	[redacted]		[redacted]		22/12/2025

GHD Pty Ltd | ABN 39 008 488 373
Contact: [redacted], [redacted] | GHD
180 Lonsdale Street, Level 9
Melbourne, Victoria 3000, Australia
T [redacted] | **F** [redacted] | **E** [redacted] | **ghd.com**

Acknowledgement of Country

GHD acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.

Executive summary

The Blue Mackerel Offshore Wind Farm Project ('the Project') proposes the installation of a 1 gigawatt (GW) offshore wind farm off the Gippsland coast. The Project is being developed by Blue Mackerel North Pty Ltd (BMN). GHD Pty Ltd (GHD) has been engaged by BMN to undertake a desktop and rapid site assessment of ecological values within the onshore cable investigation area (CIA) for the Project.

The Project involves construction of offshore wind turbine generators, inter-array cables, and export cables to connect the offshore wind farm to VicGrid's proposed connection hub. Onshore works would include installation of approximately 6 km to 10 km of onshore buried transmission cables between the shoreline and the connection hub. Horizontal directional drilling (HDD) is the preferred construction method to install the shoreline crossing for the cables to minimise impacts on the coastline and dune system.

The onshore CIA is located within the Gippsland Basin and represents the area within which the onshore transmission cables would be located. The onshore transmission cable route is yet to be confirmed and would require an onshore cable construction corridor between 6 and 10 km long by 50 m wide (up to 50 ha). The onshore CIA assessed in this report encompasses a broader area of approximately 6,217 ha, to enable an onshore transmission route to be selected that avoids and minimises impacts on ecological and other values. The land use across the onshore CIA is predominantly agriculture and forestry. The onshore CIA also contains some interspersed areas of bushland and coastal reserves containing ecological values. The Project will aim to avoid or minimise impacts on these values during the route selection and detailed design phases of the Project.

This report identifies areas where there is the potential for ecological values to be present within the onshore CIA and provides a preliminary assessment of the potential effects of the proposed development to inform the Project referrals under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Environment Effects Act 1978* (EE Act). This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.2 and the assumptions and qualifications contained throughout the Report.

Key ecological values

The following key ecological values have been identified as being known or having the potential to occur within the onshore CIA during the desktop and rapid site assessments:

- Native Vegetation: Approximately 716 ha of native vegetation is modelled to occur within the broader 6,217 ha onshore CIA, with seven Ecological Vegetation Classes (EVCs) recorded during the rapid site assessment, including endangered EVCs Swamp Scrub (EVC 53) and *South Gippsland* Plains Grassland (EVC 132_62)
- Threatened Ecological Communities (TECs): Two EPBC Act-listed TECs and two *Flora and Fauna Guarantee Act 1988* (FFG Act) listed TECs are confirmed or likely present:
  - *Natural Damp Grassland of the Victorian Coastal Plains* (NDGVCP) (EPBC Act - Critically Endangered) – Likely to occur at Darriman H29 Bushland Reserve
  - *Subtropical and Temperate Coastal Saltmarsh* (STCS) (EPBC Act - Vulnerable) – Likely to occur at Lake Denison modelled wetland and areas of modelled Estuarine Wetland (EVC 10)
  - Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland Community (FFG Act - Threatened) – Confirmed at McLoughlins Beach - Seaspray Coastal Reserve
  - Plains Grassland (South Gippsland) Community (FFG Act - Threatened) – Confirmed at Darriman H29 Bushland Reserve
- Threatened & Migratory Species:
  - Suitable habitat for 36 threatened flora, 65 threatened fauna, and 31 migratory species
  - Confirmed presence of three threatened flora:
    - *Dianella amoena* (Matted Flax-lily) (EPBC Act – Endangered, FFG Act – endangered)
    - *Calystegia soldanella* (Coast Bindweed) (FFG Act – endangered)
    - *Oxalis rubens* (Dune Wood-sorrel) (FFG Act – endangered)

- Confirmed presence of one threatened fauna species and one migratory species:
  - White-bellied Sea-Eagle (*Haliaeetus leucogaster*) (FFG Act – Endangered)
  - Double-banded Plover (*Charadrius bicinctus*) (EPBC Act – migratory)
- Key habitat areas include Giffard (Rifle Range) Flora Reserve, Darriman H29 Bushland Reserve, Lake Denison estuary, and McLoughlins Beach – Seaspray Coastal Reserve

– Wetlands & Waterways:
  - Five mapped wetlands (~224 ha) and proximity to two Ramsar sites (Corner Inlet, Gippsland Lakes)
  - Presence of ephemeral waterways and estuarine systems

Regulatory considerations

As the majority of the onshore CIA is highly modified in nature, with ecological values interspersed in discrete locations, there is scope for BMN to strategically avoid and minimise impacts to known or potential ecological values during the route selection and detailed design phase of the project.

The following legislative considerations, with regards to the onshore ecology assessment, also apply:

– EPBC Act: Potential impacts to Matters of National Environmental Significance (MNES) (threatened species, TECs, Ramsar wetlands) are unlikely to be significant if avoidance and mitigation measures are implemented
– EE Act: Preliminary assessment suggests potential for impacts relevant to the referral criteria, but impacts can likely be avoided through planning and design

Recommendations

It is recommended that BMN incorporate the findings of the preliminary onshore ecological assessment (this report) and any other assessments proposed to be undertaken (i.e., alignment selection report) to inform the siting of project infrastructure, project design and selection of appropriate construction methods (e.g., HDD or direct pipe), with an aim to avoid and minimise impacts to onshore ecological values.

For this project, key areas to avoid and minimise impacts on within the onshore CIA include:

– Giffard (Rifle Range) Flora Reserve
– Darriman H29 Reserve
– McLoughlins Beach – Seaspray Coastal Reserve
– Lake Denison and its associated estuarine habitats
– mapped current wetlands and high value waterways
– areas of roadside native vegetation along Giffard Road, Giffard West Road, McGaurans Beach Road and Owens Lane

Once the location of project infrastructure is known (i.e., shore crossing location and a preferred cable alignment), undertake more detailed desktop and site assessment for the Project. This may involve undertaking detailed mapping of native vegetation and fauna habitat, seasonal targeted surveys for TECs, threatened flora, threatened fauna and migratory species in accordance with relevant survey guidelines.

The outcomes of detailed site assessments and targeted surveys (if undertaken) should be used to further refine project design, Project planning and approvals, and construction detail, where applicable. The outcomes may inform:

– the detailed siting of project infrastructure
– selection of appropriate construction methods (e.g. horizontal directional drilling (HDD) or direct pipe)
– timing of construction activities
– likely requirements for Project planning approvals and permits, including offsets or compensation requirements

Details of management and mitigation measures should be documented in the Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) prepared for the construction and operational stages of the Project.

Contents

Table index

Figure index

Appendices

Abbreviations

Table 1.1 Abbreviations list

Abbreviation	Description
ALA	Atlas of Living Australia
BCS	Biodiversity Conservation Status
BMN	Blue Mackerel North Pty Ltd
CaLP Act	*Catchment and Land Protection Act 1994*
CEMP	Construction Environmental Management Plan
CIA	Cable investigation area
CMA	Catchment Management Authority
Cth	Commonwealth
CSIRO	Commonwealth, Scientific and Industrial Research Organisation
DBH	Diameter at Breast Height
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth)
DEECA	Department of Energy, Environment and Climate Action (Vic)
DTP	Department of Transport and Planning (Vic)
ECNES	Ecological Communities of National Environmental Significance
EE Act	*Environment Effects Act 1978*
EES	Environment Effects Statement (Vic)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988* (Vic)
FLA	Feasibility Licence Area
GHD	GHD Pty Ltd.
GipP	Gippsland Plain bioregion
GIS	Geographic Information System
GP	Generally Protected Flora (under the FFG Act)
GW	Gigawatt
ha	Hectare
HDD	Horizontal Directional Drilling
HAT	Highest astronomical tide
MNES	Matters of National Environmental Significance
MW	Megawatt
NDGVCP	Natural Damp Grassland of the Victorian Coastal Plains

Abbreviation	Description
OEMP	Operational Environmental Management Plan
PMST	Protected Matters Search Tool
P&E Act	*Planning and Environment Act 1987* (Vic)
RU	Restricted Use Protected Flora (under the FFG Act)
STCS	Subtropical and Temperate Coastal Saltmarsh
TEC	Threatened Ecological Community
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
VBA	Victorian Biodiversity Atlas
WGCMA	West Gippsland Catchment Management Authority
WONS	Weeds of National Significance
WTG	Wind Turbine Generator

Glossary

Table 1.2 Glossary terms and definitions

Term	Definition
Project terms	
Easement	An easement is a legal right held by a person or party to access, occupy and use part of the land owned by another person for a particular purpose. For example, for the construction and operation of a transmission line. Easements are usually subject to conditions negotiated between the grantor and grantee of the easement and are registered on the title of the land affected, creating a public record of the existence of the interest in the land. Easements provide safe clearances from the transmission line to any object in any direction.
Feasibility licence area (FLA)	The offshore area that BMN holds a licence to investigate for the proposed 1 GW wind farm. The FLA is 162.68 km^2 in area. It is contained within the Gippsland Declared Area OEI-01-2022 Part 1. The FLA includes the location of all WTGs, the inter-array cabling, and potentially includes the offshore substation/s.
Highest astronomical tide (HAT)	Defined as the highest tide level which can be predicted to occur under average meteorological conditions and any combination of astronomical conditions. This does not include extreme water levels caused by storm surges etc. This tide level has been used to define the boundary where the Victorian marine and terrestrial environments meet. i.e., it is the end of the marine environment and the start of the terrestrial environment. It should be noted that 'coastal' areas exist on either side of this tide line (i.e., in both the marine and terrestrial areas).
Hub	This component attaches the rotor blades to the wind tower and nacelle.
Inter-array cabling	The transmission cabling between the WTGs, and that connect into the offshore substation/s.

Term	Definition
Landowner	A person or entity that owns the parcel of land being referred to in the text.
Marine environment	In the context of Victorian planning, the marine environment extends from the HAT out to sea to 3 nautical miles. For the Project, the 'marine environment' includes both the Victorian and Commonwealth areas within which the Project exists, extending from the FLA to the coastal HAT. If distinction between the different marine environments is required, 'Victorian' and 'Commonwealth' terms will be used.
Minister's assessment	The Victorian Minister for Planning's assessment of the EES.
Nacelle	The housing on top of the wind turbine tower that contains all the components that convert wind power to electrical energy.
Offshore	Describes any part of the Project or any area that occurs within the marine environment, from the FLA to the HAT.
Onshore	Describes any part of the Project or area that occurs within the terrestrial environment, from the HAT to the VicGrid substation connection hub.
Onshore study area	A broader region surrounding the onshore CIA, encompassing a 10 km buffer, which includes areas outside of the onshore CIA, but excludes the area below the highest astronomical tide (HAT).
Onshore cable construction corridor	An area within the onshore cable investigation area, between 6 and 10 km in length, that would be disturbed to lay the underground export cables. This construction corridor would include an HDD/direct pipe work site, cable sub-surface joining bay sites, associated temporary construction areas, and access tracks. The onshore cable construction corridor will be approximately 50 m wide (inclusive of trench area, access road and buffer). During operation, the easement will be approximately 30 m wide. The onshore cable construction corridor will be aligned within the onshore cable investigation corridor.
Onshore cable investigation area (onshore CIA)	The onshore cable investigation area encompasses the terrestrial area within which the underground export cables would be installed that would connect the offshore infrastructure to the VicGrid substation connection hub. The onshore cable investigation area is approximately 6,217 ha and is approximately 10 km long, extending from the HAT to the VicGrid substation connection hub. The underground export cables could be laid anywhere within this area. It does not include the VicGrid substation connection hub.
Onshore cable investigation corridor	The preferred alignment corridor to be subject to detailed assessment of ecological values. The onshore cable investigation corridor will be aligned within the onshore cable investigation area.
Project	Blue Mackerel Offshore Wind Project
Project Area	The **Project Area** encompasses all areas that would be used to support the construction and operational components of the Project. The Project Area includes the feasibility licence area (FLA), the offshore cable investigation area and the onshore cable investigation area.
Shore crossing	The term used to describe the Project works required to 'pull-in' the offshore transmission cable from the sea to land using HDD or direct pipe. These works will connect the offshore and onshore transmission cables together.

Term	Definition
VicGrid substation connection hub	A VicGrid substation that will be located near Giffard. The connection hub would provide future offshore wind energy facilities a shared connection point/substation into the Victorian transmission network.
Traditional Owner	A person is a traditional owner of an area if: 1. the person is an Aboriginal person with particular knowledge about traditions, observances, customs or beliefs associated with the area; and 2. the person: a. Has responsibility under Aboriginal tradition for significant Aboriginal places located in, or significant Aboriginal objects originating from, the area; or b. Is a member of a family or clan group that is recognised as having responsibility under Aboriginal tradition for significant Aboriginal places located in, or significant Aboriginal objects originating from, the area.
Transmission cables	The cables that transmit the electricity generated by the Project. This includes: – Inter-array cabling (between WTGs and into the offshore substation/s) – Sub-sea export cables (beginning at the offshore substation/s, and ending when joined to the onshore underground cables) – Underground export cables (beginning at the termination of the sub-sea export cables, and ending at the VicGrid substation connection hub
Wind farm	Refers to the WTGs and the inter-array cabling infrastructure.
Wind turbine generators (WTGs)	The individual wind turbines that form the wind farm, inclusive of all infrastructure components e.g., tower, nacelle, hub, blades etc.
Discipline-specific terms	
Bioregion	A landscape-based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.
Bioregional conservation status (BCS)	An assessment of the conservation status of the native vegetation type (EVC) in the context of a particular bioregion, taking account of how commonly it originally occurred, the current level of depletion and the level of degradation of condition typical of remaining stands.
Ecological Vegetation Class (EVC)	EVCs are the standard unit for classifying native vegetation types in Victoria. An EVC is described through a combination of floristics, lifeforms and ecological characteristics and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities that occurs across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.
Exotic fauna (non-native fauna)	Any fauna that is not native to Australia or its states and territories.

Term	Definition
Onshore ecology	Onshore ecology refers to all terrestrial habitats and aquatic habitats that occur in the terrestrial environment, this includes terrestrial wetlands and intertidal areas but excludes marine habitats. Intertidal areas (i.e., estuarine areas, sandflats) were considered in this report from a habitat perspective because they may support threatened and/or migratory fauna species that also use the terrestrial environment (i.e., shorebirds).
Pests (animals, plants and pathogens)	**Pest animals** Non-native fauna that is known to be responsible for environmental degradation, particularly with regard to native fauna. Common examples include Red Fox, feral Cat, Black Rat, European Rabbit, Goat, Pig.
	Pest plants Non-native flora including any species that are introduced to Victoria. This includes species that are: – Environmental or noxious weeds that are listed under the *Catchment and Land Protection Act 1994* (CaLP Act). These plants cause environmental or economic harm, or have the potential to cause such harm, and in some cases can also present risks to human health (DJPR 2021) – Classified as Weeds of National Significance (WONS) in the Australian Weeds Strategy 2017-2027
	Pathogens A pathogen is a microorganism that causes, or can cause, disease. E.g. the Amphibian Chytrid Fungus and the Epizootic Haematopoietic Necrosis Virus that infects fish.
Plant cover	Plant cover is the proportion of the ground that is shaded by vegetation foliage when lit from directly above. Areas that include non-vascular vegetation (such as mosses and lichens) but otherwise support no vascular vegetation are not considered to be a patch for the purposes of the vegetation removal Guidelines (DEECA, 2025b). However, when non-vascular vegetation is present with vascular vegetation, it does contribute to cover when determining the percentage of perennial understorey plant cover.
Ramsar Site	Ramsar sites (or Ramsar wetlands) are wetlands of international importance listed under the Ramsar Convention on Wetlands. The Convention on Wetlands, known as the Ramsar Convention, is an intergovernmental environmental treaty established in 1971 by UNESCO, which came into force in 1975. It provides for national action and international cooperation regarding the conservation of wetlands, and wise sustainable use of their resources. Ramsar identifies wetlands of international importance, especially those providing waterfowl habitat. There are 66 Ramsar sites in Australia.
Scattered tree	A scattered tree is a native canopy tree that does not form part of a patch (DEECA, 2025b).
Threatened species (listed species)	For the purposes of this report, threatened species refers to species considered threatened in Victoria or Australia. This includes species that are listed as Vulnerable, Endangered or Critically Endangered in Victoria under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), or listed as Vulnerable, Endangered or Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Term	Definition
Victorian Biodiversity Atlas (VBA)	The VBA is administered by the Victorian Department of Energy, Environment and Climate Action and replaces several legacy systems, including the Flora Information System, the Atlas of Victorian Wildlife, and the Aquatic Fauna Database. The VBA encompasses vertebrate and invertebrate animals, fungi, vascular and non-vascular plants from terrestrial and aquatic environments, including marine waters to the three nautical mile statutory limit. It includes both native and naturalised exotic species (including weeds and pests) but is not intended to hold data on cultivated or domesticated species.

1. Introduction

The Blue Mackerel Offshore Wind Farm Project ('the Project') proposes the installation of a 1 gigawatt (GW) offshore wind farm off the Gippsland coast. The Project is being developed by Blue Mackerel North Pty Ltd (BMN).

The Australian Minister for Climate Change and Energy declared a 15,000 km^2 area off Gippsland as suitable for offshore renewable energy in December 2022 and awarded BMN a feasibility licence in May 2024 for an area of approximately 163 km^2, which allows BMN to begin the assessment work to support the Project's approvals. An *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral for marine surveys to appraise the feasibility and design of the Project was submitted in September 2024 and determined by a delegate of the Commonwealth Minister to be 'not a controlled action subject to conditions' (EPBC reference number 2024/09934). The portion of the surveys undertaken in Victorian waters also received consent under the *Marine and Coastal Act 2018*.

The Project involves construction of offshore wind turbine generators, inter-array cables, and export cables to connect the offshore wind farm to VicGrid's proposed connection hub. Works will occur within Commonwealth waters, Victorian coastal waters and onshore within Victoria. The Project is therefore expected to require preparation of an Environment Impact Statement and approval under the EPBC Act as well as planning approvals under relevant Victorian legislation. This preliminary onshore ecology assessment is being prepared to inform assessment of the onshore components of the Project and referrals under Commonwealth and Victorian legislation.

A project overview is provided within Section 2 of this report, which describes the key infrastructure associated with the Project, the proposed construction methods and the expected operational phase of the Project.

1.1 Purpose of this report

The purpose of this report is to identify areas where there is the potential for threatened species and communities, or other ecological values to be present within the onshore cable investigation area (CIA), and provide a preliminary assessment of the potential effects of the proposed development, to inform the Project referrals under the EPBC Act and *Environment Effects Act 1978* (EE Act).

1.2 Scope of this assessment

The scope of this preliminary ecological assessment involved a desktop assessment of the onshore study area and rapid site assessments of land accessible by the public within the onshore CIA. This report details the results of the ecological database searches and draws on the results of the rapid site assessments to document ecological values known or with the potential to occur within the onshore CIA, and to provide a preliminary assessment of the potential for significant impacts as a result of the proposed project on:

- Threatened ecological communities (TECs), including communities listed under the EPBC Act and/or *Flora and Fauna Guarantee Act 1988* (FFG Act)
- Threatened flora and fauna species, including species listed under the EPBC Act and/or FFG Act
- Migratory species listed under the EPBC Act
- Native vegetation, terrestrial and aquatic habitat areas and wildlife corridors within the onshore CIA
- Aquatic species and ecological values of waterways, tributaries, drainage paths, floodplains and wetlands

The preliminary ecological assessment also includes identification of avoidance, mitigation and management measures to minimise the impacts of the Project on onshore ecological values. This is supplemented with maps that use a red, amber and green colour scale to visually classify areas by ecological value at a land parcel scale, based on defined ecological criteria. These maps provide an overview of the existing ecological conditions across the onshore CIA to help inform the siting of project infrastructure and to identify areas that pose the greatest ecological constraints to the onshore CIA.

1.3 Limitations

This report: Preliminary Onshore Ecology Desktop Assessment – Blue Mackerel Offshore Wind Farm has been prepared by GHD for Blue Mackerel North Pty Ltd and may only be used and relied on by Blue Mackerel North Pty Ltd for the purpose agreed between GHD and Blue Mackerel North Pty Ltd as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Blue Mackerel North Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

GHD has prepared this report on the basis of information provided by Blue Mackerel North Pty Ltd and others (including Government authorities). GHD has not independently verified or checked this information beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on assumptions made and limitations identified by GHD described in Section 3.3 this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Project overview

The Project proposes the installation of a 1 GW wind farm off the coast of Brataualung and Tatungalung Country, Gippsland, approximately 10 km from Seaspray, Victoria (Figure 2.1). The Project intends to connect to Victoria's electricity network via VicGrid's proposed connection hub, near Giffard, Victoria.

The Project includes the following key infrastructure:

– Offshore wind turbine generators (WTGs) installed on foundations secured into the seabed (fixed foundations), arranged in an optimal array layout with up to 70 turbines depending on the type of turbine selected and its energy generating capacity. Each turbine would have a capacity ranging from 15 megawatts (MW) up to 23 MW
– Network of subsea inter-array cables connecting the WTGs, laid on the seafloor and protected by armouring or burial
– Potentially one or two offshore substation platforms installed on foundations secured into the seabed (fixed foundations)
– Export cables, laid on the seafloor and protected by armouring or burial
– Shore crossing with trenchless construction (horizontal directional drilling (HDD) or direct pipe) construction method
– Onshore buried transmission cables between the shoreline and the VicGrid substation connection hub near Giffard. The onshore transmission cable will be between 6 km and 10 km in length, with the route determined by landholder access agreements and the avoidance and minimisation of impacts on environmental and heritage values. Trenching will be the primary construction method, with trenchless construction methods preferred at environmentally sensitive locations such as waterway crossings and when crossing existing roads and infrastructure, where practicable. Cables will be installed in lengths and connected with sub-surface jointing bays

VicGrid is responsible for land acquisition and approvals for the connection hub. The Victorian Government is also assessing the role of deepwater ports, including the Victorian Renewable Energy Terminal at the Port of Hastings, to support the construction and assembly of Victorian offshore wind projects. It is anticipated that port expansion works or upgrades would be undertaken by the Port to service multiple developments and offshore wind farm projects. The connection hub and port infrastructure are therefore outside the scope of this project.

The Project traverses the Victorian terrestrial environment in Wellington Shire local government area, Victorian coastal waters and Commonwealth marine waters in the Bass Strait as shown in Figure 2.1.

2.1 Onshore activity description

This section outlines the key activities associated with the onshore components of the Project that are assessed in this report. Details regarding offshore (i.e., marine) elements are presented and assessed in the separate Preliminary Marine Ecology report (GHD, 2025b).

Construction of the Project will include the following key onshore activities:

– Onshore surveys and site preparation:
    - Onshore vegetation removal, site levelling, office and laydown construction
    - Potentially minor upgrades to local roads and material and plant delivery for onshore components

– Onshore key construction activities:
    - For the onshore landfall location/shore crossing: an HDD or direct pipe work site including space to accommodate the plant and machinery for pulling the cable through the drill hole from offshore to onshore, water storage and drilling fluid recycling unit, vehicle and equipment storage. The site is estimated to be 100 m x 100 m in area. The HDD/direct pipe work site will be setback from the high-water mark (i.e., to avoid public conservation areas, shoreline dunes, environmental constraints) but sited in sufficient proximity to the shoreline to enable directional drilling to reach sufficient water depths of >10 m. The indicative setback from the high water mark is around 200 m, however, it will be informed by measures to avoid and minimise impacts
    - Establishment of cable sub-surface joining bay sites, associated temporary construction areas, and temporary access tracks
    - Installation of the onshore transmission cable, predominantly by trenching, but with trenchless construction to be used where appropriate in environmentally sensitive locations such as the shore crossing and waterway crossings and when crossing existing roads and infrastructure, where practicable
    - Installation of cable ducts for sections of the onshore cables routes to be constructed using HDD or direct pipe (for example the shore crossing location)
    - A connection to the proposed VicGrid connection hub near Giffard as part of the Gippsland Renewable Energy Zone (GREZ)
    - Any reinstatement/landscaping works

Construction activities for the onshore transmission cable would occur in an easement up to 50 m x 10 km, resulting in an onshore cable construction corridor of up to 50 ha.

The operational life of the Project is estimated to be up to 40 years, during which time typical operational activities could include:

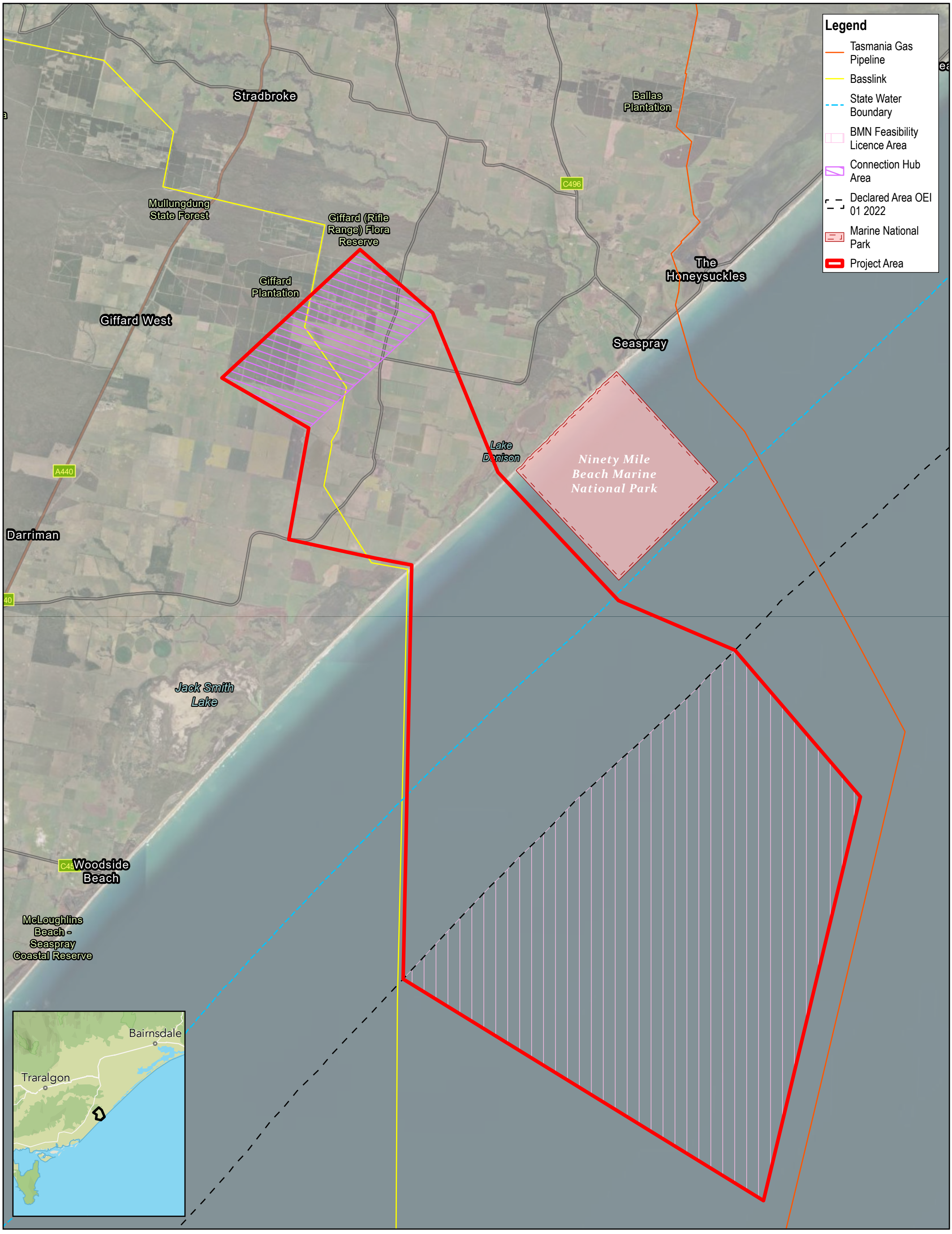
– Ongoing monitoring and operation of the WTGs throughout the year
– Routine and ad-hoc offshore maintenance activities (either offshore or at the operations and maintenance port as required). Activities may include major maintenance activities such as blade repair/replacement)
– Use and maintenance of onshore infrastructure and property (including onshore easement vegetation management)
– Ongoing infrastructure performance and environmental monitoring
– Repowering (subject to any required regulatory approvals) at the end of WTGs' design life, involving replacement with new WTGs on existing foundations, thereby extending design life further

A decommissioning plan will be prepared during detailed design and refined during the Projects operational life and in accordance with relevant legislation, guidance and policy.

Decommissioning activities would be similar in type and scale to the construction methods and would involve similar vessels and equipment. Decommissioning activities would be reviewed in discussion with the transmission system operator and regulator at the time in light of any other existing or proposed future use.

It is anticipated that decommissioning would include:

– The WTG and offshore substation foundations and any unburied cables would be designed to allow for structures above the seabed to be removed
– Buried cables and subsea foundations below the mudline would likely remain in situ to avoid the environmental disturbance caused by removal
– Onshore, underground transmission cables would typically be securely buried after use, with the cable ends cut and sealed
– Reinstatement/rehabilitation activities
– Mitigation and monitoring



Paper Size ISO A3

0 0.85 1.7 2.55 3.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project overview and relevant jurisdictions

Project No. **12656248**
Revision No. **C**
Date **5/11/2025**

FIGURE 2.1

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_021_A3P_Project overview_rev
Print date: 05 Nov 2025 - 11:25

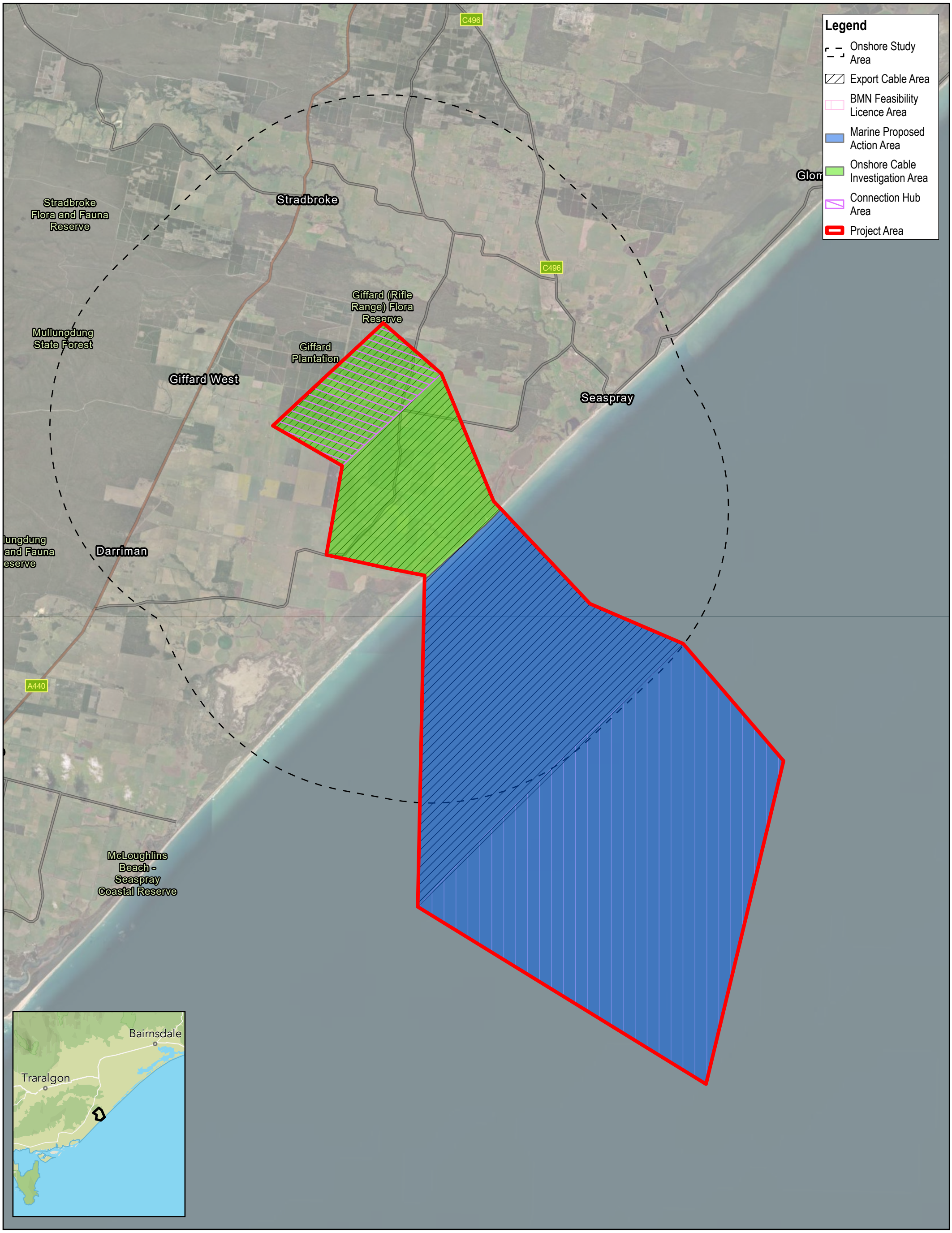
Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- Vicgrid Basemap - ESRI 2024 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray

2.2 Onshore cable investigation area and onshore study area

The **onshore cable investigation area** (‘onshore CIA’) is defined as the onshore component of the boundary within which the onshore cable will be located, and is shown on Figure 2.2. The onshore CIA is entirely within Victorian jurisdiction.

The term **onshore study area** refers to a broader region surrounding the onshore CIA, encompassing a 10 km buffer, which includes areas outside of the onshore CIA, but excludes the area below the highest astronomical tide (HAT). The HAT line defines the boundary between marine and onshore ecological assessment areas for the Project. Marine ecology is assessed in GHD (2025b).

The onshore study area for this assessment includes all land and waterways within 10 km of the onshore CIA, however, it excludes marine records. The onshore study area is larger than the onshore CIA and is included to provide context to determine the significance or connectivity of ecological values identified within the onshore CIA. The onshore study area was assessed at a desktop level only.



Paper Size ISO A3

0 1 2 3 4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Preliminary assessment project areas and study context

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 2.2

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_022_A3P_preliminary assessment_rev
Print date: 05 Nov 2025 - 11:19

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray

3. Methods

3.1 Terminology

3.1.1 Nomenclature

Common names for flora follow the Victorian Biodiversity Atlas (VBA) (Version 3.2.8) and scientific names for flora follow the Flora of Victoria (Walsh, N.G. and Entwisle, T.J. (1994-1999)), unless otherwise stated. Common names and scientific names for fauna follow the VBA (Version 3.2.8) unless otherwise stated.

In this report, fauna refers to all terrestrial and aquatic species that use the onshore environment (i.e., mammals, birds, reptiles, frogs, invertebrates and fish). As outlined in Section 2, marine fauna is considered in a separate report.

For flora, many species do not have a single well-recognised common name (they may have multiple names in common use or none at all). In this report, the flora species naming convention is provided as scientific name followed by common name. For fauna, species tend to have a single well-recognised common name, so the species naming convention is typically provided as common name followed by scientific name.

In general, both names (scientific and common) are provided for all species where first introduced, then one name is provided thereafter in that section. This convention is overlooked in some sections to make it clear which species are being referred to.

3.1.2 Flora

Native vegetation is defined in the Victoria Planning Provisions as ‘plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses’. Under the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2025b), native vegetation is classified into two categories, a **Patch** of vegetation or a **Scattered tree**:

A **Patch** of native vegetation is either:

– An area of native vegetation where at least 25% of the total perennial understorey plant cover is native
– Any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy
– Any mapped wetland included in the Current wetlands map (available on DEECA online mapping tools)

A **Scattered tree** is a native canopy tree that does not form part of a patch. A canopy species is a mature tree (i.e. it is able to flower) that is greater than 3 metres in height and is normally found in the upper layer of the relevant Ecological Vegetation Class.

Other forms of vegetation include:

– A Large Tree can be either a large scattered tree or a Large Tree within a patch. A Large Tree is a native canopy tree with a DBH greater than or equal to the Large Tree benchmark for the relevant bioregional EVC. The DBH can be determined by measuring the circumference (in centimetres) of a tree at 1.3 metres above ground level (DELWP 2025b)
– Planted native vegetation, i.e. includes non-indigenous native species and areas of revegetation
– Scattered native plants, i.e. patches of vegetation dominated by introduced species where less than 25% of the total perennial understorey plant cover is native and no scattered trees occur
– Non-native vegetation, i.e. vegetation that comprises entirely introduced flora

3.1.3 Vegetation communities

Native vegetation in Victoria is mapped in units known as ecological vegetation classes (EVCs). EVCs are described according to a combination of floristic, life form, and ecological characteristics, and through an inferred fidelity to particular environmental attributes.

Each EVC occurs under a common regime of ecological processes within a given biogeographic range and may contain multiple floristic communities.

Other vegetation types that may occur in Victoria include vegetation communities listed as threatened under the EPBC Act and/or the FFG Act. These have separate vegetation classification systems, each of which is also separate to the EVC classification system. As such, any single patch of native vegetation occurring within the subject site (or anywhere in Victoria) will be classifiable as a particular EVC, and may also be separately classified as a different threatened ecological community under the EPBC Act, and/or as another vegetation community under the FFG Act. The EVC mapping includes units called mosaics, complexes and aggregates.

EVC Complex

An EVC complex is used where vegetation shows characteristics of two different Ecological Vegetation Classes (EVCs), such as Sedgy Riverine Forest/Riverine Swamp Forest Complex. This typically reflects habitat conditions that are intermediate or fluctuating between those of each EVC, allowing elements of both to co-exist. The individual EVCs within a complex usually can't be separated at a scale suitable for mapping.

EVC Mosaic

An EVC mosaic describes vegetation made up of distinct patches of different EVCs. Unlike a complex, the individual components of a mosaic can usually be identified and mapped on-site at a broader scale. In contrast, complexes contain more interwoven vegetation types that can't be distinguished or mapped easily at the plant level.

EVC Aggregate

An EVC aggregate refers to a generalised vegetation type found in a particular ecological setting (e.g. saline lakes, billabongs, or mineralised drainage lines on basalt soils). These may include multiple EVC components tied to a specific habitat. While the different EVCs can often be recognised, their complexity can make it difficult to separate them for broad-scale mapping. Aggregates may include mosaics, complexes, or a combination of both.

3.1.4 Threatened species, migratory species and ecological communities

For each flora and fauna species or vegetation community, conservation status was determined in accordance with the Commonwealth EPBC Act and the Victorian FFG Act current at the time of reporting (August 2025).

For the purposes of this report, 'threatened species' refers to those species that are listed as threatened under the EPBC Act and/or FFG Act. 'Threatened communities' refers to communities of flora and fauna that are listed as threatened under either the EPBC Act or FFG Act.

Flora or fauna communities known or potentially occurring within the onshore study area are only considered if they are listed under one or more of these Acts. 'Migratory species' refers to species listed as Migratory under the EPBC Act. Categories of threat status are identified in Table 4.1.

Table 3.1 Threatened species, threatened communities and migratory species listing categories by legislation

Legislation	Categories
Commonwealth	
EPBC Act (threatened species and communities)	Vulnerable (VU)
	Endangered (EN)
	Critically Endangered (CR)
	Migratory (Mi)
	Marine (Ma) – not considered in this report.
State	
FFG Act (threatened communities only)	Threatened (thr)
FFG Act (threatened species only)	Vulnerable (vu)
	Endangered (en)
	Critically Endangered (cr)

3.1.5 Shorebirds

For the purpose of this report, the term 'Shorebirds' encompasses threatened and non-threatened migratory and resident (i.e., non-migratory) shorebirds (e.g., sandpipers, plovers and their allies) that use or could use onshore (including coastal/beach) habitats, regardless of their listing as migratory or threatened under the EPBC Act or FFG Act. It does not include other wetland birds (e.g., ducks, egrets, herons, bitterns, gallinules), terrestrial birds (e.g. woodland birds) or marine birds (e.g., pelagic and oceanic species such as albatrosses, shearwaters, petrels). Marine species (including seabirds) are considered in the Preliminary Assessment Report Marine Ecology (GHD 2025b).

3.1.6 Bass Strait migratory species

For the purpose of this report, Bass Strait migratory species encompasses threatened and non-threatened fauna species that are known to cross Bass Strait. These species may or may not be included on the EPBC Act list of migratory species or threatened species, or the FFG Act list of threatened species. These species will be considered as part of the Onshore Ecology assessment, but only for their presence in Victoria and not in the context of their Bass Strait migrations (i.e., potential for turbine interactions to be considered in the Preliminary Assessment Report Marine Ecology (GHD 2025b)).

3.1.7 Protected flora

Protected flora under the *FFG Act 1988* includes:

1. Plant taxa (species, subspecies or varieties) listed as threatened under the FFG Act
2. Plant taxa belonging to communities listed as threatened under the FFG Act
3. Plant taxa that are declared protected by the Minister. These are taxa which are not threatened but require protection for other reasons

There are two different categories for declared protected flora: generally protected flora (GP) and restricted use protected flora (RU; DEECA 2024).

'Generally protected flora' refers to all other protected flora that are impacted by take for all other reasons (e.g., development, infrastructure maintenance works, etc.) and can include those species at risk of both commercial/personal take and incidental take.

'Restricted use protected flora' are those flora that are exclusively impacted by take for commercial or personal use (e.g., not at risk from other activities). Take for other reasons (e.g., take incidental to track maintenance etc.) isn't restricted as long as reasonable care is taken not to impact the taxon.

Incidental take is where plants are taken to make space for something else – for example, clearing for the construction or maintenance of a building, road, or pipeline; clearing for grazing or cropping; or clearing to construct bushfire fuel break. Any take where the intent is not to obtain a specimen of the plant, but to simply remove it, is incidental take. Incidental take would apply to this Project.

For the purposes of this report the term 'protected flora' is used only for those species in the third category described above i.e. plants that are 'declared' protected flora under the FFG Act (DEECA 2024). Threatened flora and plant taxa belonging to threatened communities are addressed in sections describing threatened flora and communities within the onshore study area.

3.1.8 Weeds

The loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants is a listed key threatening process under the EPBC Act. In addition, Invasion of native vegetation by 'environmental weeds', is a listed potentially threatening process under the FFG Act.

Following confirmation of the preferred onshore cable construction corridor, a detailed assessment will be undertaken and a list of flora species observed within the proposed footprint will be compiled. This list will include environmental weeds, noxious weeds listed under the *Catchment and Land Protection Act 1994* (CaLP Act), and Weeds of National Significance (WoNS).

3.1.9 Wetlands

Wetlands are defined as surface waters, whether natural, modified or artificial, subject to permanent, periodic or intermittent inundation, which hold static or very slow-moving water and support biota adapted to inundation and the aquatic environment. This includes waterbodies such as lakes, swamps, fens, marshes, peatlands, springs and supratidal and intertidal (but not subtidal) areas (DELWP 2016b).

Wetlands, including DEECA modelled current wetlands (WETLAND_CURRENT_NVR) have been classified following T*he Victorian wetland classification framework 2014* (DELWP 2016b), which has replaced the Corrick wetland classification system originally developed in 1976. According to the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2025b), areas mapped by DEECA as a current wetland are classified as a patch of remnant native vegetation.

3.2 Preliminary onshore ecology assessment

3.2.1 Database search review

A desktop assessment of ecological values known or predicted to be present within the onshore study area (10 km buffer around the onshore CIA) was undertaken. This included a review of the following government databases and spatial datasets:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST), maintained by the Department of Climate Change, Energy, the Environment and Water (DCCEEW)
- EPBC Act-listed threatened ecological communities - Ecological Communities of National Environmental Significance (ECNES) Database (reference spatial layer: ECnes_public)
- The Atlas of Living Australia (ALA) database, maintained by the Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Birdata Database, maintained by Birdlife Australia
- The Victorian Biodiversity Atlas (VBA), maintained by the Department of Energy, Environment and Climate Action (DEECA)
- NatureKit, maintained by DEECA
- Native Vegetation Removal (NVR) Map and Tool – which provides the Location Map, the Current Wetland Layer, the Strategic Biodiversity Score and the Native Vegetation Condition Score for the study site, maintained by DEECA

– DEECA mapped current wetlands (reference spatial layer: WETLAND_CURRENT_NVR)
– Native vegetation – FFG Act-listed communities (reference spatial layer: NV2005_FFG_COMM)
– Extant and pre-1750 Ecological Vegetation Classes (EVCs) mapped by DEECA (reference spatial layers: NV1750_EVC and NV2005_EVCBCS)
– Victorian Landcover Time Series 2015 – 2019 (reference spatial layer: VIC_LANDCOVER_TS)

Database outputs were reviewed, and data pertaining to marine species were excluded from further consideration as these are assessed in GHD (2025b). Sources were last accessed/reviewed in October 2025.

The following maps and documents were also reviewed:

– Aerial imagery and topographic maps of the study site
– Index of Stream Condition (ISC) (DEPI, 2010)
– River Health Strategy - West Gippsland CMA (WGCMA, 2021)
– Handbook for the development of renewable energy in Victoria (DEECA 2025c). This document was published in May 2025, and applies to onshore renewable energy facilities that are likely to have an impact on Victoria's threatened bird and bat species

3.2.2 Rapid site assessment

3.2.2.1 Terrestrial flora and fauna

A rapid site assessment was undertaken on 5 and 6 August 2025 by a botanist and zoologist. This assessment involved a visual assessment at discrete points across the onshore CIA from publicly accessible locations (no private land was accessed), and did not include the collection of *detailed* mapping of the type, condition and extent of each EVC observed within the onshore CIA. The assessment did not include Vegetation Quality Assessments (VQA), or targeted surveys for threatened species or communities.

During the assessment incidental observations of threatened or migratory species were recorded, as were locations of potential habitat for threatened and/or migratory species and locations with the potential to support threatened ecological communities (TECs). Due to the preliminary nature of this assessment the scope did not include detailed mapping across the onshore CIA nor did it assess patches of vegetation against the TEC condition thresholds, although locations with the potential to support TECs have been mapped at a parcel level.

High-level ecological value mapping was undertaken at a land parcel scale to provide an overview of the existing ecological conditions across the onshore CIA, to help inform route selection and to identify areas where detailed ecological surveys will be required. Table 3.2 summarises the four broad categories applied to classify land parcels across the onshore CIA: High, Medium, Low and Not Assessed (e.g. areas that were landlocked/unable to be viewed as part of the rapid site assessment). Categories were assigned to the whole parcel based on observations made from the discrete assessment points. In instances where a parcel could be observed from multiple locations the highest category was applied to the parcel.

3.2.2.2 Aquatic

Rapid site assessments were undertaken on 31 July and 1 August 2025 by two aquatic ecologists. This assessment evaluated the quality of habitat to inform the likelihood assessment for the presence of threatened aquatic species.

This rapid site assessment involved a visual assessment of waterways and waterbodies within the onshore CIA from publicly accessible locations such as road crossings (no private land was accessed) but did not include targeted surveys for threatened species or communities.

At each site, the habitat was assessed based on the *Guideline for Environmental Management (GEM) – Rapid Bioassessment Methodology for Rivers and Streams* (EPA 2021). This guideline provides a structured approach to evaluating the physical condition of river and stream habitats in Victoria and assists in identifying degradation, erosion, and habitat diversity, which influence ecological health. It provides an approach for evaluating several habitat features including:

– Channel morphology: Shape, depth, and width of the stream channel
– Substrate composition: Types of materials on the streambed (e.g. gravel, sand, silt)
– Bank stability: Degree of erosion or vegetation cover on stream banks
– Riparian vegetation: Quality and extent of vegetation along the stream margins
– In-stream habitat: Presence of logs, rocks, and aquatic plants that provide shelter and breeding grounds
– Flow characteristics: Variety of flow types (riffles, pools, runs) that support different species

Digital photographs were also collected at each site as a visual record of habitat conditions. Where water was present, *in situ* recordings of water quality (i.e., temperature, dissolved oxygen, electrical conductivity, pH, turbidity and alkalinity) were also recorded.

High-level ecological value mapping was also undertaken as part of the aquatic assessment to provide an overview of the existing ecological conditions across the onshore CIA, to help inform route selection (see Table 3.2). However, this mapping was not undertaken at the land parcel scale but with polygons applied to the map using a 20 m buffer that encompassed waterways across the onshore CIA. Polygons were classified as either High, Medium, Low and Not Assessed (e.g. areas that could not be viewed as part of the rapid site assessment). The reason for a more refined scale of mapping was that if the parcel scale was considered Medium or Low, yet there was an area of a waterway that was considered High value, a land parcel scale classification would result in the entire parcel being identified as an area to avoid during selection of a preferred alignment.

The use of buffered polygons on waterways avoided this situation, but still indicated high value aquatic areas that should be avoided to minimise potential impacts.

Table 3.2 Ecological value categories applied to land parcels within the onshore cable investigation area

Ecological value category and colour scale	Description
High (red)	Native vegetation is modelled to occur within the parcel and was observed during the rapid site assessment. There are limited areas where low or no ecological values (e.g. non-native vegetation, areas of disturbance) occur within the parcel, consequently limiting opportunities to avoid impacts to areas of high ecological value should the parcel be utilised for the Project. Parcel is confirmed to, or likely to contain: – Areas of a TEC listed under the EPBC or FFG Act or, – Threatened species listed under the EPBC or FFG Act or, – Suitable habitat for terrestrial and aquatic threatened and/or migratory species (listed under the EPBC Act or FFG Act) or, – A significant area (i.e., >10 ha) of native vegetation (including current wetlands)
Medium (amber)	Native vegetation is modelled to occur within the parcel and was observed during the rapid site assessment. There are or are likely to be areas where low or no ecological values (e.g. non-native vegetation, areas of disturbance) occur within the parcel, that subsequently provide opportunities to avoid or minimise impacts on known or potential areas of high ecological value, should the parcel be utilised for the Project. Parcel may contain: – Areas of a TEC listed under the EPBC or FFG Act or, – Threatened species listed under the EPBC or FFG Act observed within the parcel or, – Suitable habitat for terrestrial and aquatic threatened and/or migratory species (listed under the EPBC Act or FFG Act) or, – A significant area (i.e., >10 ha) of native vegetation (including current wetlands)
Low (green)	Small, fragmented patches of native vegetation are modelled to occur within the parcel, and no native vegetation observed during the rapid site assessment, or if some native vegetation observed, it was limited to scattered trees or small areas of lower quality native vegetation. The parcel predominantly comprises areas of non-native vegetation and is likely to provide ample opportunity to support project infrastructure with low/minimal impact on ecological values should the parcel be utilised for the Project. Parcel is unlikely to contain: – Areas of a TEC listed under the EPBC or FFG Act, – Suitable habitat for terrestrial and aquatic threatened and/or migratory species (listed under the EPBC Act or FFG Act), or if habitat is present, it is marginal in quality with limited connectivity and could easily be avoided if the parcel is to be utilised for the Project – A significant area (i.e., >10 ha) of native vegetation (including current wetlands)
Not assessed (grey)	Parcel was not visible from publicly accessible land during the rapid site assessment Ecological values are unknown at this location

3.2.3 Likelihood of occurrence assessment

For each threatened species and threatened ecological community identified in the desktop search, an assessment was conducted to determine their likelihood of occurrence within the onshore CIA. The likelihood of occurrence assessment considered the results of desktop information and rapid site assessments, including:

- Whether the species or community was detected within the onshore CIA during the rapid site assessment
- The quality, extent and connectivity of the species' habitat observed or likely to be present within the onshore CIA
- The number, proximity and age of VBA records within the onshore study area
- Consideration of information on recent changes in the species distribution or regional threats that could influence the likelihood of occurrence
- Consideration of life history characteristics that may require increased conservatism in the assessment to account for species that are likely to be under-surveyed, cryptic, transient or periodically dormant and may have reduced detectability (e.g. orchids, migratory species or cryptic reptiles)

A decision framework was used to standardise the likelihood of occurrence assessment to one of five possible categories: (1) Confirmed, (2) Likely, (3) May, (4) Unlikely or (5) Highly unlikely, as shown in Table 3.3. A colour scale has been applied, where red is assigned to species that are confirmed to occur and ranging through to green for those species considered highly unlikely to occur.

Table 3.3 Likelihood of occurrence decision framework

Likelihood of occurrence	Threatened and migratory species
Confirmed (Recorded during this study)	Species has been recorded within the onshore CIA during field surveys.
Likely (High likelihood)	Suitable habitat is present within the onshore CIA and there are recent VBA records (i.e., within the last 25 years) for the species within the onshore study area.
May (Moderate likelihood)	Suitable habitat is available in the onshore CIA and species' known range/distribution encompasses the onshore CIA. Species generally recorded historically within the onshore study area, but not recently (i.e., not within the last 25 years). If species not recorded within the onshore study area, species is predicted to occur or known to occur regionally.
Unlikely (low likelihood)	Species' known range/distribution encompasses the onshore CIA, however, suitable habitat does not occur within the onshore CIA or may occur, but generally with low quality or quantity. Species generally not recorded historically within the onshore study area.
Highly unlikely to occur (Very low to negligible likelihood)	The species is regionally extinct (or the onshore CIA is generally outside the species current known range and there are no historical records within the onshore study area) and/or no suitable habitat is present in the onshore CIA.

3.2.4 Impact assessment

A high-level impact assessment was conducted to identify potential direct and indirect impacts associated with the proposed onshore activities. This high-level assessment of potential impacts was then used to inform:

- A preliminary assessment of potential impacts on relevant Matters of National Environmental Significance (MNES) under the EPBC Act
- A preliminary assessment of the significant impact criteria under the EPBC Act Significant Impact Guidelines (Commonwealth of Australia 2013)
- A preliminary assessment of the Project against the relevant referral criteria within the Ministerial guidelines under the EE Act (DTP 2023)

– A preliminary assessment of the potential for the project to contribute to listed key threatening processes under the EPBC Act and potentially threatening processes under the FFG Act

For the EE Act, the assessment aligned with the Ministerial Guidelines for Assessment of Environmental Effects (DTP, 2023), which outline the process for determining whether a project is likely to have a significant effect on the environment and therefore requires an Environment Effects Statement (EES).

3.3 Assessment limitations and assumptions

The following assumptions and limitations apply to the services undertaken by GHD in connection with preparing this report:

– The services are limited to those specifically detailed in the report and are subject to the scope limitations stated in Section 1.3 and set out in the report
– The preliminary onshore ecological assessment is limited to a desktop assessment and rapid site assessment only. The findings of this assessment would need to be confirmed through detailed field assessments and where recommended, targeted surveys
– The preliminary onshore ecological assessment is limited to an assessment of onshore ecological values only (terrestrial and aquatic flora and fauna) and did not include assessment of the offshore marine components of the Project. However, the assessment does include resident and migratory shorebirds and Bass Strait migratory species, that regularly use terrestrial habitat. Marine obligate species (e.g., marine fish and invertebrates, marine mammals, marine reptiles, oceanic and pelagic seabirds, such as albatrosses, petrels) that do not use or rarely use onshore habitats were not included in this assessment. These species are assessed as part of the Preliminary Assessment Report Marine Ecology – Blue Mackerel Offshore Wind Farm (GHD 2025b)
– The preliminary onshore ecological assessment is limited to consideration of vascular plant species (ferns, conifers and flowering plants) and onshore vertebrate fauna only. The assessment did not include non-vascular flora (e.g. mosses, liverworts, lichens), fungi, or invertebrates, except where listed threatened species are known or are suspected to occur
– The rapid site assessment involved a visual assessment at discrete points across the onshore CIA from publicly accessible locations (no private land was accessed), and did not involve undertaking any detailed ecological assessments such as vegetation mapping, Vegetation Quality Assessments (VQA) or targeted surveys for threatened species or communities. Due to the preliminary nature of this assessment, the scope did not include detailed mapping across the onshore CIA or to assess patches of vegetation against the TEC condition thresholds. Locations with the potential to support TECs have been mapped at a parcel level only
– The rapid site assessment was undertaken during winter which is not an optimal time for determining the presence of some EVCs (i.e., native grassland), TECs and threatened species (i.e., flora species that flower in spring)
– The impact assessment and mitigation measures are based on both the dimensions and construction methods provided by Blue Mackerel North as well as BMN's proposed approach to, where possible, avoid and minimise impacts to ecological values known or predicted to occur in the CIA, or where these are not yet available, an assumed dimension or construction method based on similar projects. Should these dimensions or construction methods change, assessments of potential impacts will require review and updating as required
– The impact assessment and mitigation measures presented in this report are preliminary in nature (based on the desktop information and rapid site assessments only) and would need to be revisited as part of the detailed ecological assessment once the locations and extent of proposed project infrastructure within the onshore CIA are confirmed
– The assessment of impacts in this report is standalone and does not consider the cumulative impacts of other components of the project or the cumulative impacts of projects occurring in the region

  With regards to threatened fauna species, EPBC Act-listed migratory species and Bass Strait migratory species, this report considers onshore ecological impacts only. Offshore impacts (i.e., collision risk with Wind Turbine Generators) are considered in the separate Preliminary Assessment Report Marine Ecology – Blue Mackerel Offshore Wind Farm (GHD 2025b)

3.3.1 Use of databases

The Victorian Biodiversity Atlas (VBA) database can be used to search a defined geographical area to produce species lists of flora and fauna that have been recorded historically within the searched area. The database lists are only as accurate as the quality and quantity of data that have been recorded and documented from the area.

Location details for many records (typically older records) have a relatively low degree of accuracy (e.g., within 1 km). Thus, the database search may not pick up some records of species that were made within the site historically.

These datasets are not exhaustive. In other words, many locations locally and across Victoria have a low level of documented survey effort for one or more groups of flora and fauna. The environs located within the onshore CIA (particularly coastal and estuarine areas) are likely to be subject to low levels of survey effort historically because of limited access and lower numbers of local infrastructure developments in contrast with urban areas and major regional centres. During field surveys, it is not uncommon to find species at locations for which there are few or no previous nearby database records.

4. Legislative context

Table 4.1 provides an overview of the key legislation that is relevant to the onshore ecology components of the Project. This overview is not intended to be exhaustive or detailed. The relevance and approval requirements under the key legislation would be assessed in more detail as the proposed project impacts are understood.

Table 4.1 Commonwealth and State legislation considered in this report and relevance to the Project

Legislation	Description and relevance to the Project
Commonwealth	
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Australia's primary environmental legislation. It provides a legal framework to protect and manage matters of national environmental significance (MNES), including World Heritage properties, Ramsar wetlands, nationally threatened species and ecological communities, migratory species, Commonwealth marine areas and nuclear actions. The EPBC Act requires environmental impact assessments for projects that may significantly affect these protected matters.
State	
***Environment Effects Act 1978* (EE Act)**	The Victorian *Environment Effects Act 1978* (EE Act) is aimed at assessing the environmental impacts of proposed public works. Under this Act, certain projects that are likely to have significant effects on the environment must undergo an environmental impact assessment before they can proceed. This process initially involves preparing an Environment Effects Statement (EES) referral, which includes a detailed description of the proposed development, an outline of public and stakeholder consultations, and predictions of significant environmental effects. Following the referral, the Minister for Planning has the authority to determine whether an EES, or other assessment or conditions such as an Environment Report, is required and to set the scope of the impact assessment. The Act ensures that environmental considerations are integrated into the planning and decision-making processes, promoting sustainable development and protecting Victoria's natural resources.
***Planning and Environment Act 1987* (P&E Act)**	The Victorian *Planning and Environment Act 1987* (P&E Act) establishes a framework for the use, development, and protection of land in Victoria. The Act aims to ensure the fair, orderly, economic, and sustainable use of land while balancing the present and future interests of all Victorians. It includes the Victoria Planning Provisions and municipal planning schemes, which guide land use and development across the state. The Act also provides for the protection of natural and man-made resources, the maintenance of ecological processes, and the preservation of genetic diversity. The Act is administered by the Minister for Planning and is regularly reviewed to ensure it meets contemporary planning needs and environmental standards. Native vegetation removal is regulated under the P&E Act through municipal planning schemes. Under Clauses 52.16 and 52.17 of municipal planning schemes a permit is required to 'remove, destroy, or lop' (remove) native vegetation unless an exemption applies.

Legislation	Description and relevance to the Project
Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines)	The Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines) were incorporated into the Victorian Planning Provisions and all planning schemes in Victoria in December 2017 (DELWP 2025b). The Guidelines apply when there is a requirement for a permit to remove native vegetation under the P&E Act.
Flora and Fauna Guarantee Act 1988 **(FFG Act)**	The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) was the first Australian law to address the protection of species, genetic material, and habitats to prevent extinction and ensure biodiversity. The Act establishes a legal and administrative framework to promote the conservation, management, and control of native species and their habitats in Victoria. It includes provisions for listing threatened species and ecological communities, identifying critical habitats, and managing potentially threatening processes. Amendments in 2019 strengthened the Act by incorporating principles such as the consideration of Traditional Owners' rights and the impacts of climate change.
Wildlife Act 1975	The Victorian *Wildlife Act 1975* declares all wildlife (as defined by the Act) as protected from harm, with certain exceptions. It aims to prevent wildlife species from becoming extinct and promotes the sustainable use and access to wildlife resources. It sets out the rules for how people can engage with wildlife, including responsibilities, offences, licences, and authorisations. The Act is currently under review to update its provisions and ensure it aligns with contemporary values and best practices in wildlife management. This review aims to enhance the protection and conservation of Victoria's diverse wildlife.
Catchment and Land Protection Act 1994 **(CaLP Act)**	The Victorian *Catchment and Land Protection Act 1994* (CaLP Act) sets out requirements for managing invasive species, including pest plants. Under this Act, certain plants can be declared as noxious weeds if they pose a significant threat to primary production, Crown land, the environment, or community health. Landowners are legally required to manage declared noxious weeds and pest animals on their land, including eradicating regionally prohibited weeds and preventing the growth and spread of regionally controlled weeds, and taking measures to control established pest plants. Penalties for non-compliance can be substantial, ensuring that landowners take their responsibilities seriously in protecting Victoria's natural resources and agricultural productivity.
Fisheries Act 1995	The *Fisheries Act 1995* provides a modern legislative framework for the regulation, management, and conservation of Victorian fisheries and aquatic habitats. It aims to ensure sustainable use and protection of fisheries resources and contains a regulatory framework for managing licences, permits and the transfer of quota units.

Legislation	Description and relevance to the Project
Environment Protection Act 2017 **and the associated Environment Reference Standard**	The *Environment Protection Act 2017*, which came into effect on 1 July 2021, aims to protect human health and the environment by reducing the harmful effects of pollution and waste. It includes a General Environmental Duty that requires all Victorians to take reasonable and practical steps to minimize risks to human health and the environment from their activities. The Environment Reference Standard (Victorian Government 2021) is part of the Act and may specify indicators and objectives to be used to measure whether an environmental value specified in the environment reference standard is being achieved. It may specify one or more of the following indicators or objectives—(a) ambient environmental quality pollutant measures; (b) ambient environmental quality ecological measures; (c) measures of human health or the health of other species; or (d) targets for emissions of pollutants.

5. Existing environment

5.1 Landscape context

The onshore study area sits within the Gippsland Plain (GipP) bioregion, Wellington Shire Local Government Area (LGA) and the West Gippsland Catchment Management Authority (CMA). The GipP bioregion generally sits below 200 m above sea level (asl) and has a temperate climate, averaging between 500 to 1,100 mm rainfall a year (DEECA 2025a). The onshore study area broadly features flat, low-lying coastal and alluvial plains and is banded by coastal barrier dunes that grade into low lying floodplains and swampy flats (landward of the barrier dunes), and low undulating hills further inland (GHD 2025a).

The onshore study area sits within a highly modified landscape, with evidence of extensive clearing of native vegetation on private land historically for agricultural and agroforestry uses. However, large tracts of remnant native vegetation persist within the onshore study. area that provide habitat for numerous threatened flora and fauna species and threatened ecological communities. These areas are often present in reserves or as remnant vegetation along roadsides within the onshore study area, and to a lesser extent, within the onshore CIA.

The onshore CIA is bordered by the Giffard Nature Conservation Reserve to the north-west (which partially intersects with the onshore CIA in the north-west corner), the Giffard H30 and Giffard H31 Bushland Reserves to the north-northeast, which are connected by tracts of remnant native vegetation on private landholdings and by Lake Denison and Jack Smith Lake to the east and west respectively (based on review of aerial imagery) (Figure 5.1). Lake Denison wetland also occurs within the onshore CIA along with McLoughlins – Seaspray Coastal Reserve and Darriman H29 Bushland Reserve (refer to Figure 5.1 for location). Further afield (approximately 7 km west of the onshore CIA), west of South Gippsland Highway, a large tract of remnant bushland occurs comprising four adjoining reserves/state forest: Stradbroke Flora and Fauna Reserve, Kangaroo Swamp Nature Conservation Reserve, Mullundung State Forest and Mullungdung Nature Conservation Reserves.

The onshore CIA sits within the Seaspray Depression of the Gippsland Basin, stretches 4.6 km along a section of Ninety Mile Beach (which encompasses McLoughlins Beach – Seaspray Coastal Reserve) and extends approximately 5 km inland (Figure 5.1). The coastal area along McLoughlins Beach comprises barrier dunes formed from coastal dune deposits (GHD 2025a).). Landward and adjoining coastal dune formations is occupied by low lying areas associated with Lake Denison and surrounding wetlands, these were formed from Holocene derived coastal lagoon and swamp and lake deposits (GHD 2025a). The terrain further inland and at higher elevations largely comprises alluvial floodplain deposits punctuated by occasional inland dune deposits largely derived from fine sand (GHD 2025a).

The onshore CIA is approximately 6,217 hectares (ha) of predominantly cleared coastal and near coastal land, with some areas preserved as bushland and coastal reserves. A review of 2015-2019 modelled Land Use layer (VIC_LANDCOVER_TFS) identified that approximately 87% of the onshore CIA is used for agriculture and agroforestry purposes, with approximately 13% covered by modelled native vegetation and/or mapped current wetlands and waterways.

5.2 Wetlands and waterways

5.2.1 Current wetlands

According to the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2025b), all mapped wetlands (i.e., Current wetland layer in DEECA's Mapshare NVR Map) are considered as a remnant patch of native vegetation. There are five wetlands mapped under the Current Wetlands layer within the onshore CIA totalling 224 ha. Wetland identification, extent, wetland type including aquatic system, salinity and watering regime are outlined in Table 5.1.

Table 5.1 Current wetlands, extent, aquatic system, salinity regime and watering regime for each wetland mapped within the onshore cable investigation area

Current Wetland ID	Aquatic system	Salinity regime	Wetland dominant vegetation type	Watering regime	Origin	Area (ha)
91767	Palustrine or Lacustrine	Fresh	Unknown	Periodically inundated	Naturally occurring	**3.3**
90965	Estuarine	Mesosaline	Coastal Saltmarsh	Supratidal	Naturally occurring	**209.1**
91166	Palustrine or Lacustrine	Fresh	Unknown	Periodically inundated	Dam/storage	**2.8**
91160	Palustrine	Fresh	Sedge/grass/forb	Periodically inundated	Naturally occurring	**2.7**
91136	Palustrine	Fresh	Sedge/grass/forb	Periodically inundated	Artificial (type unknown)	**6.1**
Total						**224**

5.2.2 Wetlands of International Importance (Ramsar wetlands)

The PMST identified two Wetlands of International Importance (Ramsar sites) as relevant to the onshore study area:

– Corner Inlet (approximately 21 km south-west of the onshore CIA)
– Gippsland Lakes (approximately 9 km north-east of the onshore CIA)

Corner Inlet

Corner Inlet is a large tide-dominated embayment located adjacent to the southernmost tip of the Australian mainland (DSEWPaC 2011). The inlet consists of a submerged plain covered by sand or mud flats with well-developed seagrass beds, and large sand islands (DSEWPaC 2011). Due to its large area and the diversity of habitats present, Corner Inlet supports internationally significant populations of a number of aquatic and semi-aquatic species (DSEWPaC 2011). Threatened fauna species supported include Orange-bellied Parrot, Growling Grass Frog, Fairy Tern and Australian Grayling.

This Ramsar site occurs approximately 21 km south-west of the onshore CIA.

Gippsland Lakes

The Gippsland Lakes Ramsar site consists of a group of coastal lagoons and marsh environments that are separated from the sea by a barrier system of sand dunes and fringed on the seaward side by the Ninety Mile Beach. A range of wetland habitat types are present within this Ramsar site, including coastal lagoons, subtidal seagrass, algal beds and a range of saline, brackish and freshwater marsh environments (DSEWPAC 2010).

The nearest part of this Ramsar site is at Lake Reeve which occurs approximately 9 km north-east of the onshore CIA.

5.2.3 Nationally important wetlands

The Directory of Important Wetlands in Australia (the Directory) was first published in 1993. The Directory not only identifies nationally important wetlands, it provides a substantial knowledge base of what defines wetlands, their variety, and the many flora and fauna species that depend on them (DCCEEW 2023). In addition, it contains information about their social and cultural values and some of the ecosystem services and benefits they provide (DCCEEW 2023).

Although no Nationally important wetlands occur within the onshore CIA, Jack Smith Lake State Game Reserve, immediately south of the onshore CIA (within 1 km) is listed as a nationally important wetland.

This Reserve (including Jack Smith and Lambs Lake) is of high value for flora and fauna and contains extensive areas of coastal saltmarsh, which have been known to support the EPBC Act-listed Orange-bellied Parrot (*Neophema chrysogaster*).

5.2.4 Waterways - rivers and creeks

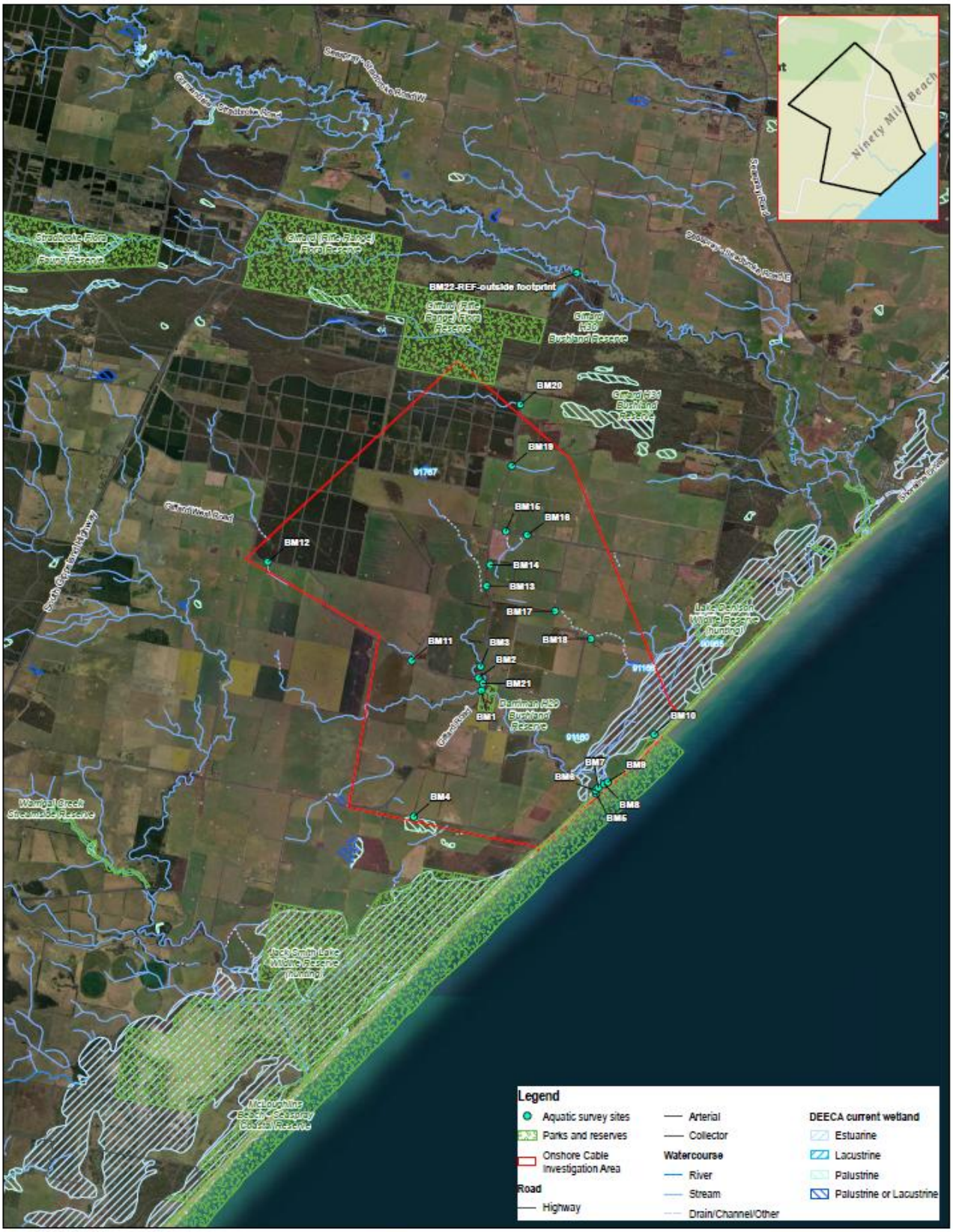
Rivers and creeks in the onshore CIA are located within the South Gippsland Basin and include freshwater reaches, inlets and estuaries. All waterways within the Basin are unregulated, although there are several off-stream storages and offtakes for domestic township water supply and irrigation (WGCMA 2014). However, the local area receives less rainfall than other parts of southern Gippsland due in part to the rain shadow effect on the Strzelecki Ranges, making it more susceptible to drought that can result in a loss of surface water flow (WGCMA 2021). With regard to waterway health, WGCMA (2021) consider the key threats to waterways in the West Gippsland region include the degradation of riparian vegetation, sediment and nutrient runoff, urban and rural development, fragmentation of habitat and climate change.

The condition of waterways in Victoria is assessed using the Index of Stream Condition (ISC) that consolidates data from a variety of sources to give a detailed overview of river and stream condition across the state (DEPI 2010). The ISC is made up of five sub-indices: hydrology, streamside zone, physical form, water quality and aquatic life, and was last assessed in the Basin in 2010. Across the entire South Gippsland Basin, the ISC assessment determined that almost three-quarters (74%) of the stream length in are in moderate condition, with 10% in good condition, 10% in poor condition and 5% in very poor condition (DEPI 2010). Only 0.4% (representing 1 reach) of stream length was found to be in excellent condition (DEPI 2010). The main impacts to waterway conditions are related to:

– Elevated phosphorus, turbidity and salinity due to a range of factors including dairying in high rainfall zones and run-off from unsealed roads
– Flow regimes under immense stress in areas dependent on water supply for domestic and agricultural use, and the impacts of drought and summer low flows
– Highly fragmented riparian vegetation
– Impacts to the physical form of waterways including barriers to fish passage, a loss of large woody debris, instability and erosion of waterway banks, and a loss of instream habitat features

There have been no ISC assessments undertaken within the onshore CIA, but both freshwater and estuarine reaches of Merrimans Creek and Monkey Creek to the east of the onshore CIA, and Bruthen Creek to the west of the onshore CIA were assessed. The lower freshwater and estuarine reaches for these waterways are considered to be in moderate condition due to a combination of the impacts listed above.

The rapid site assessment undertaken as part of this project was aimed at assessing waterway health in the absence of ISC data and other available information relevant to the onshore CIA. Within the onshore CIA, there are several small waterways that flow through land largely cleared for pasture. The major waterway is an unnamed creek that generally flows north to south through the onshore CIA, before entering the southwestern section of the Lake Dennison system. A relatively large tributary also enters this creek near the Darriman H29 Bushland Reserve. These waterways were targeted during the assessment and the results are included in Appendix E and summarised below. The specific locations assessed are included in (Figure 5.1).



Paper Size ISO A3

0 0.55 1.1 1.65 2.2

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

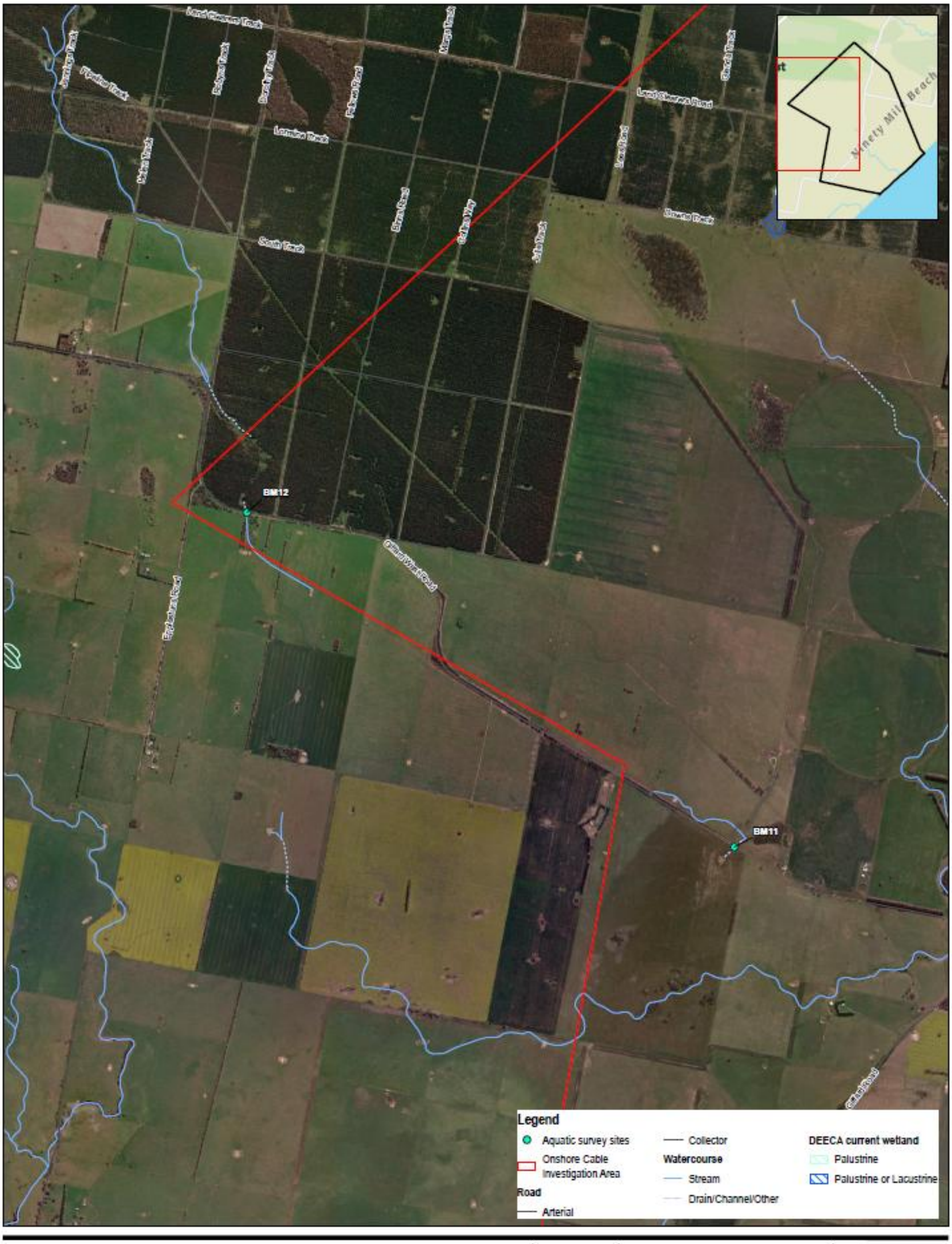
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

DEECA Current Wetlands, Waterways, Parks and Reserves

Project No. 12668248
Revision No. A
Date 6/11/2026

Page 1 of 5

FIGURE 5.1



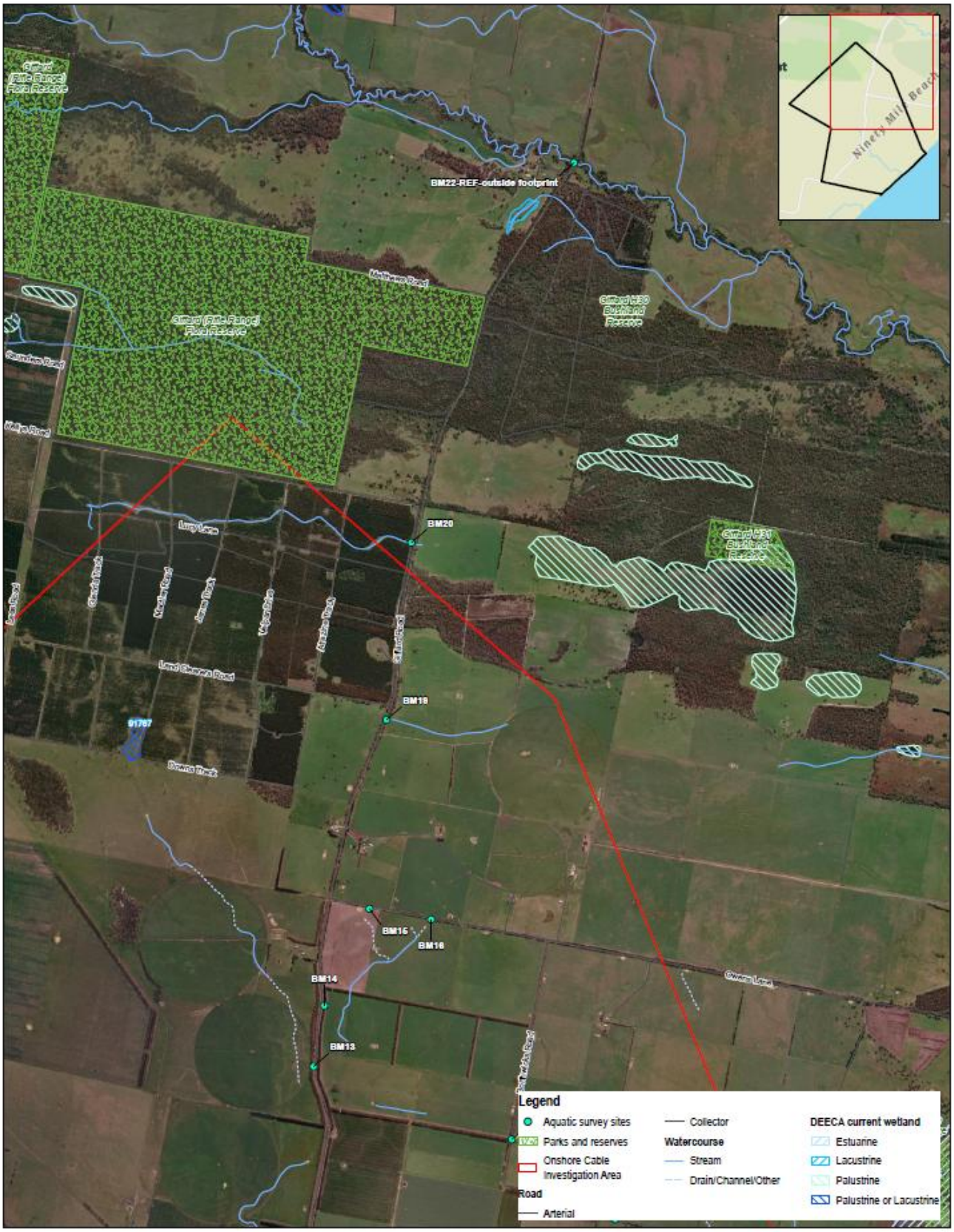
Paper Size ISO A3
0 0.15 0.3 0.45 0.6
Kilometers
Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

DEECA Current Wetlands, Waterways, Parks and Reserves

Project No. 12568248
Revision No. A
Date 6/11/2025

FIGURE 5.1



Paper Size ISO A3

0 0.2 0.4 0.6 0.8

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

DEECA Current Wetlands, Waterways, Parks and Reserves

Project No. 12668248
Revision No. A
Date 5/11/2026

FIGURE 5.1

Paper Size ISO A3

0 0.15 0.3 0.45 0.6

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 6/11/2026

DEECA Current Wetlands, Waterways, Parks and Reserves

Page 4 of 5
FIGURE 5.1

Paper Size ISO A3

0 0.15 0.3 0.45 0.6

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 6/11/2026

DEECA Current Wetlands, Waterways, Parks and Reserves

FIGURE 5.1

The rapid site assessment confirmed that waterways within the onshore CIA are subject to a range of key threats as listed above, predominantly due to the agricultural landscape. During the site assessment most of the waterways were dry and the presence of terrestrial vegetation within the waterway channels confirmed that they are largely intermittent, and likely only flow following high rainfall periods. With the exception of vegetated roadside areas, these waterways tended to be devoid of riparian vegetation and had little instream aquatic habitat. Many of these waterways were essentially pasture drains, with impacts associated with cattle access and agricultural land use (e.g., eroded banks and likely high nutrients) and provide little aquatic habitat for threatened species.

Figure 5.2 An ephemeral waterway in the upper reaches in the onshore cable investigation area

Apart from farm dams on some waterways that flowed through pasture, the only water observed in freshwater reaches was in the unnamed creek at Giffard Road (Site BM1) where an isolated pool was present, and further downstream towards the estuarine sections associated with Lake Denison (Sites BM8 and BM10) (Figure 5.3). While at other times of the year and during wetter seasons there may be more water present in other areas, the findings of the assessment suggest the waterways are highly intermittent and ephemeral.

At Giffard Road the presence of water may suggest that this site may act as a refuge pool for aquatic fauna during dry periods. There was some instream habitat including Common Reeds (*Phragmites australis*) and scattered tussocks, and large woody debris. However, the presence of terrestrial grasses in the channel indicate that this reach is also often dry. Dense mats of Red Water Fern (*Azolla filiculoides*) also suggest waterways in the area have high nutrients concentrations. The riparian vegetation at this site was continuous to semi-continuous along both banks, with tree cover and shrub cover estimated at 50-80%, and the ground cover >80%. Most of the riparian vegetation was native, with the exception of the exotic grasses that made up much of the ground cover, including within dry areas of the channel. While the riparian vegetation provided a large amount of shading and large woody debris to the channel, beyond the section near to Giffard Road the channel again entered agricultural land, and resembled pasture drains with little riparian vegetation or instream habitat. While there is some potential for this reach to provide habitat for threatened fish species in the vicinity of Giffard Road, this is likely to only occur for short durations when water is present following high rainfall periods.

Figure 5.3 The unnamed creek at Giffards Road

Permanent water was present in the channel towards the estuarine sections associated with Lake Denison, near to outlet to the ocean of both the unnamed creek and Lake Denison (Figure 5.4). However, large sand berms were present at both outlets causing a disconnection between the onshore reaches and the ocean (Figure 5.4). This was particularly the case at the outlet of the unnamed creek, where the berm more resembled a sand dune that was noticeably higher than the water level of the estuary. This 'dune' and the dry section between the estuary and ocean had established terrestrial vegetation, indicating that it would rarely open to the ocean. At both outlets, the berms at the estuary entrance would act as a barrier to fish passage between the onshore areas and the ocean.

Despite the disconnect between the estuaries and ocean*, in situ* water quality recordings indicates that there is some interaction between the onshore areas and the ocean (and potentially saline groundwater). At the outlet of the unnamed creek (Site BM8), electrical conductivity (EC) was around 32,000 µS/cm, while at the outlet of Lake Denison (Site BM10) it was around 67,000 µS/cm. This range suggests moderately saline to saline water and is typical of brackish to estuarine waterways. The slightly alkaline pH recorded at both outlets (8.4 to 8.8) is also similar to the range observed in the ocean. Dissolved oxygen exceeded 100% at both outlets, likely due to the presence of algae that was abundant within the water.

Figure 5.4 ***Sand berms resulting in disconnection between onshore areas and the ocean of the unnamed creek (top) and Lake Denison (bottom)***

Overall, with the exception of a few high-value freshwater reaches fringed by native vegetation, the majority of onshore waterways presented as heavily modified waterways and agricultural drains. These channels exhibited minimal ecological integrity, offering scarce aquatic habitat and limited opportunity to support biodiversity. The only notable exception was the expansive estuarine and lake systems near McLoughlins Beach and the Seaspray Coastal Reserve, which retained some natural features. However, even these coastal systems were compromised by low freshwater inflows and the persistent barrier effect of sand berms, which restrict connectivity and fish movement. Taken together, the degraded condition of freshwater reaches, poor hydrological regimes, and fragmented estuarine habitats indicate that these areas are unlikely to support threatened fish species. The current agricultural landscape does not provide the structural complexity, water quality, or flow conditions necessary for viable populations to persist.

5.2.5 Groundwater dependent ecosystems

A groundwater dependent ecosystem (GDE) is an ecosystem that has its species composition and natural ecological processes wholly or partially determined by groundwater (Serov et al. 2012). If the availability of groundwater to GDEs is reduced, or the quality allowed to deteriorate, these ecosystems may be impacted. GDEs can be broadly grouped into three categories:

– Ecosystems that depend on the surface expression of groundwater:
    - Swamps and wetlands can be sites of groundwater discharge and may represent GDEs. These may be permanent or ephemeral systems that receive seasonal or continuous groundwater contribution. Tidal flats and inshore waters may also be sites of groundwater discharge
    - Permanent or ephemeral stream systems may receive seasonal or continuous groundwater contribution to flow as baseflow. Interactions depend on the nature of the streambed and underlying aquifer, and the relative water level heads in the aquifer and the stream
– Ecosystems that depend on the subsurface presence of groundwater. Terrestrial vegetation such as trees and woodlands may be supported seasonally or permanently by groundwater. These may comprise shallow or deep-rooted communities that use groundwater to meet some or all their water requirements. Animals may depend on this vegetation and therefore indirectly depend on groundwater. Groundwater quality generally needs to be high to sustain vegetation growth
– Ecosystems that reside within a groundwater resource. These are referred to as hypogean ecosystems. Micro-organisms such as stygofauna in groundwater systems can exert a direct influence on water quality

The Bureau of Meteorology GDE Atlas suggests that there is a range of GDEs within the onshore CIA (Figure 5.5). These include ecosystems that depend on the surface expression of groundwater (e.g. estuarine wetlands, freshwater marshes and meadows) and ecosystems that may depend on the subsurface presence of groundwater (e.g. lowland forests/heathy woodland mosaics, riparian scrub, lowland forests).

Legend

- Onshore Cable Investigation Area

Aquatic GDEs

- Moderate potential GDE - from national assessment
- Moderate potential GDE - from regional studies
- High potential GDE - from national assessment
- High potential GDE - from regional studies
- Unclassified potential GDE - from regional studies

Terrestrial GDEs

- Low potential GDE - from national assessment
- Moderate potential GDE - from national assessment
- High potential GDE - from national assessment

Giffard (Rifle Range) Flora Reserve
Mullungdung State Forest
Giffard (Rifle Range) Flora Reserve
A440
Giffard Plantation
ard West
Giffard Road
Owens Lane
Owens Lane
Lake Denison
Lake Denison
Giffard
Giffard Road
Giffard Road
Jack Smith Lake
Melbourne
Geelong
Traralgon

Paper Size ISO A3

0 0.4 0.8 1.2 1.6

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Bureau of Meteorology GDE Atlas results showing potential locations of aquatic and terrestrial groundwater dependent ecosystems

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 5.5

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_065_A3P_GDEs_rev
Print date: 05 Nov 2025 - 13:49

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray

5.3 Native vegetation

5.3.1 Ecological Vegetation Classes (EVCs)

Approximately 5,508 ha (88.5%) of the onshore CIA contains no modelled native vegetation, with only 716 ha (11.5%) modelled to contain native vegetation (based on DEECA's Native Vegetation Modelled 2005 EVC dataset) (Table 6.2). Where the onshore CIA is modelled to contain no native vegetation, the land is predominantly used for agricultural or agroforestry purposes (based on the Victorian Landcover Time Series 2015 – 2019 spatial layer VIC_LANDCOVER_TS).

The 716 ha of modelled native vegetation comprises six EVCs, including two EVC mosaics (Table 5.2). The majority of the modelled native vegetation (76.9%) is made up of Lowland Forest (EVC 16, 21.8%) or Lowland Forest/Heathy Woodland Mosaic (EVC 698, 55.1%) (Table 5.2). Of the 716 ha of modelled native vegetation within the onshore CIA, the bioregional conservation status can be categorised as:

– Least Concern (16%),
– Depleted (1.8%),
– Vulnerable (82.1%); and
– Endangered (0.1%)

The modelling indicates the majority of the onshore cable investigation area does not support native vegetation.

Table 5.2 Modelled native vegetation within the onshore cable investigation area (CIA), Gippsland Plains Bioregion (source: DEECA 2005 EVC layer)

Ecological Vegetation Class	Bioregional conservation status (BCS)	Modelled extent (area, ha) of each EVC within the onshore CIA (ha)[1]	Percentage of the onshore CIA modelled to contain each EVC
Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01)	Depleted	13	0.2%
Estuarine Wetland (EVC 10)	Least Concern	115	1.8%
Lowland Forest (EVC 16)	Vulnerable	156	2.5%
Swamp Scrub (EVC 53)	Endangered	1	Negligible (< 0.0 %)
Riparian Scrub (EVC 191)	Vulnerable	38	0.6 %
Lowland Forest/Heathy Woodland Mosaic (EVC 698)	Vulnerable	395	6.3%
Modelled native vegetation (total)		**716**	**11.5%**
No modelled native vegetation		**5,501**	**88.5%**
Total area of onshore cable investigation area		**6,217**	**100 %**

The rapid site assessment recorded eight EVCs including two EVC mosaics. Table 5.3 lists EVCs identified during the rapid site assessment.

The rapid site assessment identified areas where no patches of native vegetation were observed, but where Lowland Forest (EVC 16) is modelled to occur by DEECA. These locations have been identified as having low values as per the native vegetation classification system described in Section 3.2.2 and identified in Figure 5.6.

Conversely, it is likely that additional EVCs occur within the onshore CIA at locations where no native vegetation has been modelled by DEECA and that were not accessible or visible during the rapid assessment or that could not be observed at a scale necessary to accurately identify and assign a specific EVC.

[1] Rounded to nearest hectare

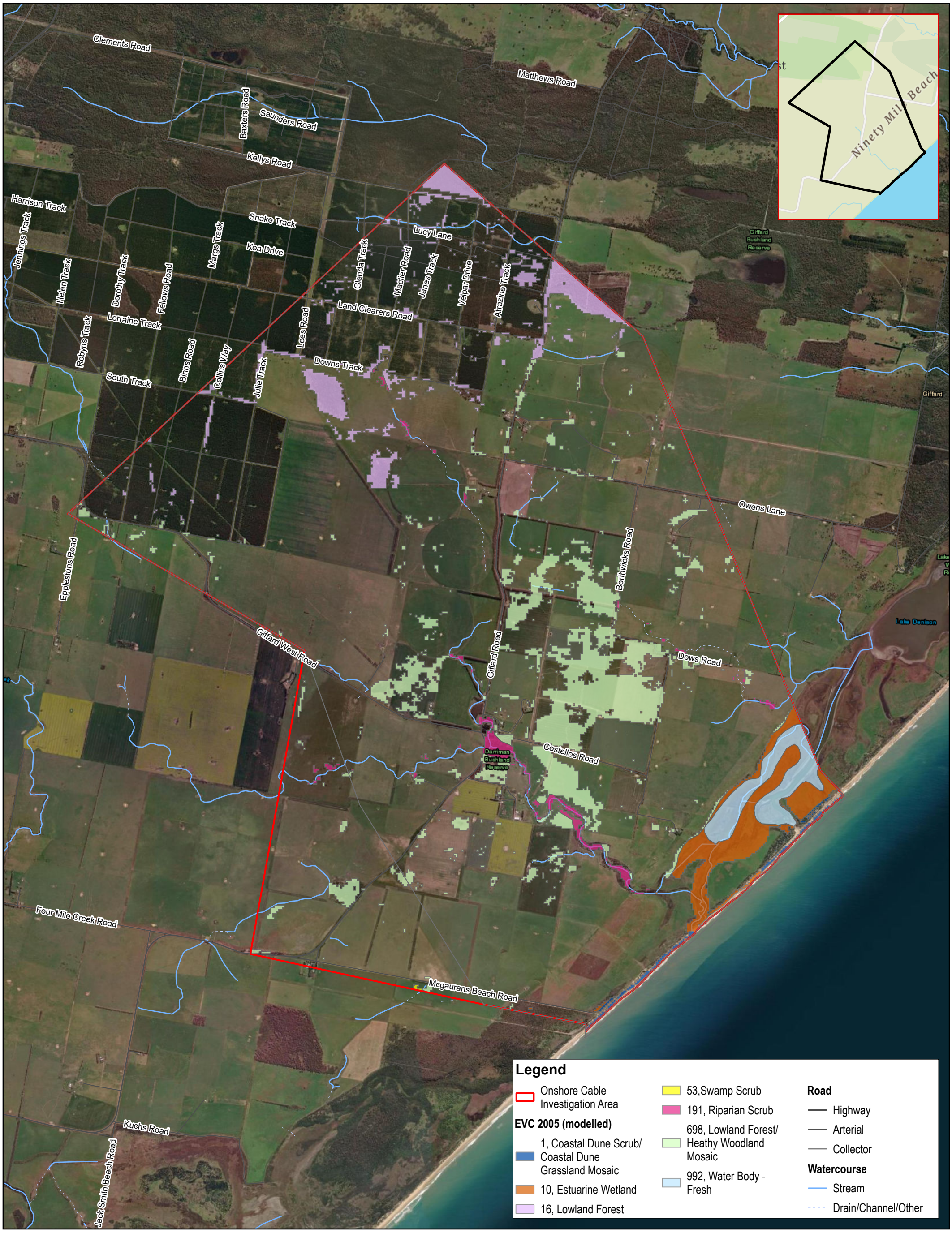
Table 5.3 Ecological Vegetation Classes (EVCs) modelled as occurring in the onshore cable investigation area (CIA) and key locations if observed during the rapid site assessment

EVC and BCS	Modelled within the onshore CIA (x)	Observed within the onshore CIA	Key location observed during rapid site assessment	Representative photos
Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01) depleted	✓	✓ (both composite EVCs observed)	McLoughlins Beach - Seaspray Coastal Reserve	 

EVC and BCS	Modelled within the onshore CIA (x)	Observed within the onshore CIA	Key location observed during rapid site assessment	Representative photos
Coast Banksia Woodland (EVC 02) vulnerable	x	✓	McLoughlins Beach - Seaspray Coastal Reserve at discrete locations behind barrier dune atop secondary dune systems	
Estuarine Wetland (EVC 10) least concern	✓	✓	McLoughlins Beach - Seaspray Coastal Reserve Modelled to occur on private property adjoining and intersecting with Lake Denison modelled wetland	

EVC and BCS	Modelled within the onshore CIA (x)	Observed within the onshore CIA	Key location observed during rapid site assessment	Representative photos
Lowland Forest (EVC 16) vulnerable	✓	✓	Giffard Flora and Fauna Reserve Darriman H29 Bushland Reserve Roadsides along Giffard Road and Owens Lane Modelled to occur within multiple private property parcels throughout the onshore CIA	
Swamp Scrub (EVC 53) endangered	✓	✓	Darriman H29 Bushland Reserve Roadsides along Giffard Road and West Giffard Road	
Riparian Scrub (EVC 191) vulnerable	✓	x	N/A	NA

EVC and BCS	Modelled within the onshore CIA (x)	Observed within the onshore CIA	Key location observed during rapid site assessment	Representative photos
Lowland Forest/Heathy Woodland Mosaic (EVC 698) vulnerable	✓	✓	Darriman H29 Bushland Reserve Roadsides along Giffard Road and Owens Lane	Refer Lowland Forest (EVC 16), there is no representative photo of Heathy Woodland
South Gippsland Plains Grassland (EVC 132_62) endangered	x	✓	Darriman H29 Bushland Reserve Roadsides along Giffard Road and West Giffard Road	



Paper Size ISO A3

0 0.3 0.6 0.9 1.2

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

DEECA 2005 modelled Ecological Vegetation Classes in the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 5.6

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_056_A3P_EVCs_rev
Print date: 05 Nov 2025 - 14:11

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray

DRAFT

Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

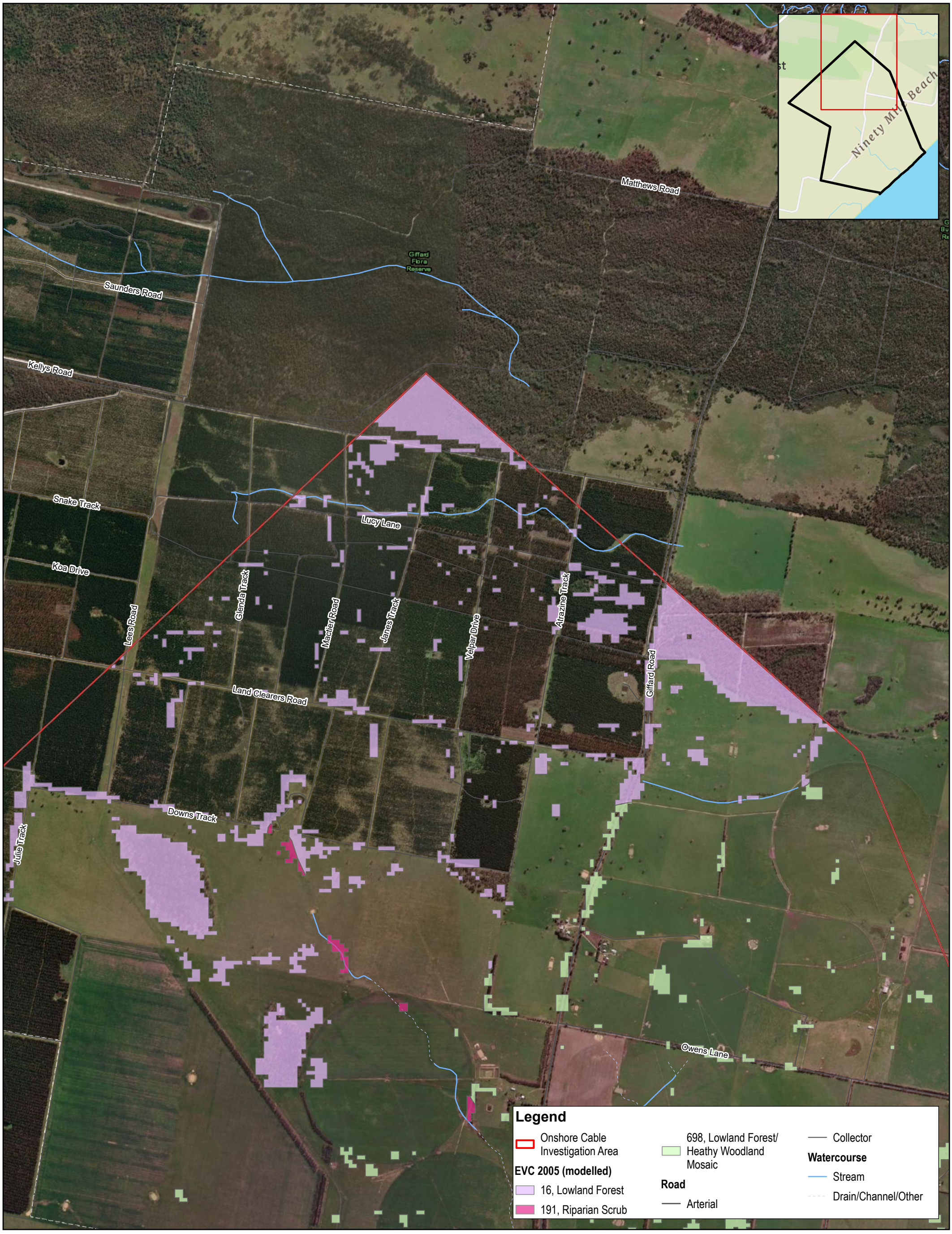
DEECA 2005 modelled Ecological Vegetation Classes in the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 5.6

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_056_A3P_EVCs_rev
Print date: 05 Nov 2025 - 14:11

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray



DRAFT

Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

DEECA 2005 modelled Ecological Vegetation Classes in the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 5.6

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_056_A3P_EVCs_rev
Print date: 05 Nov 2025 - 14:11

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray

DRAFT

Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

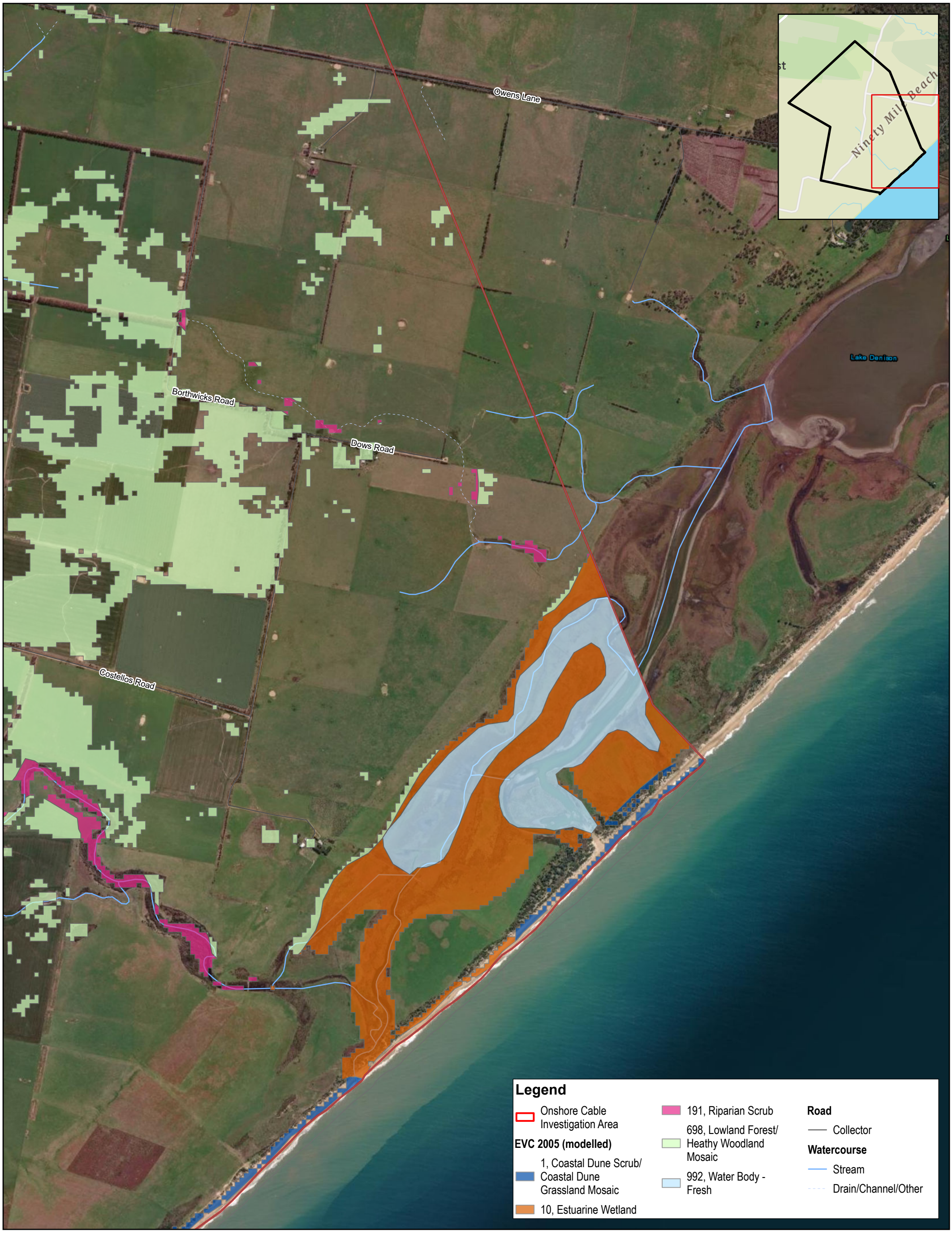
DEECA 2005 modelled Ecological Vegetation Classes in the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 5.6

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_056_A3P_EVCs_rev
Print date: 05 Nov 2025 - 14:11

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray



DRAFT

Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

DEECA 2005 modelled Ecological Vegetation Classes in the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **5/11/2025**

FIGURE 5.6

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_056_A3P_EVCs_rev
Print date: 05 Nov 2025 - 14:11

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by:kdaray

5.3.2 Threatened ecological communities

5.3.2.1 Commonwealth

The PMST (located in Appendix A) was reviewed to identify potential threatened ecological communities (TECs) listed under the EPBC Act predicted to occur in the onshore study area. According to the PMST, two nationally listed TECs may or are considered likely to occur within the onshore study area and onshore CIA see Figure 5.7 for ECNES Database TEC modelling across the onshore CIA). Further consideration of each TEC is provided in Table 5.4, including a description of each TEC, conservation status and associated EVCs.

The EPBC-listed *Subtropical and Temperate Coastal Saltmarsh* (STCS) and *Natural Damp Grassland of the Victorian Coastal Plain* (NDGVCP) TECs are both modelled as either likely to, or may occur, across the onshore study area and onshore CIA (Table 5.4). A review of DEECA's 2005 EVC dataset identified 130 ha of Estuarine Wetland (EVC 10) modelled as occurring within the onshore study area, which both adjoins and intersects with Lake Denison modelled wetland (Wetland_NO_90965). This EVC is associated with the *Subtropical and Temperate Coastal Saltmarsh* (STCS) TEC. The rapid site assessment identified that STCS TEC is likely to occur within the onshore CIA.

Although no EVCs associated with NDGVCP are modelled to occur within the onshore study area, this TEC has previously been recorded within the onshore CIA within Darriman H29 Bushland Reserve (DoE 2015). The rapid site assessment confirmed that NDGVCP is likely to persist within Darriman H29 Bushland Reserve and may also occur in higher quality areas of South Gippsland Plains Grassland (EVC 132_62) observed at a few locations along Giffard Road (particularly south of Darriman H29 Bushland Reserve). NDGVCP may also occur along Giffard West Road.

Table 5.4 Nationally listed Threatened Ecological Communities with potential to occur within the onshore cable investigation area

Title of community	Conservation status	Description	Associated EVCs/current wetlands and other recorded occurrence in onshore study area	Source	Rapid site assessment findings
Natural Damp Grassland of the Victorian Coastal Plains (NDGVCP)	Critically Endangered	This community predominantly occurs within the Gippsland Plains bioregion and is typically a type of closed tussock grassland or low open grassy woodland on poorly drained heavy silty loams. This community is typically dominated by *Themeda triandra* (Kangaroo Grass) or *Poa labillardierei labillardierei* (Common Tussock-grass) on wetter sites, with floristic composition often variable between drier and wetter sites and whether there is a brackish influence (DoE 2015). Whilst shrubs and scattered canopy trees may occur, they are generally scattered at low cover and never dominant, with cover increasing at the fringes of the community in association with transition zones to a more treed or shrub-dominated community (DoE 2015).	Plains Grassland (EVC 132) **is not** modelled to occur within the onshore study area. Brackish Grassland (EVC 934) **is not** modelled to occur within the onshore study area. Previously recorded at Darriman H29 Bushland Reserve within the onshore CIA (DoE 2015). Modelled as potentially occurring across the onshore CIA	PMST ECNES Database NV_2005_EVCBCS DCCEEW DoE 2015	The desktop and rapid assessment identified that the majority of the onshore CIA is likely to be dominated by non-native vegetation including areas of agroforestry, crops and non-native pasture grasses. Areas where NDGVCP may persist are limited to discrete locations subject to lower levels of disturbance history and includes conservation reserves, roadsides and private property not subject to cropping and intensive grazing. Likely **to occur** at: Darriman H29 Bushland Reserve May occur at: Roadsides along Giffard Road and West Giffard Road Private Property north of West Giffard Road

Subtropical and Temperate Coastal Saltmarsh (STCS)	Vulnerable	This community occurs in coastal areas subject to regular or intermittent tidal influence and is often the main vegetation type in the intertidal zone at southern latitudes. This community may also occur at locations that have groundwater connectivity to tidal waterbodies (DSEWPC 2013). The Coastal Saltmarsh community predominantly consists of salt tolerant flora (halophytes) including grasses, forbs, sedges, rushes and succulent forbs and shrubs. The vegetation structure and floristic composition is subject to variability, often dependant on degree of tidal influence, salinity, soil and substrate etc. (DSEWPC 2013).	Coastal Saltmarsh (EVC 09) **is not** modelled to occur within the onshore study area. Estuarine Wetland (EVC 10) **is** modelled to occur within the onshore study area (130 ha). Wetland_NO_90965 is identified as an Estuarine Coastal Saltmarsh dominant wetland and is modelled to occur within the onshore study area (205 ha, including 103 ha also modelled as and included in the 130 ha extent of modelled Estuarine Wetland (EVC 10)	PMST ECNES Database NV_2005_EVCBCS WETLAND_CURRENT_NVR	Likely **to occur** at: Private property adjoining and intersecting with Lake Denison modelled wetland and modelled Estuarine Wetland (EVC 10) May **Occur** at: A few discrete locations within McLoughlins Beach - Seaspray Coastal Reserve

5.3.2.2 State

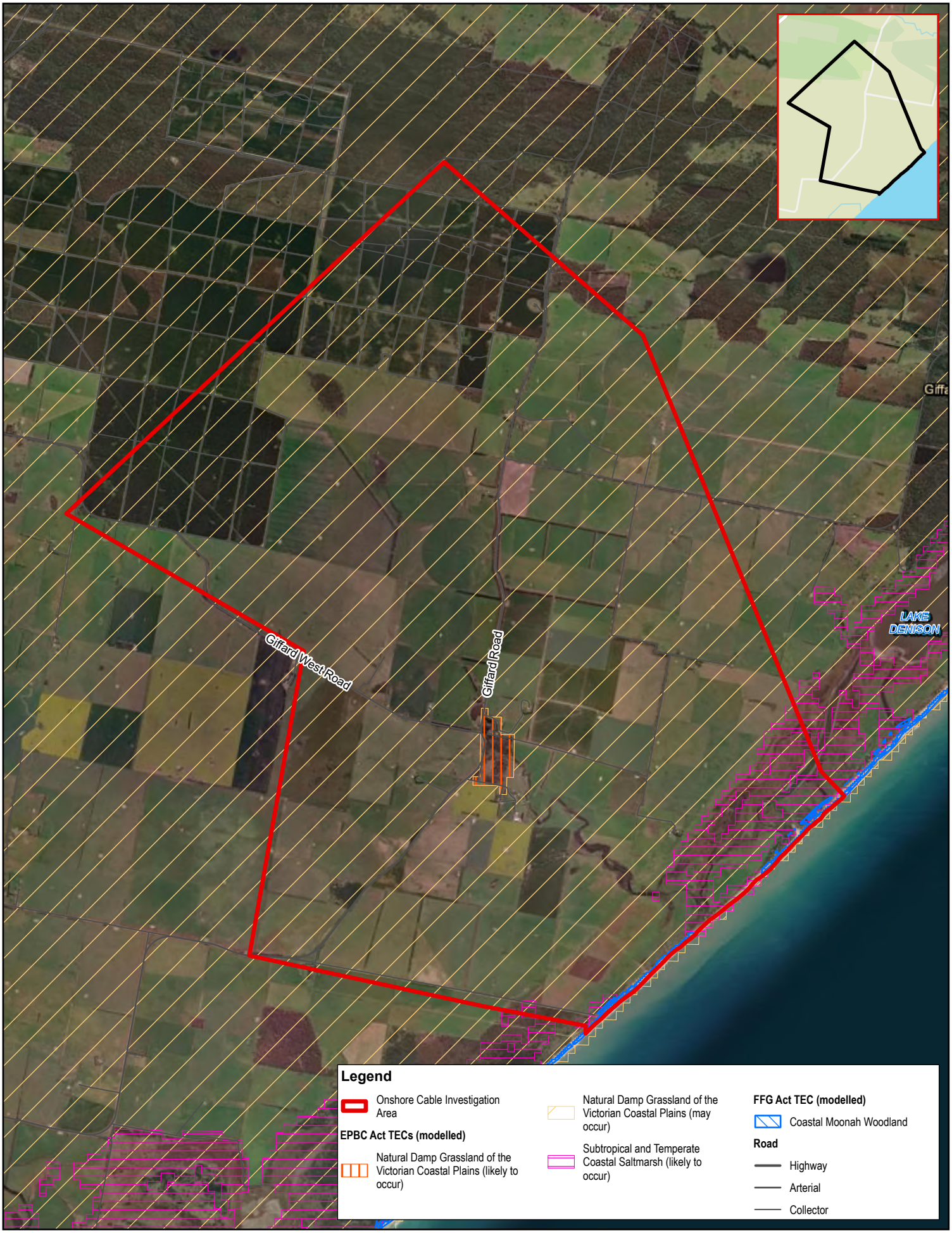
A review of the DEECA 2005 Modelled FFG threatened community dataset (NV2005_FFG_COMM) identified one FFG Act-listed TEC modelled to occur within the onshore study area, Coastal Moonah (*Melaleuca lanceolata* subsp*. lanceolata*) Woodland Community. This TEC is modelled to occur on upper dunes along the coastline and was observed to occur across the south-west portion of the coastal barrier dune system during the rapid site assessment (refer to Figure 5.7 for the modelled extent of this TEC).

Although not modelled to occur within the onshore study area, one additional FFG-listed TEC, Plains Grassland (South Gippsland) community is known to occur within the onshore CIA, as outlined within Table 5.5. This TEC is associated with the EPBC-listed NDGVCP.

Table 5.5 State-listed Threatened Ecological Communities with potential to occur within the onshore cable investigation area

Title of community	Conservation status	Description	Associated EVCs/current wetlands and other recorded occurrence in onshore CIA	Source	Rapid site assessment findings
Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland Community	Threatened	The Coastal Moonah Woodland Community is an open grassy woodland found along parts of the Victorian coastline and is characteristically dominated by *Melaleuca lanceolata* subsp. *lanceolata* (Moonah). This TEC tends to occur on high-level dunes on alkaline soils along the coast (SAC 2013).	Coastal Dune Scrub (EVC 160) modelled to occur within the onshore CIA	NV2005_FFG_COMM NV2005_EVC	**Confirmed** at: McLoughlins Beach - Seaspray Coastal Reserve
Plains Grassland (South Gippsland) Community	Threatened	The Plains Grassland (South Gippsland) Community varies in structure from closed tussock grassland to open woodland. This TEC may have historically been an open woodland with areas of very sparsely-treed tussock grassland with shrubby zones associated with drainage lines. This community type occurs in places on the Gippsland plains between the Yarram region, between Seaspray and Welshpool, on the east and the top of Western Port Bay on the west (SAC 2013).	Plains Grassland (EVC 132) **is not** modelled to occur within the onshore study area, however this EVC was observed within the onshore CIA during the rapid site assessment Brackish Grassland (EVC 934) is not modelled to occur within the onshore CIA	NA Although not modelled to occur within the onshore study area, parts of this TEC are associated with the EPBC-listed NDGVCP TEC, which is broadly modelled to occur within the onshore CIA.	**Confirmed** at: Darriman H29 Bushland Reserve Likely to occur at: Roadsides along Giffard Road and West Giffard Road Private Property north of West Giffard Road

Title of community	Conservation status	Description	Associated EVCs/current wetlands and other recorded occurrence in onshore CIA	Source	Rapid site assessment findings
		As with the dominant species of the associated EPBC-listed NDVTCP the dominant tussock species differ between drier and wetter forms, *Themeda triandra* (Kangaroo Grass) on drier sties and *Poa larbillardirei* (Common Tussock-grass) on wetter sites. Similarly, additional indicative species differ between brackish and non-saline sites (SAC 1994).			



Paper Size ISO A3

0 0.3 0.6 0.9 1.2

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

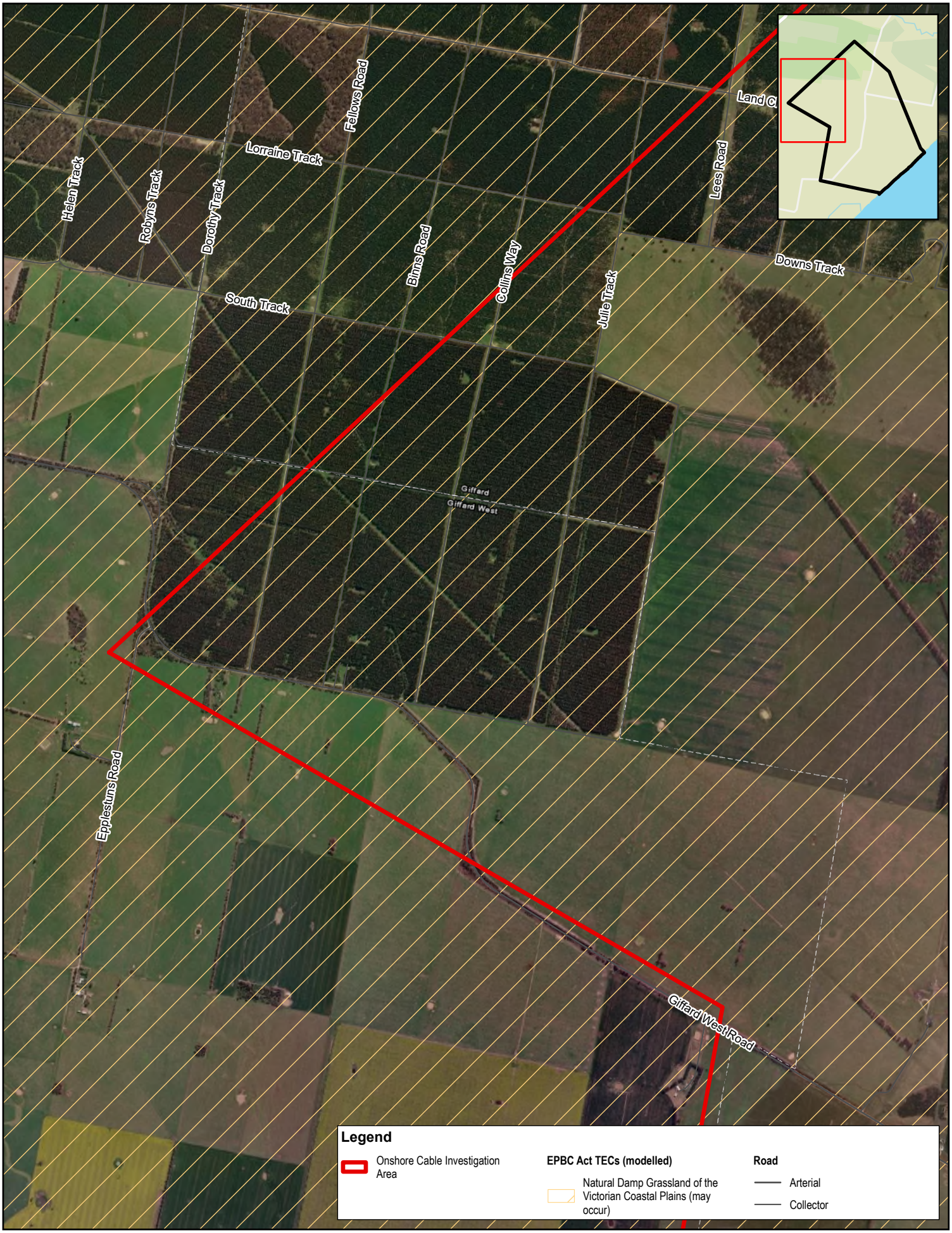
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Modelled Threatened Ecological Communities within the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **10/11/2025**

FIGURE 5.7

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_057_A3P_TECs_rev
Print date: 10 Nov 2025 - 10:56



Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

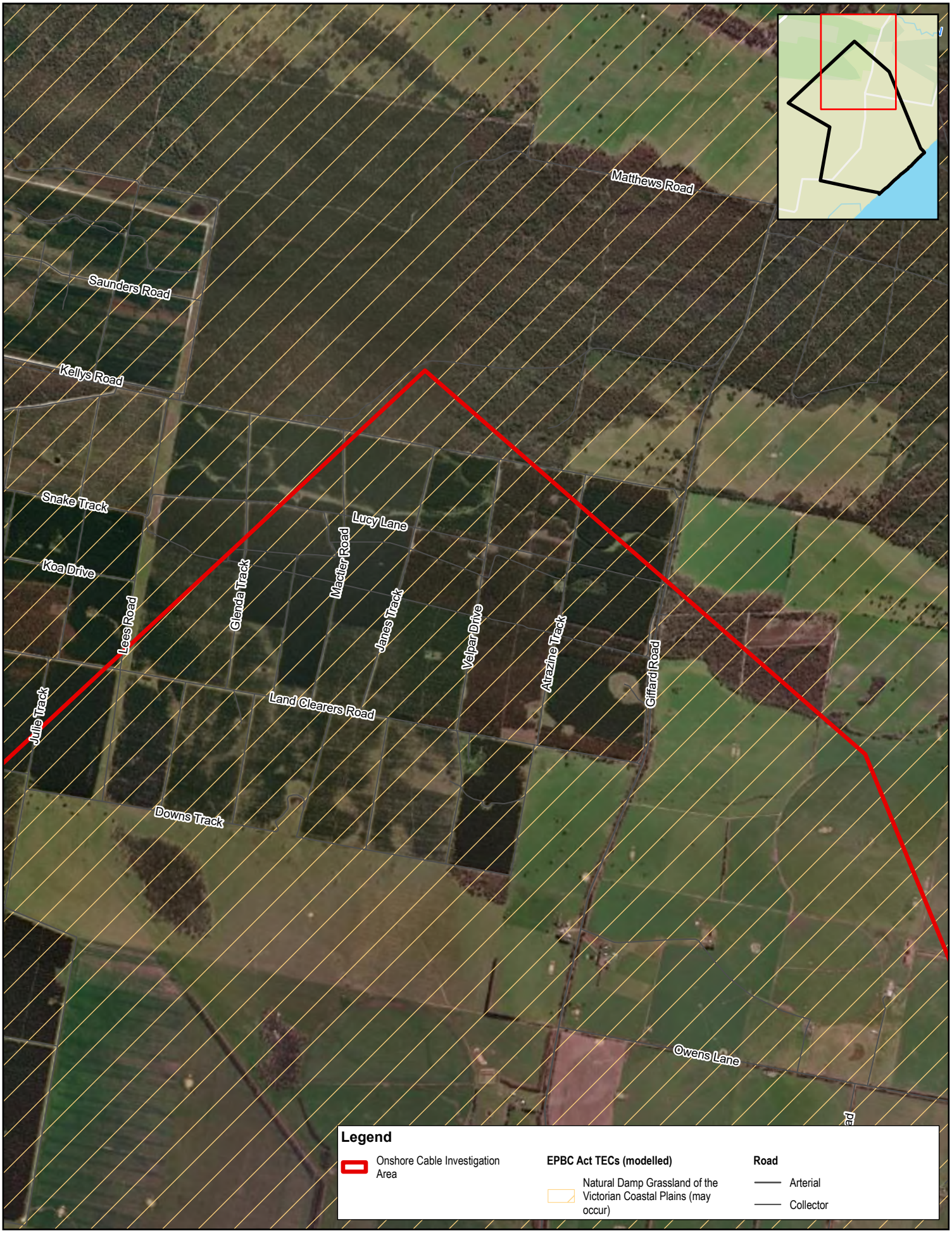
Modelled Threatened Ecological Communities within the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **10/11/2025**

Page 2 of 5

FIGURE 5.7

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_057_A3P_TECs_rev
Print date: 10 Nov 2025 - 10:56



Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

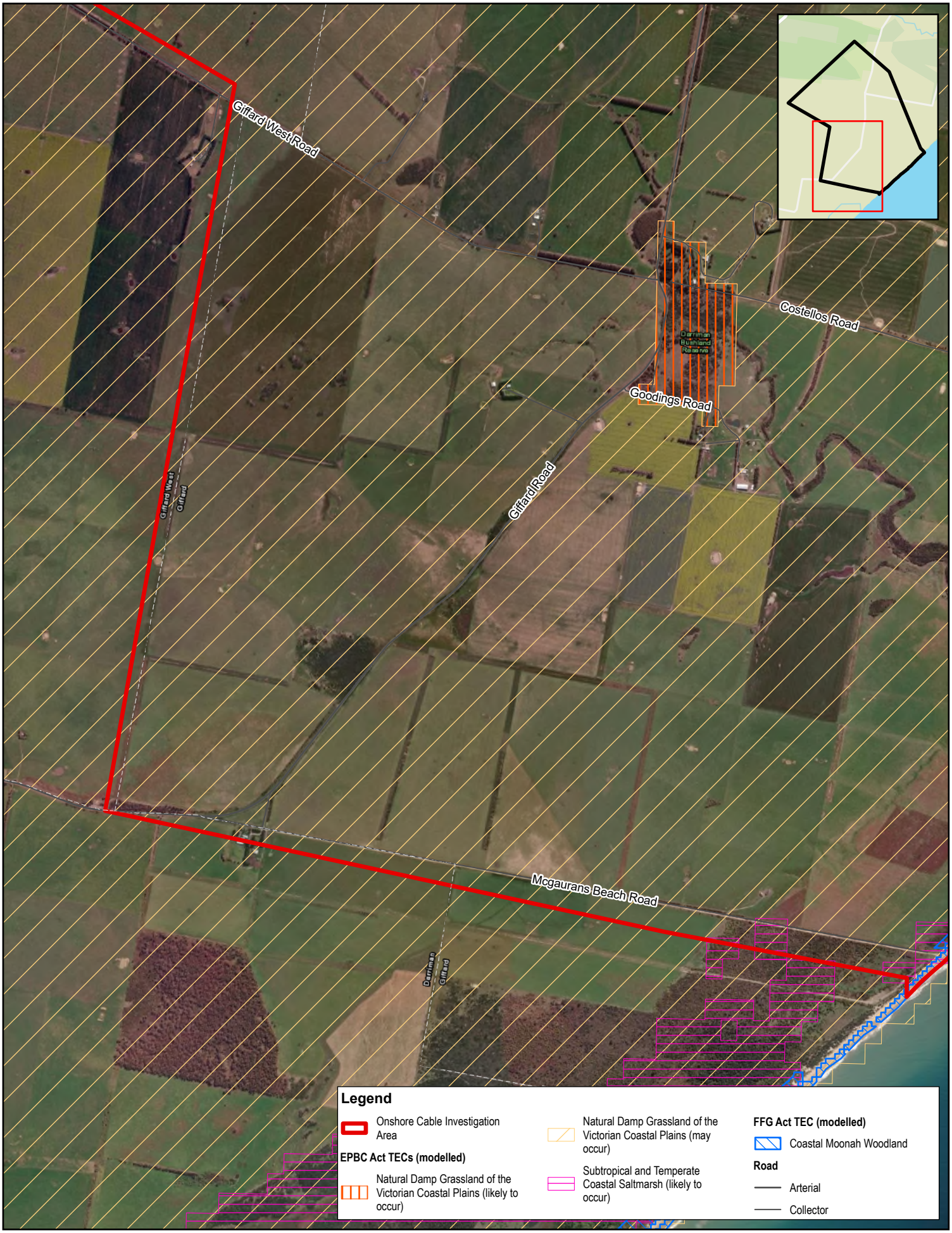
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Modelled Threatened Ecological Communities within the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **10/11/2025**

FIGURE 5.7

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_057_A3P_TECs_rev
Print date: 10 Nov 2025 - 10:56



Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

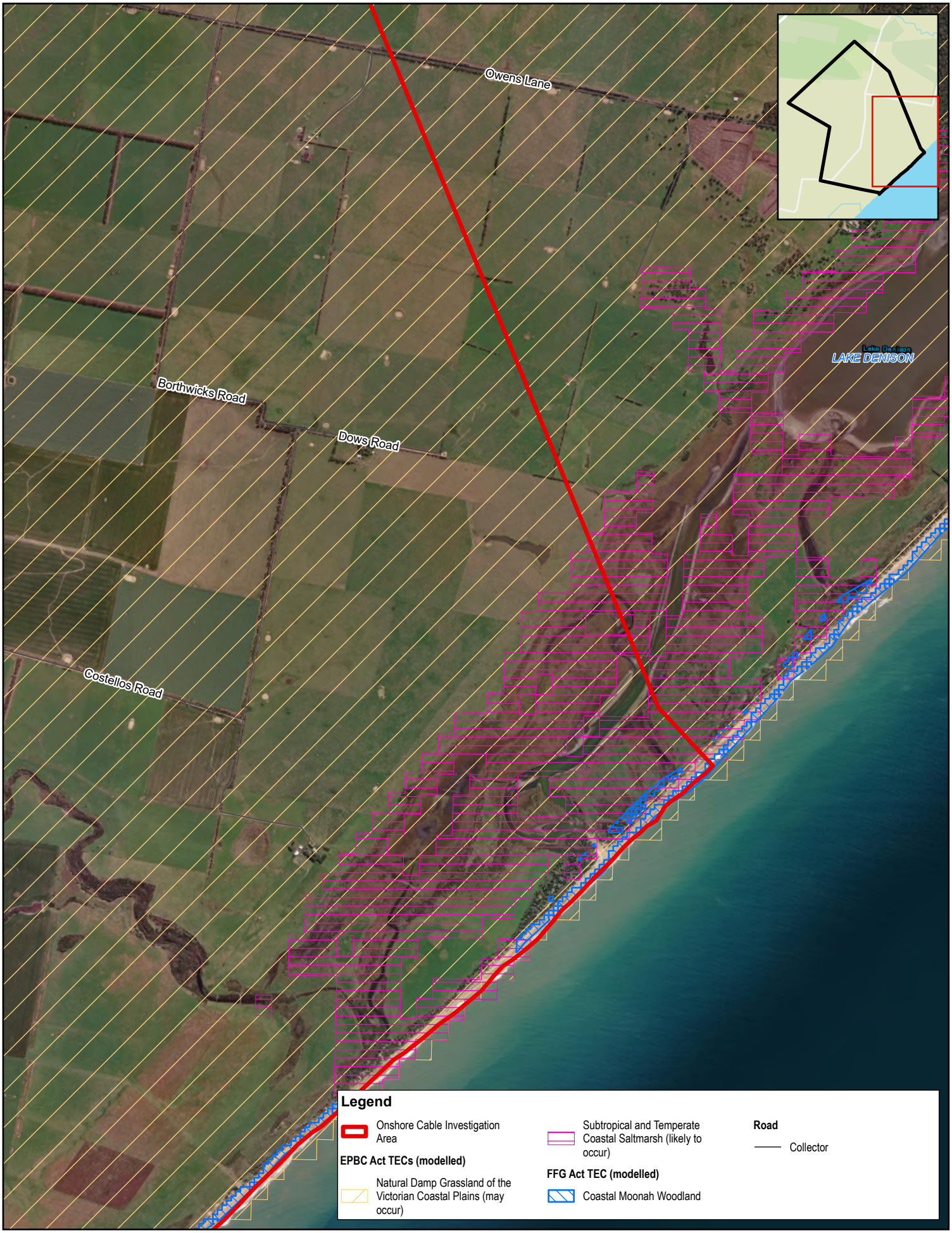
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Modelled Threatened Ecological Communities within the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **10/11/2025**

FIGURE 5.7

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_057_A3P_TECs_rev
Print date: 10 Nov 2025 - 10:56



Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Modelled Threatened Ecological Communities within the onshore cable investigation area

Project No. **12656248**
Revision No. **A**
Date **10/11/2025**

Page 5 of 5

FIGURE 5.7

\\ghdnet\ghd\AU\Melbourne\Projects\31\12656248\GIS\Maps\Deliverables\12656248_EcologyFigures.aprx - 12656248_057_A3P_TECs_rev
Print date: 10 Nov 2025 - 10:56

Data source:DEECA 2025,VicMap,2025 ;Aerial Imagery: ESRI Basemap- ESRI 2025 - Aerial Data Custodian, Data Set Name/Title, Version/Date. Created by tworth

5.4 Flora

5.4.1 Threatened flora

The desktop assessment identified 44 threatened flora species that have the potential to occur within the onshore study area (a 10 km buffer of the onshore CIA). These species have either previously been recorded (in the VBA) and/or are predicted to occur (by the PMST), or are known to occur in the locality (but there are no VBA records in the onshore study area). Of these species, 14 are listed as threatened under the EPBC Act and 41 are listed under the FFG Act (with 11 species listed under both acts). A preliminary assessment of the likelihood of occurrence for all threatened flora species identified by the desktop assessment for the onshore study area can be found in Appendix B.

During the rapid site assessment in August 2025, three threatened flora species were recorded:

– *Dianella amoena* (Matted Flax-lily) - listed as Endangered under the EPBC Act and the FFG Act. This species was recorded in Darriman H29 Bushland Reserve
– *Calystegia soldanella* (Coast Bindweed) – listed as endangered under the FFG Act. This species was recorded in McLoughlins Beach – Seaspray Coastal Reserve
– *Oxalis rubens* (Dune Wood-Sorrel) - listed as endangered under the FFG Act. This species was recorded in McLoughlins Beach – Seaspray Coastal Reserve

Of the 44 threatened flora species considered, 36 possibly occur within the onshore CIA (refer to Table 5.6 for species assessed as ‘may’ or ‘likely’ to occur). The threatened flora species considered possibly occurring within the onshore CIA occupy a range of habitats including wetlands, coastal dunes (including coastal grasslands and shrublands), saltmarsh and estuarine wetlands, forests, woodlands and heathlands (predominantly healthy woodlands). Additionally, some species may persist in disturbed environments including in modified (treeless) forms of forest or woodland communities where the understorey has remained intact.

Areas of large, connected and more intact native vegetation often provide the most value for threatened flora species, with most threatened flora species unlikely to occur across the majority of the onshore CIA, particularly in cropped, non-native pasture and heavily grazed areas; nor are they likely to persist in small and fragmented patches of degraded native vegetation.

Locations within the onshore CIA that are likely to provide the greatest opportunity for threatened flora include:

– Giffard (Rifle Range) Flora Reserve, a portion of which occurs in the north-west corner of the onshore CIA and is known to harbour several threatened flora species listed under both the FFG and EPBC Acts including *Commersonia prostrata* (Dwarf Kerang) and provides suitable habitat for several other threatened flora
– McLoughlins Beach – Seaspray Coastal Reserve which spans the barrier dune and coastal portion of the onshore CIA, known to support the FFG-listed endangered *Oxalis rubens* (Dune Wood-Sorrel) recorded during the rapid assessment and provides potential habitat for *Poa billardierei* (Coast Fescue) and other coastal threatened flora. Additionally, the FFG-listed endangered *Calystegia soldanella* (Coast Bindweed) was recorded during the field assessment. This species was not identified at the desktop assessment level, with the nearest records occurring within Wilsons Promontory
– Darriman H29 Bushland Reserve, occurs entirely within the onshore CIA and is known to support NDGTCP and Plains Grassland (South Gippsland) TECs, Lowland Forest (EVC16), Swamp Scrub (EVC 53). The rapid site assessment identified the EPBC and FFG - listed Endangered *Dianella amoena* (Matted Flax-lily) within the reserve
– Wetlands including freshwater and estuarine wetlands that provide potential habitat for both halophytic and freshwater threatened flora species including *Amphibromus fluitans* (Floating Swamp Wallaby-grass) and *Lachnagrostis robusta* (Salt Blown-grass). *Amphibromus fluitans* (Floating Swamp Wallaby-grass) may also occur in lower quality and isolated farm dams and seasonally wet depressions
– Road Reserves, areas of high quality and treeless remnant native vegetation with intact and diverse understorey associated with road reserves throughout the onshore CIA provide potential habitat for species like *Diuris punctata* var. *punctata* (Purple Diuris), previously recorded adjacent to the onshore CIA within the road reserve and *Austrostipa rudis* subsp. *australis* (Veined Spear-grass), with potential individuals for both species observed within the onshore CIA during the rapid assessment

Table 5.6 Threatened flora species confirmed to or have potential to occur in the onshore cable investigation area

Scientific Name	Common name	EPBC	FFG	Source	Count	Last record	Likelihood of occurrence
Acacia howittii	Sticky Wattle		vu	VBA	3	2023	**May**
Althenia marina	Sea Water-mat		cr				**May**
Amphibromus fluitans	River Swamp Wallaby-grass	VU		VBA, PMST	3	2004	**Likely**
Austrostipa rudis subsp. *australis*	Veined Spear-grass		en	VBA	1	1983	**Likely**
Caladenia aurantiaca	Orange-tip Finger-orchid		en	VBA	7	2003	**May**
Caladenia tessellata	Thick-lipped Spider-orchid	VU	vu	PMST			**May**
Calochilus imberbis	Naked Beard-orchid		cr	VBA	1	2000	**May**
Calystegia soldanella	Coast Bindweed		en	NA			**Confirmed**
Commersonia prostrata	Dwarf Kerrawang	EN	en	VBA, PMST	34	2012	**Likely**
Corybas fimbriatus	Fringed Helmet-orchid		en	VBA	1	2023	**May**
Dianella amoena	Matted Flax-lily	EN	en	PMST			**Confirmed**
Dianella longifolia var. *grandis*	Glaucous Flax-lily		cr	VBA	1	2000	**May**
Diuris punctata var. *punctata*	Purple Diuris		en	VBA	2	2003	**May**
Dodonaea procumbens	Trailing Hop-bush	VU		PMST			**May**
Eucalyptus arenicola	Gippsland Lakes Peppermint		en	VBA	5	2000	**May**
Eucalyptus bosistoana	Coast Grey-box		en #	VBA	121	2023	**Likely**
Eucalyptus fulgens	Green Scentbark		en	VBA	2	2003	**Likely**
Grevillea chrysophaea	Golden Grevillea		vu	VBA	3	2000	**May**
Lachnagrostis robusta	Salt Blown-grass		en	VBA	1	1998	**May**
Lachnagrostis semibarbata var. *filifolia*	Purple Blown-grass		en	VBA	2	1991	**May**
Leptorhynchos elongatus	Lanky Buttons		en	VBA	1	1994	**May**
Oxalis rubens	Dune Wood-sorrel		en	VBA	2	2003	**Confirmed**
Poa billardierei	Coast Fescue		en	VBA	1	1979	**Likely**
Pomaderris discolor	Eastern Pomaderris		en	VBA	1	2000	**May**
Pomaderris pilifera subsp. *pilifera*	Striped Pomaderris		en	VBA	1	2000	**May**
Posidonia australis	Fibre-ball Weed		en	VBA	2	1960	**May**
Prasophyllum spicatum	Dense Leek-orchid	VU	cr	PMST			**May**
Pseudanthus ovalifolius	Oval-leaf Pseudanthus		vu	VBA	1	2000	**May**
Pterostylis chlorogramma	Green-striped Greenhood	VU	en	VBA, PMST	119	2023	**May**
Pterostylis grandiflora	Cobra Greenhood		en	VBA	416	2023	**May**
Senecio spathulatus var. *lactifructus*	Coast Groundsel		en				**May**
Thelymitra epipactoides	Metallic Sun-orchid	EN	en	PMST			**May**
Triglochin minutissimna	Tiny Arrowgrass		en				**May**
Triglochin mucronata	Prickly Arrowgrass		en				**May**
Xanthosia leiophylla	Parsley Xanthosia		en	VBA	1	1978	**May**
Zieria veronicea subsp. *veronicea*	Pink Zieria		en	VBA	7	2012	**May**

5.5 Fauna

5.5.1 Fauna habitat

Based on aerial imagery and the DEECA Landcover layer 2015-2019, a large portion (approximately 88.5%) of the onshore CIA has been cleared or modified for various land uses, particularly for agriculture and forestry plantations (refer to Section 5.1). Generally, areas where native vegetation has been cleared or substantially modified is now characterised by non-native pasture grasses or crops that provide low value habitat for fauna and are unlikely to regularly support threatened fauna and migratory species. However, there are areas within the onshore CIA where native vegetation remains. Most remnant habitats that occur throughout the onshore CIA include forest, woodland, scrub, wetlands/waterways and coastal vegetation (i.e., grassland, sedgeland, saltmarsh) which are likely to be of high habitat value for a range of fauna, including threatened and migratory species.

The key fauna habitats likely to occur within the onshore CIA and their value for different faunal groups is summarised below.

Grassland

Large portions of the onshore CIA have been cleared for agricultural purposes and are now dominated by non-native pasture grasses or crops. Some land parcels may also contain native grassland. Generally, most grassland areas within the onshore CIA are expected to have disturbed soil, low structural complexity and provide relatively poor-quality fauna habitat (Figure 5.8). Most areas of grassland within paddocks appear to be frequently grazed by cattle or sheep, however, some roadsides were observed to contain less disturbed, native grassland during the rapid site assessment. Although the habitat quality of most grassland in the onshore CIA is low, common and adaptable fauna species are expected to use this habitat, particularly native birds such as Australian Magpie (*Gymnorhina tibicen*) and Masked Lapwing (*Vanellus miles*) and non-native birds such as Common Starling (*Sturnus vulgaris*) and European Skylark (*Alauda arvensis*). Raptors recorded during the site assessment, such as the Black-shouldered Kite (*Elanus axillaris*), Brown Falcon (*Falco berigora*), Nankeen Kestrel (*Falco cenchroides*), Wedge-tailed Eagle (*Aquila audax*), White-bellied Sea-Eagle (*Haliaeetus leucogaster*) and other threatened raptors such as the Black Falcon (*Falco subniger*) and Little Eagle (*Hieraaetus morphnoides*) may also regularly or occasionally hunt over grassland habitats as part of a broader home range, particularly where grassland occurs near to higher quality forest, woodland/scattered tree or coastal habitat. Mammals, such as the native Eastern Grey Kangaroo (*Macropus giganteus*) and the introduced European Rabbit (*Oryctolagus cuniculus*) are also expected to regularly use this habitat. Threatened fauna species with smaller, discrete home ranges are unlikely to regularly use or rely on grassland habitat within the onshore CIA, unless it is associated with other ecological features (i.e., surrounding waterways or wetlands).

Figure 5.8 Low quality roadside grassland habitat within the onshore cable investigation area

Forest/woodland

Most patches of forest/woodland habitat within the onshore CIA appear to be of relatively small extent and fragmented, occurring mostly within road reserves or as isolated patches surrounded by cleared or modified areas. In isolation, smaller and narrower patches of habitat tend to be of low to medium value for fauna but are collectively more valuable, particularly for dispersal where they can act as 'stepping stones'. However, there are some larger patches of forest/woodland that occur in the north of the onshore CIA at Giffard (Rifle Range) Flora Reserve and its surrounds which are more likely to provide more valuable habitat and support populations of threatened fauna. During the rapid site assessment, forest habitats within Giffard (Rifle Range) Flora Reserve were observed to contain complex habitat features, such as hollow-bearing trees, dense understorey cover and coarse-woody debris (Figure 5.9). Darriman H29 Bushland Reserve also provides a relatively large extent of moderate quality forest/woodland habitat, within an otherwise modified landscape.

Forest/woodland habitats are expected to provide suitable habitat for a range of terrestrial birds, including threatened species such as the Gang-gang Cockatoo (*Callocephalon fimbriatum*), Swift Parrot (*Lathamus discolor*) and Powerful Owl (*Ninox strenua*). These habitats are also expected to support various ground-dwelling and arboreal mammals and reptiles. Larger patches, with suitable vegetation cover in the understorey and other suitable habitat features (i.e., hollow-bearing trees), may also support threatened species with smaller, discrete home ranges such as New Holland Mouse (*Pseudomys novaehollandiae*) and Lace Monitor (*Varanus varius*). Ephemeral drainage lines and other low-lying areas in forest/woodland habitats may also be suitable for the Southern Toadlet (*Pseudophryne semimarmorata*).

Figure 5.9 Forest habitat within Giffard (Rifle Range) Flora and Fauna Reserve

Riparian/swamp scrub

This habitat is expected to be confined to relatively narrow riparian corridors along waterways or other low-lying depressions within the onshore CIA. The most notable occurrence of this habitat is along an unnamed waterway that flows from north of the township of Giffard toward McLoughlins Beach and Seaspray Coastal Reserve and flows through Darriman H29 Bushland Reserve (Figure 5.10). This habitat provides suitable habitat for a range of ground-dwelling mammals, small birds, reptiles and frogs, and may support threatened species, such as Swamp Skink (*Lissolepis coventryi*), Glossy Grass Skink (*Pseudemoia rawlinsoni*) and Southern Toadlet (*Pseudophryne semimarmorata*).

Figure 5.10 Scrub habitat within Darriman H29 Bushland Reserve

Wetlands/waterways

There are a number of wetlands and waterways in the onshore CIA, most of which are small, unnamed tributaries (some of which may be ephemeral) or farm dams within agricultural land. The most notable wetland in/near the onshore CIA is Lake Denison, which is a large estuarine wetland. Only the estuarine components of this wetland occur within the onshore CIA, the true lake occurs outside of the onshore CIA. An unnamed waterway that flows from north of the township of Giffard toward McLoughlins Beach and Seaspray Coastal Reserve (forming part of Ninety Mile Beach) also connects with the Lake Denison Estuary. There are also other smaller coastal wetlands present within the onshore CIA near the Lake Denison Estuary (Figure 5.11).

Coastal wetland/estuarine habitats are likely to be of high value to a range of shorebirds and other wetland birds, including threatened and/or migratory species such as Latham's Snipe (*Gallinago hardwickii*), Red-necked Stint (*Calidris ruficollis*) and Sharp-tailed Sandpiper (*Calidris acuminata*). During the rapid site assessment, two species of shorebird were observed using this habitat within the onshore CIA, the resident non-threatened Red-capped Plover (*Charadrius ruficapillus*) and the EPBC Act-listed migratory species, Double-banded Plover (*Charadrius bicinctus*).

To the south of the onshore CIA, is Jack Smith Lake, a wetland of regional significance that provides important seasonal habitat for a number of migratory shorebirds including the Double-banded Plover (*Charadrius bicinctus*) and Sharp-tailed Sandpiper (*Calidris acuminata*). Freshwater wetlands and waterways within the onshore CIA, that are less saline and occur further from the coast, may also provide habitat for a range of frog species, including threatened species such as Growling Grass Frog (*Litoria raniformis*) and Green and Golden Bell Frog (*Litoria aurea*).

Wetlands and waterways within the onshore CIA are unlikely to provide habitat for threatened fish species, including threatened species such as the Dwarf Galaxias and Australian Grayling.

For example, in freshwater reaches Australian Grayling usually prefer cool and clear waters, gravel substrates, and alternating pool and riffle habitats (Bishop and Bell 1978; Berra 1982; Backhouse et al. 2008). This habitat is limited due to lack of flows and the highly intermittent nature of the waterways. Although Dwarf Galaxias can survive periods of drying in ephemeral habitats, for long-term survival the species requires intermittent connectivity to more permanent waterways during flood events, and permanent waterways are not present within the onshore CIA. Complex habitat structure is also absent in many reaches in the onshore CIA, due to smaller streams being located on grazing land with little riparian vegetation, impacts associated with stock access, and high nutrients levels. Furthermore, the intermittently opened estuary mouths, such as the one associated with Lake Denison, are likely to act as a barrier to migratory fish such as Australian Grayling that rely on access to the ocean for the development of juveniles following spawning in freshwater/estuarine areas.

Figure 5.11 Wetland habitat near the Lake Denison estuary

Coastal vegetation

The coastal habitats at McLoughlins Beach and Seaspray Coastal Reserve (forming part of Ninety Mile Beach) consist of a mixture of wide, sandy beaches, grading into coastal grassy, scrub or woodland habitats and areas of coastal saltmarsh further landward (Figure 5.12). The dynamic coastal habitats at Ninety Mile Beach are unlikely to provide habitat for a diverse suite of shorebirds, rather those that prefer sandy beach habitats, including threatened and/or migratory species such as Hooded Plover (*Thinornis cucullatus cucullatus*) and Double-banded Plover (*Charadrius bicinctus*). During the rapid site assessment these habitats were observed to be used by some coastal species such as Pied Oystercatcher (*Haematopus longirostris*) and Pacific Gull (*Larus pacificus*). The coastal vegetation provides habitat for a range of birds, reptiles and small ground-dwelling mammals and may be suitable for threatened species such as Swamp Skink (*Lissolepis coventryi*), Glossy Grass Skink (*Pseudemoia rawlinsoni*) and White-footed Dunnart (*Sminthopsis leucopus*).

Figure 5.12 Coastal vegetation and open sandy beach habitat at McLoughlins Beach and Seaspray Coastal Reserve

5.5.2 Threatened fauna

The desktop assessment identified 75 threatened fauna species that have been recorded (in the VBA) and/or are predicted to occur (by the PMST) and/or are known to occur in the locality (but there are no VBA records in the onshore study area) that have the potential to occur within the onshore study area (a 10 km buffer of the onshore CIA).Of these species, 44 are listed as threatened under the EPBC Act and 70 are listed under the FFG Act (with 39 species listed under both acts). A preliminary assessment of the likelihood of occurrence for all threatened fauna species identified by the desktop assessment for the onshore study area can be found in Appendix C.

During the rapid site assessment, one threatened fauna species was recorded:

– White-bellied Sea-Eagle (*Haliaeetus leucogaster*) - listed as Endangered under the FFG Act. This species was recorded in Darriman H29 Bushland Reserve

Of the 75 threatened fauna species, 65 were considered a possibility of occurring within the onshore CIA based on the desktop assessment and rapid site assessment (i.e., assessed as 'May' or 'Likely' to occur). These species occupy a variety of habitats, ranging from forests/woodlands, wetlands and their associated vegetation and coastal vegetation. As such, threatened fauna are discussed further under three broad categories, namely:

– Avifauna (birds) (which includes all relevant shorebirds, wetland birds and terrestrial birds)
– Other fauna (which includes all relevant terrestrial and freshwater aquatic mammals, reptiles and amphibians)
– Ichthyofauna (fish) (which includes all relevant freshwater fish species, including catadromous and anadromous species that migrate between freshwater and the ocean)

5.5.2.1 Avifauna (birds)

For the purpose of this report, avifauna (birds) are discussed under three categories:

– Shorebirds and coastal birds – encompassing threatened and non-threatened migratory and resident (i.e., non-migratory) shorebirds (e.g., sandpipers, plovers and their allies, terns) that could use onshore (including coastal/beach habitats)
– Wetland birds – encompassing threatened birds that use onshore aquatic habitats (i.e., ducks, egrets, bitterns)
– Terrestrial birds – encompassing threatened birds that use other terrestrial habitats (i.e., woodland birds)

Shorebirds and coastal birds

A total of 21 threatened shorebird species were considered a possibility of occurring within the onshore CIA (i.e., assessed as 'May' or 'Likely' to occur) (Table 5.7). Most habitat for shorebirds within the onshore CIA occurs at Lake Denison and its associated estuarine habitats. Some shorebirds may also use sandy beach habitats at McLoughlins Beach/Ninety Mile Beach and freshwater wetlands/waterways that occur in the onshore CIA.

Table 5.7 Threatened shorebird and coastal species considered a possibility of occurring within the onshore cable investigation area

Common name	Scientific name	EPBC	FFG	VBA recs	Last recorded	Source	Likelihood of occurrence
Australian Gull-billed Tern	*Gelochelidon nilotica macrotarsa*		en	1	1985	VBA	**May**
Australian Painted Snipe	*Rostratula australis*	EN	cr			PMST	**May**
Bar-tailed Godwit	*Limosa lapponica baueri*	EN	en	4	1998	VBA, PMST	**May**
Caspian Tern	*Hydroprogne caspia*		vu	33	2021	VBA	**Likely**
Common Greenshank	*Tringa nebularia*	EN	en	11	2012	VBA, PMST	**Likely**
Common Sandpiper	*Actitis hypoleucos*		vu			PMST	**May**
Curlew Sandpiper	*Calidris ferruginea*	CR	cr	17	2020	VBA, PMST	**Likely**
Eastern Curlew	*Numenius madagascariensis*	CR	cr	2	2009	VBA, PMST	**Likely**
Fairy Tern	*Sternula nereis*	VU	cr			PMST	**May**
Great Knot	*Calidris tenuirostris*	VU	vu	1	1998	VBA	**May**
Greater Sand Plover	*Charadrius leschenaultii*	VU	vu			PMST	**May**
Grey Plover	*Pluvialis squatarola*	VU	vu	1	1981	VBA	**May**
Hooded Plover	*Thinornis cucullatus cucullatus*	VU	vu	11	2019	VBA, PMST	**Likely**
Latham's Snipe	*Gallinago hardwickii*	VU	vu	8	2007	VBA, PMST	**Likely**
Lesser Sand Plover	*Charadrius mongolus*	EN	en			PMST	**May**
Little Tern	*Sternula albifrons*	VU	cr	2	1981	VBA, PMST	**May**
Marsh Sandpiper	*Tringa stagnatilis*		en	4	1982	VBA, PMST	**May**
Pacific Golden Plover	*Pluvialis fulva*		vu	10	2017	VBA, PMST	**Likely**
Red Knot	*Calidris canutus*	VU	vu	6	1998	VBA, PMST	**May**
Ruddy Turnstone	*Arenaria interpres*	VU	vu	7	2017	VBA	**Likely**
Sharp-tailed Sandpiper	*Calidris acuminata*	VU	vu	23	2021	VBA, PMST	**Likely**

Wetland birds

A total of nine threatened wetland bird species were considered a possibility of occurring within the onshore CIA (i.e., assessed as 'May' or 'Likely' to occur) (Table 5.8). Key habitat for wetland birds within the onshore CIA occurs at Lake Denison and its associated estuarine or coastal wetland habitats. Some wetland birds may also use freshwater wetlands/waterways that occur in the onshore CIA.

Table 5.8 Threatened wetland bird species considered a possibility of occurring within the onshore cable investigation area

Common name	Scientific name	EPBC	FFG	VBA recs	Last recorded	Source	Likelihood of occurrence
Australasian Bittern	*Botaurus poiciloptilus*	EN	cr	2	1979	VBA, PMST	**May**
Australasian Shoveler	*Spatula rhynchotis*		vu	43	2020	VBA	**Likely**
Australian Little Bittern	*Ixobrychus dubius*		en	1	1996	VBA	**May**
Blue-billed Duck	*Oxyura australis*		vu	5	1989	VBA	**May**
Eastern Great Egret	*Ardea alba modesta*		vu	8	2018	VBA	**Likely**
Freckled Duck	*Stictonetta naevosa*		en	3	2017	VBA	**Likely**
Little Egret	*Egretta garzetta nigripes*		en	6	2017	VBA	**Likely**
Magpie Goose	*Anseranas semipalmata*		vu	1	1999	VBA	**May**
Musk Duck	*Biziura lobata*		vu	21	2007	VBA	**Likely**

Terrestrial birds

A total of 21 threatened terrestrial bird species were considered a possibility of occurring within the onshore CIA (i.e., assessed as 'May' or 'Likely' to occur) (Table 5.9). Most habitat for threatened terrestrial birds within the onshore CIA occurs in areas of forest/woodland habitat, scrub habitat and within coastal vegetation. Raptors (i.e., Black Falcon, Little Eagle and Square-tailed Kite, White-bellied Sea-Eagle) that use open habitats may forage over open grassland habitats. Some terrestrial birds may also use freshwater wetlands/waterways that occur in the onshore CIA and their associated riparian habitats.

Table 5.9 Threatened terrestrial bird species considered a possibility of occurring within the onshore cable investigation area

Common name	Scientific name	EPBC	FFG	VBA recs	Last recorded	Source	Likelihood of occurrence
Barking Owl	*Ninox connivens*		cr	1	1980	VBA	**May**
Black Falcon	*Falco subniger*		cr	0	-	NA	**May**
Blue-winged Parrot	*Neophema chrysostoma*	VU	vu	18	2019	VBA, PMST	**Likely**
Brown Treecreeper	*Climacteris picumnus victoriae*	VU	vu	0	-	PMST	**May**
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*		vu	8	1999	VBA	**May**
Diamond Firetail	*Stagonopleura guttata*	VU	vu	0	-	PMST	**May**
Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN	en	15	2023	VBA, PMST	**Likely**
Glossy Black-cockatoo	*Calyptorhynchus lathami lathami*	VU	vu	0	-	PMST	**May**
Grey Goshawk	*Accipiter novaehollandiae*		en	1	1980	VBA	**May**
Ground Parrot	*Pezoporus wallicus*		en	1	1980	VBA	**May**
Hooded Robin	*Melanodryas cucullata cucullata*	EN	en	0	-	PMST	**May**
King Quail	*Synoicus chinensis*		en	1	1975	VBA	**May**
Little Eagle	*Hieraaetus morphnoides*		vu	4	2005	VBA	**Likely**
Orange-bellied Parrot	*Neophema chrysogaster*	CR	cr	12	2020	VBA, PMST	**Likely**
Painted Honeyeater	*Grantiella picta*	VU	vu	0	-	PMST	**May**
Pilotbird	*Pycnoptilus floccosus*	VU	vu	1	1975	VBA, PMST	**May**
Powerful Owl	*Ninox strenua*		vu	10	2008	VBA	**Likely**
Square-tailed Kite	*Lophoictinia isura*		vu	0	-	NA	**May**
Swift Parrot	*Lathamus discolor*	CR	cr	2	2017	VBA, PMST	**Likely**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*		en	35	2019	VBA	**Confirmed**
White-throated Needletail	*Hirundapus caudacutus*	VU	vu	10	2019	VBA, PMST	**Likely**

5.5.2.2 Other fauna (mammals, reptiles, amphibians, invertebrates)

A total of 15 other threatened terrestrial and aquatic fauna species (comprising mammals, reptiles and frogs) were considered a possibility of occurring within the onshore CIA (i.e., assessed as 'May' or 'Likely' to occur) (Table 5.10Table 5.10). Habitat for most of these species (particularly the mammals, Lace Monitor and toadlets) within the onshore CIA occurs in areas of forest/woodland habitat, scrub habitat and within coastal vegetation. Other species such as Glossy Grass Skink, Swamp Skink, Growling Grass Frog and Green and Golden Bell Frog are more likely to be associated with freshwater wetlands/waterways and their associated riparian habitats.

Table 5.10 Threatened terrestrial and aquatic fauna species considered a possibility of occurring within the onshore cable investigation area

Common name	Scientific Name	EPBC	FFG	Count	Last recorded	Source	Likelihood of Occurrence
Mammals							
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	vu	0	-	PMST	**May**
New Holland Mouse	*Pseudomys novaehollandiae*	VU	vu	0	-	PMST	**May**
Southern Brown Bandicoot	Isoodon obesulus obesulus	EN	en	0	-	PMST	**May**
Southern Greater Glider	*Petauroides volans*	EN	en	19	2022	VBA	**May**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN	en	0	-	PMST	**May**
White-footed Dunnart	*Sminthopsis leucopus*		vu	0	-	NA	**May**
Yellow-bellied Glider	*Petaurus australis*	VU	en	2	2006	VBA, PMST	**May**
Reptiles							
Glossy Grass Skink	*Pseudemoia rawlinsoni*		en	3	1977	VBA	**May**
Lace Monitor	*Varanus varius*		en	15	2017	VBA	**Likely**
Swamp Skink	*Lissolepis coventryi*	EN	en	1	1997	VBA, PMST	**May**
Frogs							
Green and Golden Bell Frog	*Litoria aurea*	VU		0	-	PMST	**May**
Growling Grass Frog	*Litoria raniformis*	VU	vu	9	1977	VBA, PMST	**May**
Martin's Toadlet	*Uperoleia martini*	EN	en	1	1998	VBA, PMST	**May**
Southern Toadlet	*Pseudophryne semimarmorata*		en	41	2021	VBA	**Likely**

5.5.2.3 Ichthyofauna (fish)

The desktop assessment determined that four threatened fish have been recorded in the search area (10 km buffer around the study site). However, all four are considered unlikely to occur within the onshore CIA (see Appendix C).

Although the migratory Australian Grayling would pass through estuarine and marine areas during spawning migrations, this species along with Southern Pygmy Perch require permanent freshwater habitats that are not present in the onshore CIA. Both Dwarf Galaxias and Flinders Pygmy Perch can persist for a time in freshwater habitats with dense stands of vegetation such as wetlands, drainage lines and backwaters that may dry out seasonally. These habitat types are not present within the onshore CIA.

5.5.3 Migratory species (under the EPBC Act)

The desktop assessment identified 32 migratory species that have been recorded (in the VBA) and/or are predicted to occur (by the PMST) that have the potential to occur within the onshore study area (a 10 km buffer of the onshore CIA). Of these species, 19 are also listed as threatened under the EPBC Act and/or FFG Act.

Thirty-one (31) of the 32 migratory species, are either known to occur (i.e., 'confirmed' during the rapid site assessment) or were considered a possibility of occurring within the onshore CIA (i.e., assessed as 'May' or 'Likely' to occur). A preliminary assessment of the likelihood of occurrence for all migratory species identified by the desktop assessment for the onshore study area can be found in Appendix D.

Most habitat for migratory species within the onshore CIA occurs at Lake Denison and its associated estuarine habitats. Some species may also use sandy beach habitats at Ninety Mile Beach and freshwater wetlands/waterways that occur in the onshore CIA. During the rapid site assessment, one migratory species was recorded within the onshore CIA, the Double-banded Plover (*Charadrius bicinctus*). Although an exact count of birds could not be undertaken during the preliminary assessment (due to land access issues), a relatively large number of Double-banded Plovers were seen within the Lake Denison estuary (up to approximately 100 birds) and it is possible that this is important habitat for the Double-banded Plover. The nearby Jack Smith Lake, a wetland of national significance, is known to provide important habitat for this species.

5.5.4 Bass Strait migratory species

For the purpose of this report, Bass Strait migratory species encompasses threatened and non-threatened fauna species that are known to cross Bass Strait. Large numbers of birds fly between mainland Australia and Tasmania, with many birds flying south in spring, and returning north in autumn for the austral winter. Some bats, such as the Grey-headed Flying Fox (*Pteropus poliocephalus*) and White-striped Freetail Bat (*Austronomus australis*) may also migrate across Bass Strait and are occasionally recorded on Bass Strait islands or as vagrants in Tasmania (Drissen et al. 2011). It is unlikely that any bat species are regular migrants across Bass Strait.

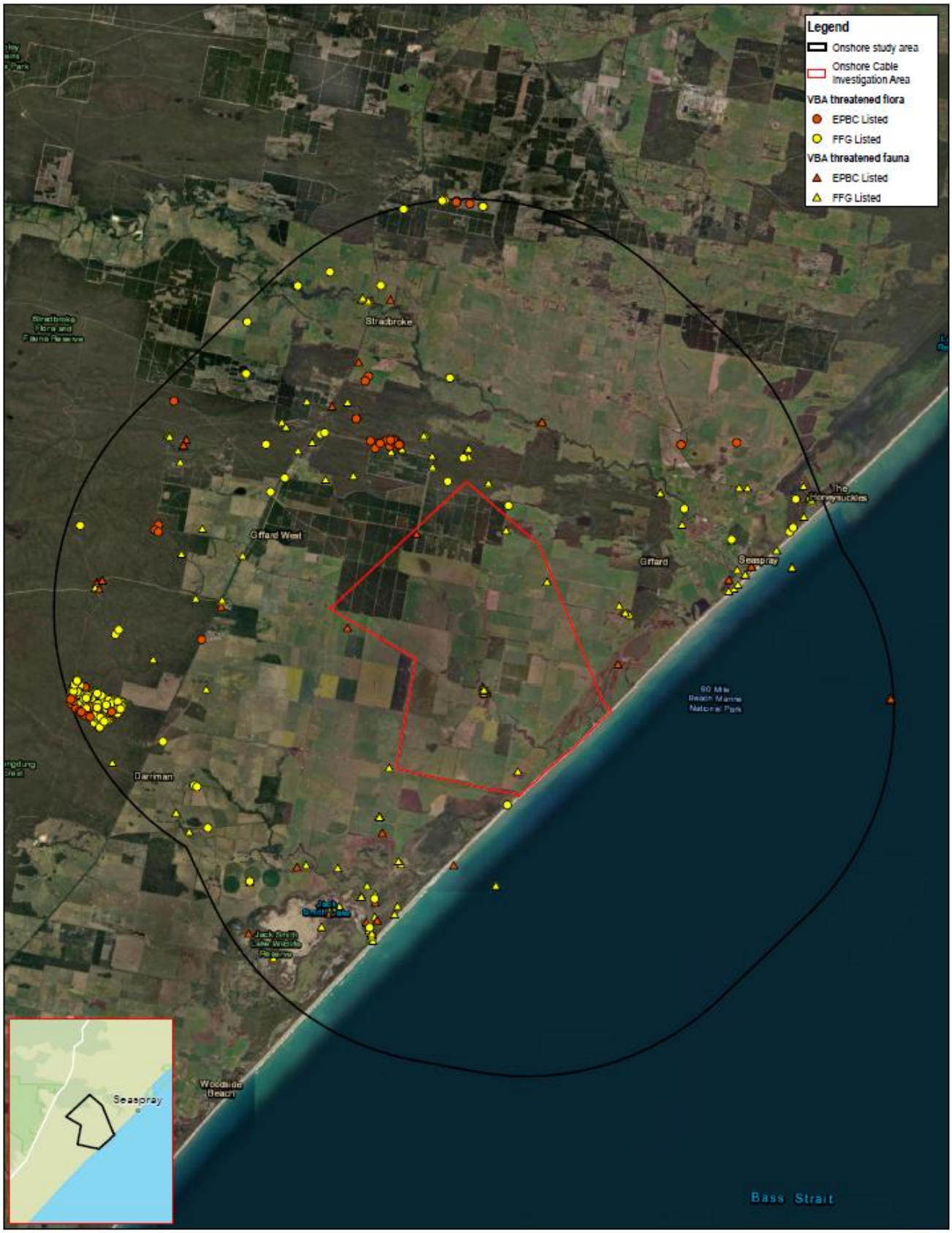
However, the Bass Strait flyway is understudied and there are considerable knowledge gaps about which species migrate across Bass Strait and the flight paths they choose for migration. For threatened Bass Strait migratory bird species such as Orange-bellied Parrot (*Neophema chrysogaster*), Swift Parrot (*Lathamus discolor*) and Blue-winged Parrot (*Neophema chrysostoma*), these movements and their timing is relatively well-understood. For example, the onshore CIA falls within the core non-breeding range for the Orange-bellied Parrot and there are records for this species at the nearby Jack Smith Lake and within the onshore CIA (Birdlife Australia 2023 and references within). The exact locations of historic, Orange-bellied Parrot records in the onshore CIA are unclear (due to location uncertainty/inaccuracies) but suitable habitat is confined to coastal areas along the southern extent of the onshore CIA. Whilst the onshore CIA includes the non-breeding range for the Orange-bellied Parrot, it is not within the probable Bass Strait migratory route identified within the Recovery Plan for the species (DoE, 2016).

However, for other non-threatened species such as Flame Robin (*Petroica phoenicea*) and Silvereye (*Zosterops lateralis*) these movements are poorly understood and may vary between populations and individuals. The *Handbook of Australian, New Zealand and Antarctic Birds* (HANZAB) provides information on the movements of bird species and whether movements across Bass Strait have been documented (Birdlife Australia 2023). The species recorded during the rapid site assessment that are either known to or may migrate across Bass Strait are shown in Table 5.11.

Table 5.11 Bird species recorded during the rapid site assessment that are either known to or may migrate across Bass Strait

Common name	Scientific Name	Status
Australasian Grebe	*Tachybaptus novaehollandiae*	
Australian Shelduck	*Tadorna tadornoides*	
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	
Black-shouldered Kite	*Elanus axillaris*	
Brown Falcon	*Falco berigora*	
Chestnut Teal	*Anas castanea*	
Double-banded Plover	*Charadrius bicinctus*	EPBC Act: migratory
Eastern Spinebill	*Acanthorhynchus tenuirostris*	
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	
Golden Whistler	*Pachycephala pectoralis*	
Great Cormorant	*Phalacrocorax carbo*	
Grey Butcherbird	*Cracticus torquatus*	
Grey Fantail	*Rhipidura fuliginosa*	
Grey Teal	*Anas gracilis*	
Horsfield's Bronze-cuckoo	*Chrysococcyx basalis*	
Magpie-lark	*Grallina cyanoleuca*	
Nankeen Kestrel	*Falco cenchroides*	
Pacific Gull	*Larus pacificus*	
Pied Oystercatcher	*Haematopus longirostris*	
Red-capped Plover	*Charadrius ruficapillus*	
Silver Gull	*Larus novaehollandiae*	
Silvereye	*Zosterops lateralis*	
Straw-necked Ibis	*Threskiornis spinicollis*	
Striated Pardalote	*Pardalotus striatus*	
Tree Martin	*Hirundo nigricans*	
Willie Wagtail	*Rhipidura leucophrys*	

The primary threat that the Project poses to Bass Strait migratory species is the risk of collision with sea-based turbines. That threat is not included in this onshore assessment. Land-based threats to these species, notably, direct and indirect impacts to onshore habitat, are considered in Section 6.1.



Paper Size ISO A3

0 0.9 1.8 2.7 3.6

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

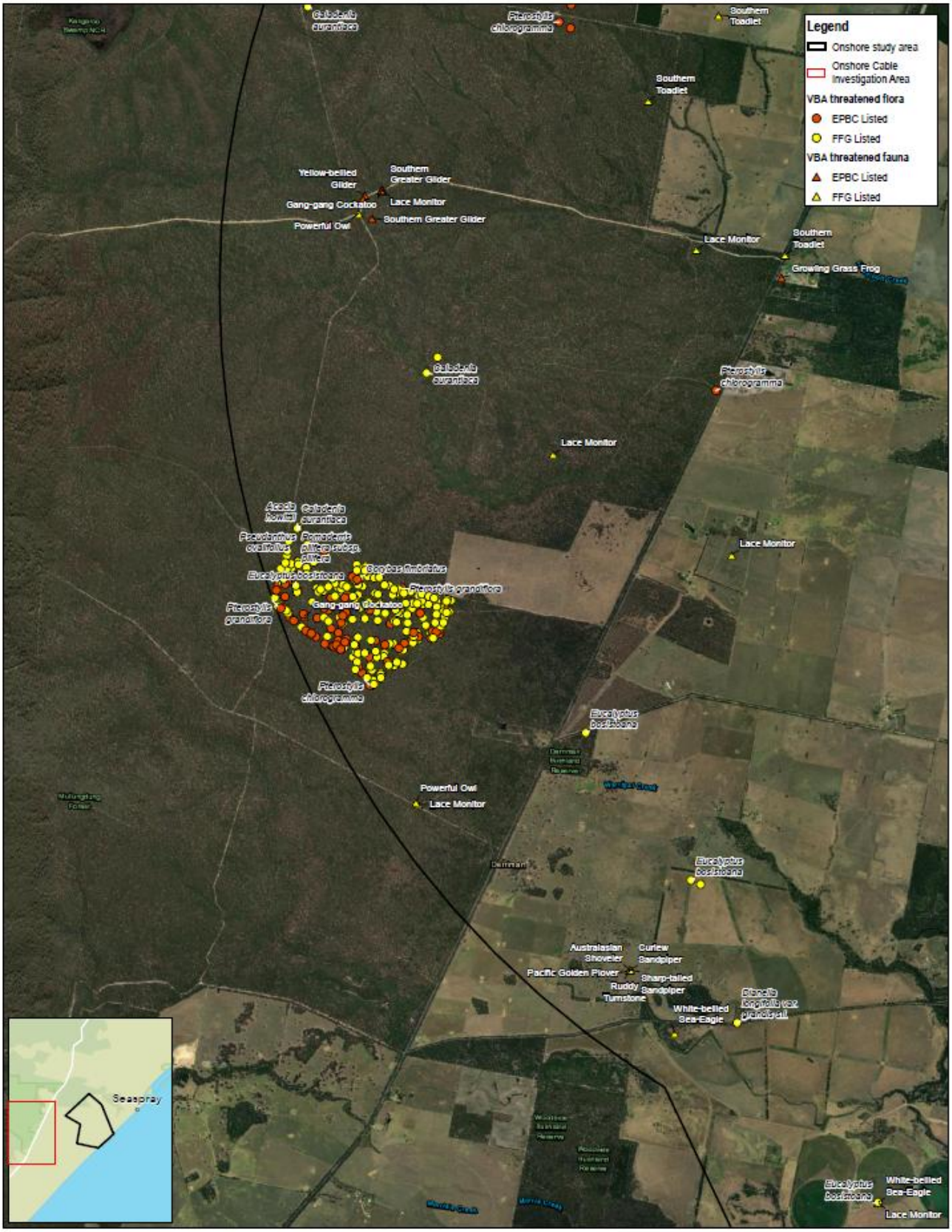
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

Page 1 of 9

FIGURE 5.13



Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

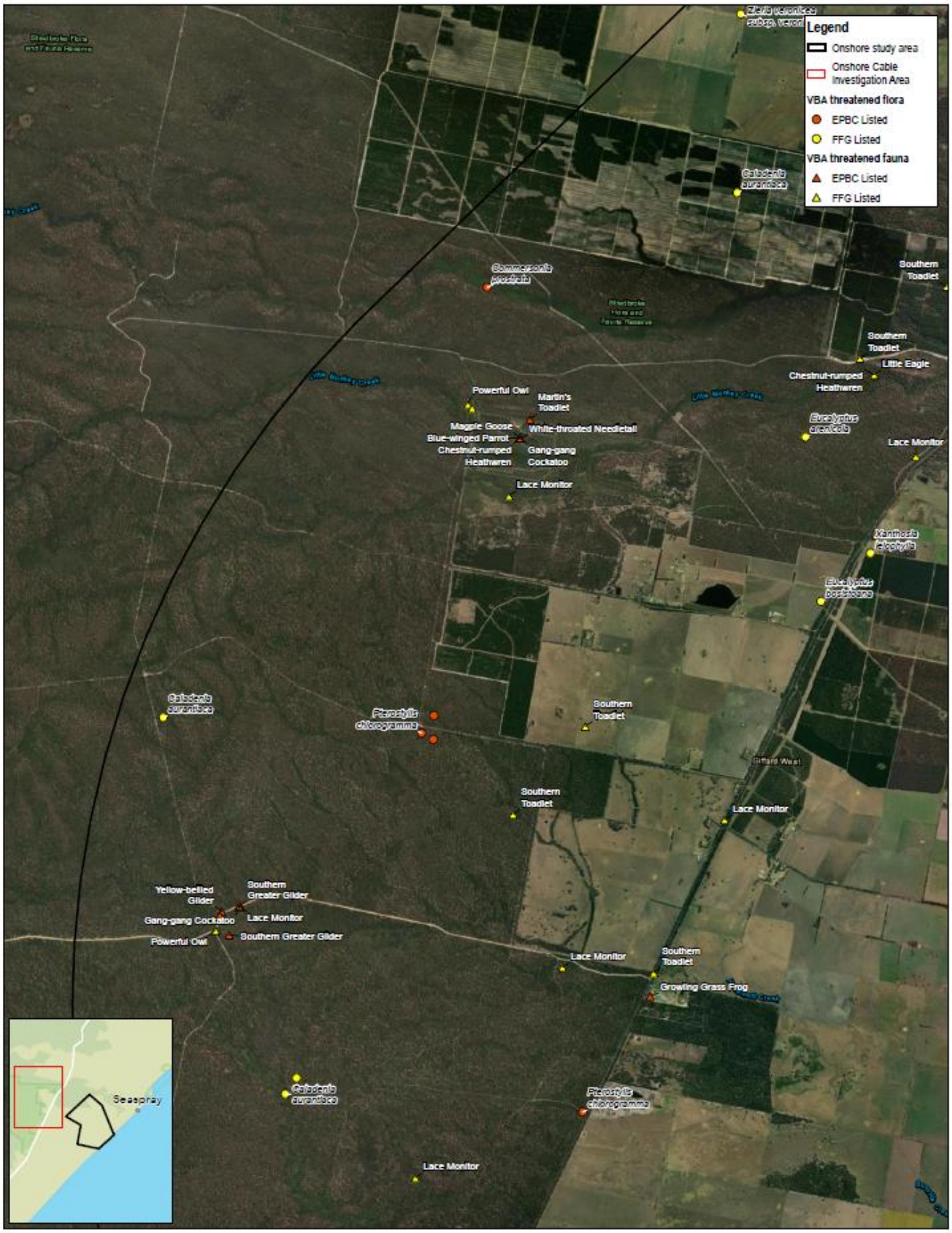
GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

FIGURE 5.13



Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

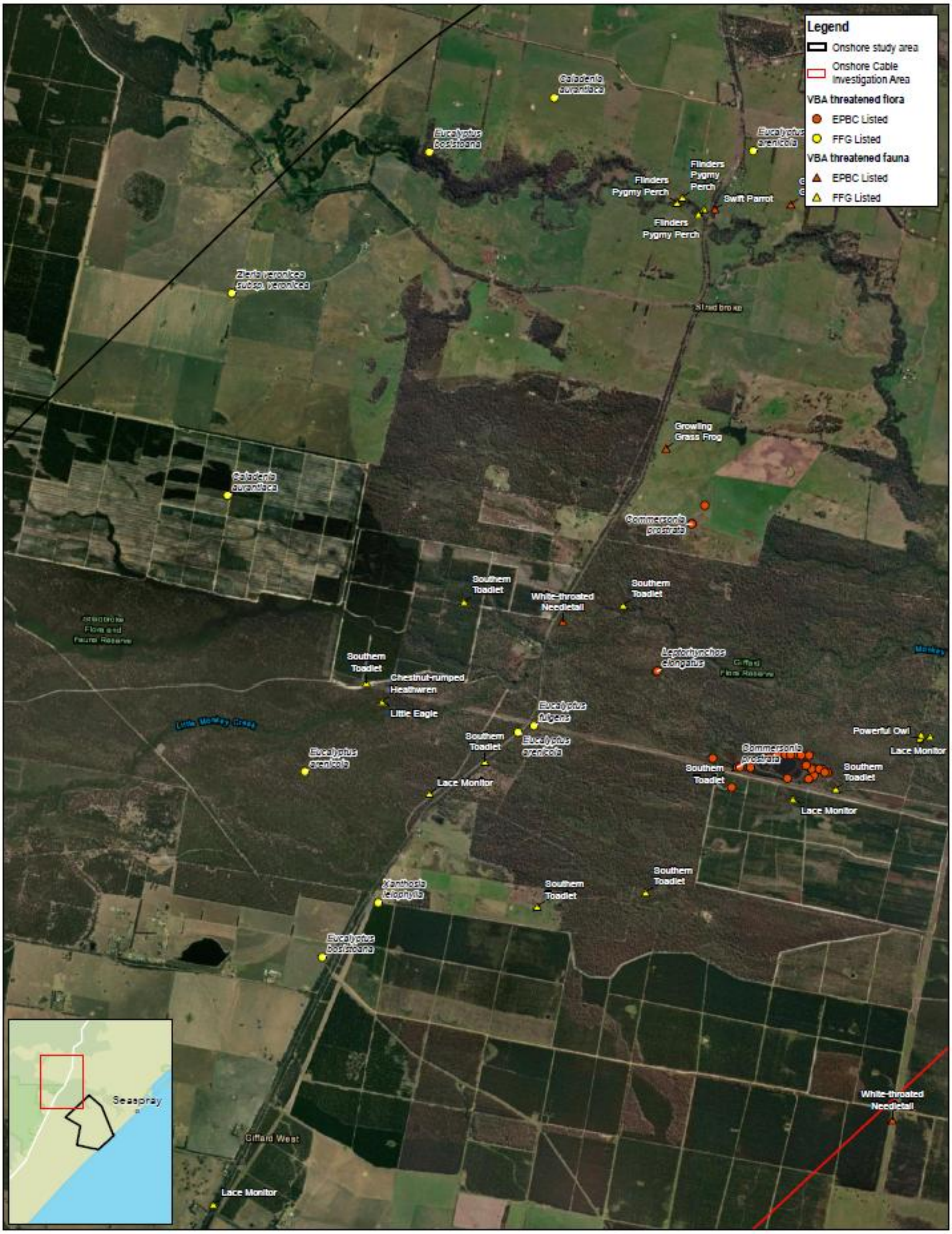
GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

FIGURE 5.13



Paper Size ISO A3
0 0.2 0.4 0.6 0.8
Kilometers
Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12658248
Revision No. A
Date 6/11/2025

Page 4 of 9
FIGURE 5.13

Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

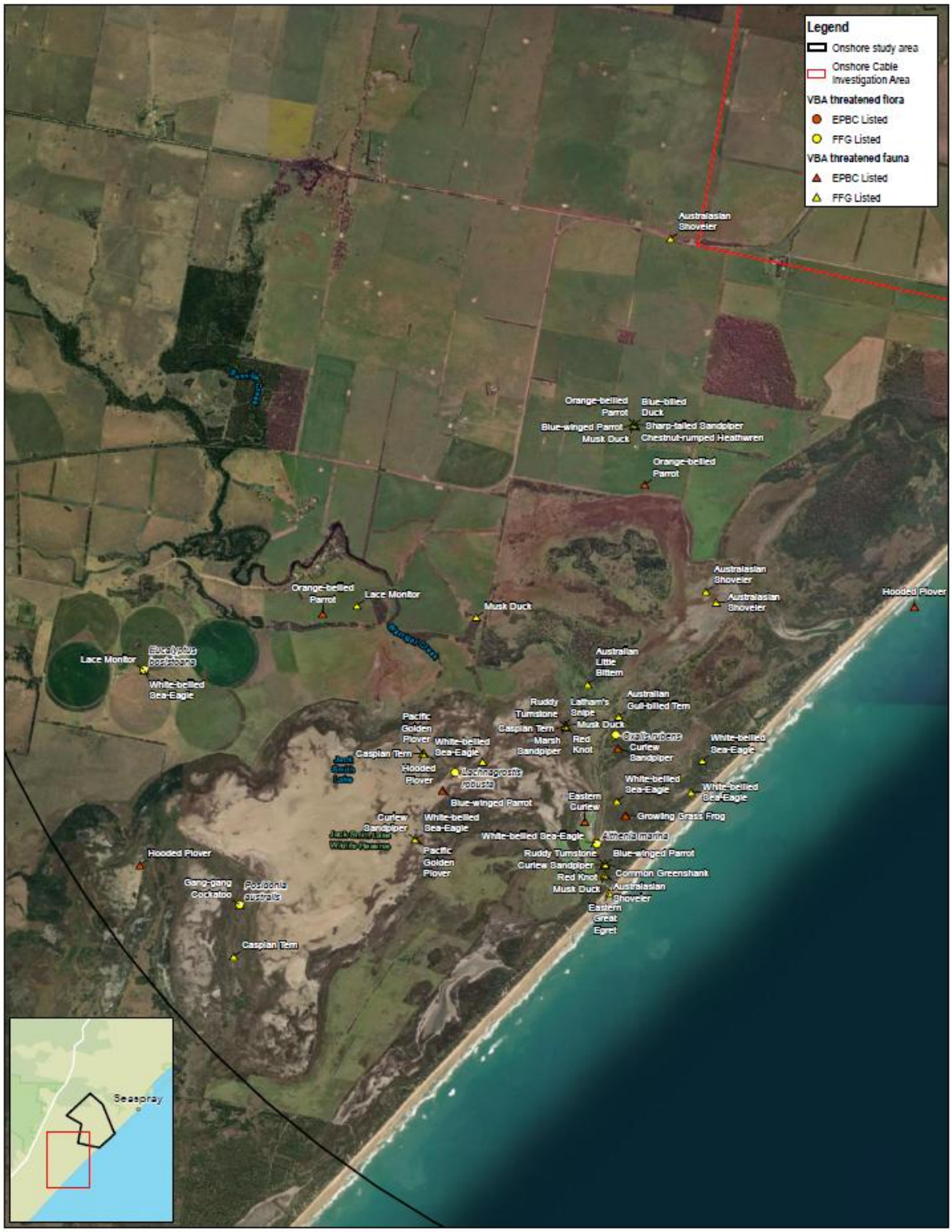
GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

FIGURE 5.13



Paper Size ISO A3

0 0.2 0.4 0.6 0.8

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

FIGURE 5.13

Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

Page 7 of 9

FIGURE 5.13

Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

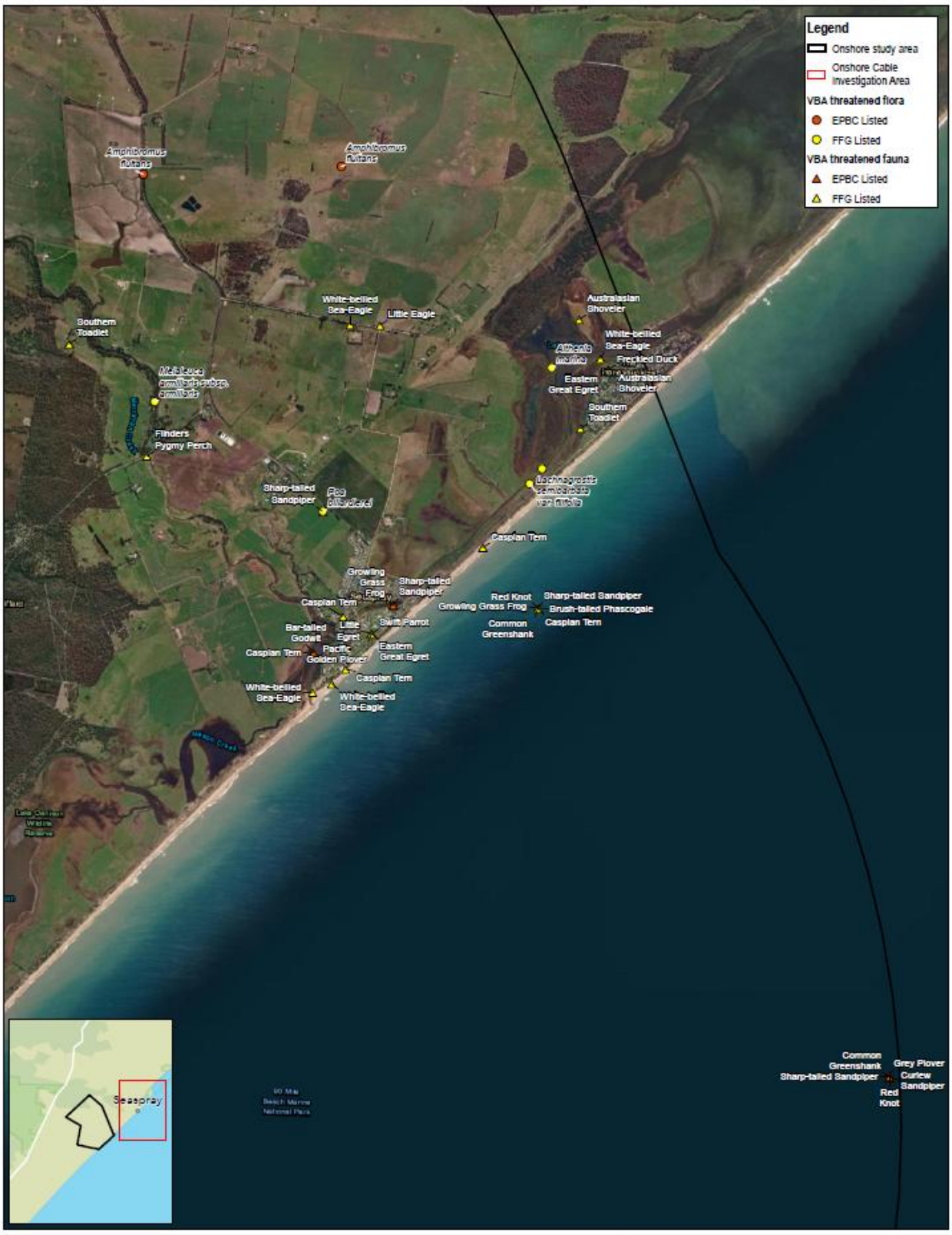
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

Page 8 of 9

FIGURE 5.13



Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Victorian Biodiversity Atlas records for threatened species within the onshore study area

Project No. 12668248
Revision No. A
Date 6/11/2025

Page 9 of 9

FIGURE 5.13

6. Impact assessment and mitigation

There are several ecological values identified within the onshore CIA. The preferred alignment for the onshore cable investigation corridor has not yet been confirmed and would be selected to avoid and minimise impacts on ecological and other values. Due to this, the potential impacts to onshore ecological values cannot yet be quantified, however this section provides a high-level assessment of potential impacts to onshore ecological values that may occur as a result of the Project. To identify potential impact pathways, consideration was given to:

– Listed key threatening processes under the EPBC Act and potentially threatening processes under the FFG Act
– Potential Project-specific impacts based on the identified ecological values in the onshore CIA and the construction and operation of the Project

The listed key threatening processes under the EPBC Act and potentially threatening processes under the FFG Act are summarised in Section 6.1, and the preliminary assessment for the Project against the relevant EPBC Act and EE Act criteria is provided in Section 6.3. A consolidated list of potential mitigation measures is included in Section 6.4.

6.1 Threatening processes

High-level preliminary assessments of the potential for the onshore component of the Project to contribute to key threatening processes under the EPBC Act, and potentially threatening processes under the FFG Act, are provided in Appendix F.

Broadly, the potential for the Project to contribute to the threatening processes is primarily associated with:

– Vegetation clearance, including riparian vegetation along rivers and streams, and associated losses of coarse woody debris and hollow-bearing trees, and the fragmentation of fauna habitat
– The spread or increase of pest plants and animals (e.g., weeds, rats and mice) during construction
– The spread of pathogens and diseases (cinnamon fungus, Chytrid fungus, Psittacine Circoviral Disease) during construction
– Increase in sediment input into rivers and streams
– Incidental spills of fuels and other potential contaminants

Management of threatening processes will be addressed by adoption of mitigation measures, including the development of a CEMP for the Project.

6.2 Potential project-specific impacts

There is the potential for project-specific impacts to onshore ecological values known or considered as having the potential to occur in the onshore CIA (Section 5). Mitigation measures have been proposed to avoid and minimise direct and indirect impacts to onshore ecological values during the route selection and detailed design phase, as well as during the construction and operation stages of the Project (Section 2).

The potential impacts to onshore ecological values are expected to be mostly associated with:

– **Direct loss of vegetation and fauna habitat**
  - Loss and disturbance of native vegetation and associated vegetation communities and flora listed as threatened under the FFG Act and/or EPBC Act
  - Loss, degradation and/or fragmentation of habitat for fauna species listed as threatened or migratory under the FFG Act and/or EPBC Act
  - Loss, degradation, barrier effects and/or fragmentation of intertidal, wetland, freshwater or terrestrial habitat

– **Indirect loss of vegetation and fauna habitat**
  - Loss or degradation of vegetation and fauna habitat including ground disturbance, sedimentation and erosion, changes in surface water quality, hydrological and groundwater changes, dust, noise and electromagnetic field (EMF)
  - Indirect effects on fauna due to potential reduction in prey availability as a result of impacts on prey species
  - Introduction and/or spread of weeds, pathogens and other pest plants and animals
  - Dewatering of groundwater during construction resulting in changes to groundwater dependent ecosystems (GDEs)
  - Ground disturbance increasing the risks of acid sulfate soils (ASS)
– **Direct loss of fauna**
  - Injury, mortality or displacement of fauna during construction or operation.
  - Physical and toxicity effects to fauna populations, including breeding/roosting/foraging habitats from construction activities or unplanned events
– **Other impacts**
  - The availability of suitable offsets that satisfy the requirements of applicable Commonwealth and/or State government native vegetation and offset policies
  - Potential cumulative effects on listed species from the proposed project in combination with other known or proposed projects

Note that although threatened aquatic fauna are unlikely to be present in wetlands and waterways within the onshore CIA, under Victoria's *Environment Protection Act 2017*, the General Environmental Duty requires individuals and businesses to proactively identify and minimise risks of harm to human health and the environment (including wetlands and waterways) from pollution and waste so far as reasonably practicable. This means that although threatened aquatic fauna are unlikely to be present in wetlands and waterways within the onshore CIA, the wetlands and waterways are a value themselves that require protection.

6.3 Preliminary impact assessment

6.3.1 EPBC Act assessment of potential impacts on Matters of National Environmental Significance (MNES)

A preliminary assessment of potential impacts on relevant ecological Matters of National Environmental Significance (MNES) (threatened species and TECs, migratory species and wetlands of international importance) is provided in Table 6.1.

This preliminary assessment has considered the onshore CIA, as well as the two closest Ramsar sites: Corner Inlet and Gippsland Lakes. The preliminary assessment is based on desktop information and a rapid site assessment from publicly accessible land to inform the onshore route selection and identify opportunities to avoid and minimise impacts on MNES. Further detailed ecological assessments are required and will be carried out for the project to assess the proposed route and enable a more detailed assessment of the potential presence of MNES, the potential for direct or indirect impacts and to inform actions to avoid and minimise adverse effects.

Direct impacts on threatened species and habitat, or threatened ecological communities are expected to be avoided and minimised provided the recommended mitigation measures outlined in Table 6.1. and Section 6.4 are adopted. Given the preliminary nature of this assessment, a more detailed assessment would need to be undertaken once the location of the alignment and construction approaches are confirmed.

Table 6.1. Preliminary assessment of potential impacts to ecological MNES under the EPBC Act (Commonwealth of Australia 2013)

MNES	Project details	Potential mitigation measures	Preliminary impact assessment following mitigation
Nationally threatened species and ecological communities	The onshore CIA is known or likely to contain populations of and/or habitat for EPBC Act-listed threatened flora and fauna species. The onshore CIA is likely to contain EPBC Act-listed threatened ecological communities.	**Prior to construction** During the detailed design phase of the Project, BMN intends to utilise cleared land and/or areas identified as containing low ecological values, as far as possible, to avoid potential impacts to nationally threatened species and ecological communities. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed on the onshore cable investigation corridor to confirm the presence and extent of MNES with the potential to be directly or indirectly impacted by the onshore cable construction corridor. BMN will then design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). BMN commits to designing the alignment and using appropriate construction methods to avoid and minimise impacts to: – Habitat for EPBC Act-listed flora and fauna species (i.e., locate project infrastructure outside of key habitat areas) – Known or potential areas of TECs including: • Darriman H29 Bushland Reserve • Lake Denison • EVCs associated with any EPBC Act-listed TECs • Areas of roadside native vegetation along Giffard, Giffard West Road, McGaurans Beach Road and Owens Lane **Post construction** Additional mitigation measures will be detailed in the Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP) prepared for the Project. These measures will detail the process(es) to protect native vegetation and habitat proposed to be retained as well as for avoiding and minimising impacts to native vegetation and habitat. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Ecological values within the onshore CIA are expected to be mostly located within discrete areas, such as within bushland reserves, coastal reserves, estuaries and waterways, and along roadsides, with most of the onshore CIA comprising disturbed areas used for agriculture and forestry. Further assessment is proposed to characterise the extent, number and location of TECs, threatened species and habitat for threatened species within the onshore CIA. The onshore transmission cables would require a construction corridor approximately 50 m wide by between 6 and 10 km long (up to 50 ha). Trenchless construction is proposed for the shore crossing and may be adopted in other sensitive locations to mitigate impacts. The trenchless construction work site for the shore crossing would be sited to minimise impacts on the coastal environment. Whilst there is potential for significant impacts without mitigation, given the nature of the onshore CIA and proposed construction activities, it is considered likely that the project can avoid and minimise impacts on nationally threatened species and ecological communities through siting and design of infrastructure.
Migratory species	The onshore CIA contains coastal, estuarine and other wetland habitats that are known or likely to provide habitat for and/or support migratory bird species.	**Prior to construction** During the detailed design phase of the Project, BMN intends to utilise cleared land and/or areas identified as containing low ecological values as far as possible, to avoid potential impacts to habitat for EPBC Act-listed migratory fauna species. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed on the onshore cable investigation corridor to confirm the presence and extent of suitable habitat with the potential to be directly or indirectly impacted by the onshore cable construction corridor. BMN will then design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). BMN commits to designing the alignment and using appropriate construction methods to avoid impacts to habitat for EPBC Act-listed migratory fauna species (i.e., locate project infrastructure outside of key habitat areas, such as coastal wetlands and the Lake Denison estuary). **Post construction** Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	As noted above, ecological values within the onshore CIA are expected to be mostly located within discrete areas. Further assessment is proposed to characterise the extent and location of important habitat for migratory species within the onshore CIA. Project infrastructure will be sited and designed to avoid and minimise impacts on these values where possible.

MNES	Project details	Potential mitigation measures	Preliminary impact assessment following mitigation
Wetlands of International Importance (Ramsar sites)	The onshore CIA occurs near two Ramsar sites: – Corner Inlet (approx. 21 km southwest of onshore CIA) – Gippsland Lakes (approx. 9 km northeast of onshore CIA)	**Prior to construction** During the detailed design phase of the Project, BMN intends to utilise cleared land and/or areas identified as containing low ecological values as far as possible, to avoid potential impacts to Ramsar wetlands outside of the onshore CIA. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed on the onshore cable investigation corridor. BMN will design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). BMN commits to designing the alignment and using appropriate construction methods to avoid: – indirect impacts to Ramsar wetlands (i.e., locate Project infrastructure away from waterways that flow into the Ramsar sites) or use appropriate construction methods (e.g., HDD or direct pipe) to avoid impacts to these waterways – impacts to habitat for migratory species and other bird species that may also use these Ramsar sites (i.e., locate Project infrastructure outside of key habitat areas for shorebirds and other wetland birds – such as coastal wetlands and the Lake Denison estuary) **Post construction** Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to Ramsar wetlands. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	The onshore CIA occurs outside of these Ramsar sites and direct impacts are not expected. Mitigation measures would be implemented to minimise the risk of indirect impacts from the Project to these Ramsar sites.

6.3.2 EPBC Act preliminary significant impact assessments

The following section provides a summary of the preliminary assessments of the significant impact criteria under the EPBC Act significant impact guidelines (Commonwealth of Australia 2013). Building on the preliminary impact assessment and high-level mitigation measures outlined in Section 6.3.1, the following section reviews each relevant MNES category (critically endangered and endangered species, vulnerable species, threatened ecological communities, migratory species and Ramsar wetlands) and the potential for significant impacts separately.

For each relevant MNES category, a dedicated table outlines the relevant significant impact criteria, explains the potential impact pathways for the Project, and identifies how BMN proposes to mitigate the risks through detailed assessment, refinement of design and construction method, and implementation of mitigation measures (refer Table 6.2, Table 6.3, Table 6.4, Table 6.5 and **Error! Reference source not found.**).

Provided the potential mitigation measures in Section 6.4 are adopted and areas where known or potential ecological MNES may occur are avoided, it is currently assessed as unlikely the Project's onshore activities will result in significant impacts to EPBC Act-listed threatened species, migratory species, TECs or Ramsar wetlands.

This assessment will need to be refined once detailed ecological assessments have been undertaken and the onshore cable construction corridor and construction methods are confirmed.

Table 6.2 Potential for significant impacts to critically endangered and endangered species within the onshore cable investigation area

Significant Impact Criteria **An action is likely to have a significant impact on a Critically Endangered and Endangered species if there is a real chance or possibility that it will:**	Preliminary assessment of impacts to critically endangered (CR) and endangered (EN) species	Potential significance of impact
Lead to a long-term decrease in the size of the population	The presence of critically endangered and endangered species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat (e.g. road reserves). Further detailed assessments will be carried out to identify the presence of critically endangered and endangered species, and guide refinement of Project design. There is opportunity to avoid impacts through route selection, and/or minimise impacts through use of appropriate construction methods (e.g., HDD or direct pipe). A CEMP and OEMP will be used to manage construction and operation and reduce risks to the critically endangered and endangered species such that a long-term decrease in the size of a population is unlikely.	Unlikely to have a significant impact
Reduce the area of occupancy of the species	The presence of critically endangered and endangered species is likely to be confined to reserves, wetlands and/or small, discrete areas of suitable habitat outside of reserves. Further detailed assessments will be carried out to identify the presence of critically endangered and endangered species, and guide refinement of Project design. There is opportunity to avoid impacts through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction) and mitigation measures. As a result, it is unlikely there will be a reduction in the area of occupancy of critically endangered or endangered species.	Unlikely to have a significant impact
Fragment an existing population into two or more populations	There is opportunity to avoid impacts to habitat for critically endangered and endangered species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). As a result, it is unlikely there will be fragmentation of a population(s) of critically endangered or endangered species.	Unlikely to have a significant impact
Adversely affect habitat critical to the survival of the species	The presence of critically endangered and endangered species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat elsewhere. Further detailed assessments, including on ground assessment, will be carried out to identify habitat for critically endangered and endangered species, and guide refinement of Project design. There is opportunity to avoid impacts to habitat critical for the survival of critically endangered and endangered species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). As a result, it is unlikely there will be adverse effects to habitat critical for the survival of critically endangered or endangered flora and fauna species.	Unlikely to be a significant impact
Disrupt the breeding cycle of a population	Detailed assessments, including on ground assessment, will be carried out to identify breeding habitat for critically endangered and endangered species, and guide refinement of Project design. There is opportunity to avoid impacts to breeding habitat for critically endangered and endangered species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). A CEMP and OEMP will be used to manage construction and operation and include measures to avoid and minimise potential impacts such as sediment and erosion, noise, light and pest plant and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes).	Unlikely to be a significant impact

Significant Impact Criteria An action is likely to have a significant impact on a Critically Endangered and Endangered species if there is a real chance or possibility that it will:	Preliminary assessment of impacts to critically endangered (CR) and endangered (EN) species	Potential significance of impact
	As a result, it is unlikely there will be adverse effects that disrupt the breeding cycle of a population of critically endangered or endangered flora and fauna species.	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The presence of critically endangered and endangered species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat elsewhere. Further detailed assessments will be carried out to identify the presence of habitat, and guide refinement of Project design. There is opportunity to avoid impacts to habitat for critically endangered and endangered species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). As a result, it is unlikely there will be impacts to the quality or availability of habitat such that critically endangered or endangered species are likely to decline.	Unlikely to be a significant impact
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Habitats within the onshore CIA are susceptible to invasive species. The implementation of a CEMP and OEMP for construction and operation, including measures for pest plants and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes), should reduce the likelihood of invasive species establishing in habitats for critically endangered or endangered species.	Unlikely to be a significant impact
Introduce disease that may cause the species to decline	The implementation of a CEMP and OEMP for construction and operation, including measures for disease management should reduce the likelihood of a disease being introduced which may cause critically endangered or endangered species to decline.	Unlikely to be a significant impact
Interfere with the recovery of the species	The opportunity to avoid impacts to habitat through route selection, and/or minimise impacts through use of appropriate construction methods, as well as implementation of a CEMP and OEMP means the Project is unlikely to interfere with the recovery of a critically endangered or endangered species.	Unlikely to be a significant impact

Critically endangered (CR) and endangered (EN) species considered in Table 6.2:

Flora: *Commersonia prostrata* (Dwarf Kerrawang) (EN), *Dianella amoena* (Matted Flax-lily) (EN), *Thelymitra epipactoides* (Metallic Sun-orchid) (EN)

Fauna: Shorebirds and coastal birds - Australian Painted Snipe (*Rostratula australis*) (EN), Bar-tailed Godwit (*Limosa lapponica baueri*) (EN), Common Greenshank (*Tringa nebularia*) (EN), Curlew Sandpiper (*Calidris ferruginea*) (CR), Eastern Curlew (*Numenius madagascariensis*) (CR), Lesser Sand Plover (*Charadrius mongolus*) (EN). **Wetland birds** - Australasian Bittern (*Botaurus poiciloptilus*) (EN). **Terrestrial birds** - Gang-gang Cockatoo (*Callocephalon fimbriatum*) (EN), Hooded Robin (*Melanodryas cucullata cucullata*) (EN), Orange-bellied Parrot (*Neophema chrysogaster*) (CR), Swift Parrot (*Lathamus discolor*) (CR). **Mammals** - Southern Brown Bandicoot (*Isoodon obesulus obesulus*) (EN), Southern Greater Glider (*Petauroides volans*) EN Spot-tailed Quoll (*Dasyurus maculatus maculatus*) (EN). **Reptiles -** Swamp Skink (*Lissolepis coventryi*) (EN). **Frogs -** Martin's Toadlet (*Uperoleia martini*) (EN).

Table 6.3 Potential for significant impacts to vulnerable species within the onshore cable investigation area6.

Significant Impact Criteria **An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:**	Preliminary assessment of impacts to vulnerable species	Potential significance of impact
Lead to a long-term decrease in the size of an important population of a species	The presence of vulnerable species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat elsewhere. Further detailed assessments will be carried out to identify the presence of vulnerable species and whether any populations are deemed important. There is opportunity to avoid impacts through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). A CEMP and OEMP will be used to manage construction and operation and reduce risks to important populations of vulnerable species, such that a long-term decrease in the size is unlikely.	Unlikely to be a significant impact
Reduce the area of occupancy of an important population	The presence of vulnerable species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat elsewhere. Further detailed assessments will be carried out to identify the presence of vulnerable species and whether any populations are deemed important. There is opportunity to avoid impacts through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction) and mitigation measures. As a result, it is unlikely there will be a reduction in the area of occupancy of an important population of a vulnerable species.	Unlikely to be a significant impact
Fragment an existing important population into two or more populations	There is opportunity to avoid impacts to habitat for vulnerable species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). As a result, it is unlikely there will be fragmentation of population of vulnerable species.	Unlikely to be a significant impact
Adversely affect habitat critical to the survival of a species	Habitat for vulnerable species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat elsewhere. Further detailed assessments will be carried out to identify the presence of vulnerable species, and guide refinement of Project design. There is opportunity to avoid impacts to habitat critical for the survival of vulnerable species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). As a result, it is unlikely there will be adverse effects to habitat critical for the survival of critically vulnerable species.	Unlikely to be a significant impact
Disrupt the breeding cycle of a population	Detailed assessments, including on ground assessment, will be carried out to identify breeding habitat for vulnerable species, their habitats and lifecycles, and guide refinement of Project design. There is opportunity to avoid impacts to breeding habitat for vulnerable species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). A CEMP and OEMP will be used to manage construction and operation and include measures to avoid and minimise potential impacts such as sediment and erosion, noise, light and pest plant and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes). As a result, it is unlikely there will be adverse effects that disrupt the to the breeding cycle of a population of vulnerable flora and fauna species.	Unlikely to be a significant impact

Significant Impact Criteria An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Preliminary assessment of impacts to vulnerable species	Potential significance of impact
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Habitat for vulnerable species is likely to be confined to reserves, wetlands and small, discrete areas of suitable habitat elsewhere. Further detailed assessments will be carried out to identify the presence of vulnerable species, and guide refinement of Project design. There is opportunity to avoid impacts to habitat for vulnerable species through route selection, and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction). As a result, it is unlikely there will be impacts to the quality or availability of habitat such that vulnerable species are likely to decline.	Unlikely to be a significant impact
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Habitats within the onshore CIA are susceptible to invasive species. The implementation of a CEMP and OEMP for construction and operation, including measures for pest plants and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes), should reduce the likelihood of invasive species establishing in habitats for vulnerable species.	Unlikely to be a significant impact
Introduce disease that may cause the species to decline	The implementation of a CEMP and OEMP for construction and operation, including measures for disease management should reduce the likelihood of a disease being introduced which may cause vulnerable species to decline.	Unlikely to be a significant impact
Interfere with the recovery of the species	The opportunity to avoid impacts to habitat through route selection, and/or minimise impacts through use of appropriate construction methods, as well as implementation of a CEMP and OEMP means the Project is unlikely to interfere with the recovery of a vulnerable species.	Unlikely to be a significant impact

Vulnerable species considered in Table 6.3 Potential for significant impacts to vulnerable species within the onshore cable investigation area6.:

Flora: *Amphibromus fluitans* (River Swamp Wallaby-grass), *Caladenia tessellata* (Thick-lipped Spider-orchid), *Dodonaea procumbens* (Trailing Hop-bush), *Prasophyllum spicatum* (Dense Leek-orchid), *Pterostylis chlorogramma* (Green-striped Greenhood)

Fauna: Shorebirds and coastal birds - Fairy Tern (*Sternula nereis*), Great Knot (*Calidris tenuirostris*), Greater Sand Plover (*Charadrius leschenaultia*), Grey Plover (*Pluvialis squatarola*), Hooded Plover (*Thinornis cucullatus cucullatus)*, Latham's Snipe (*Gallinago hardwickii*), Little Tern (*Sternula albifrons*), Red Knot (*Calidris canutus*), Ruddy Turnstone (*Arenaria interpres*), Sharp-tailed Sandpiper (*Calidris acuminata*). **Terrestrial birds** - Blue-winged Parrot (*Neophema chrysostoma*), Brown Treecreeper (*Climacteris picumnus victoriae*), Diamond Firetail (*Stagonopleura guttata*), Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*), Painted Honeyeater (*Grantiella picta*), Pilotbird (*Pycnoptilus floccosus*) White-throated Needletail (*Hirundapus caudacutus*). **Mammals** - Grey-headed Flying-fox (*Pteropus poliocephalus*), New Holland Mouse (*Pseudomys novaehollandiae*), Yellow-bellied Glider (*Petaurus australis*). **Frogs** - Green and Golden Bell Frog (*Litoria aurea*), Growling Grass Frog (*Litoria raniformis*).

Table 6.4 Potential for significant impacts to Threatened Ecological Communities (TECs) within the onshore cable investigation area

Significant Impact Criteria **An action is likely to have a significant impact on a threatened ecological community if there is a real chance or possibility that it will:**	Preliminary assessment of impacts to Threatened Ecological Communities (TECs)	Potential significance of impact
Reduce the extent of an ecological community	The presence of TECs is likely to be confined to reserves, wetlands and/or small, discrete areas on private land. Further detailed assessments will be carried out to identify the presence of TECs, and guide refinement of Project design. There is opportunity to avoid impacts through route selection and/or minimise impacts through use of appropriate construction methods (i.e., trenchless construction) and mitigation measures. As a result, it is unlikely there will be a reduction in the extent of a TEC.	Unlikely to be a significant impact
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Following detailed assessment to identify the presence of TECs, there will be opportunity to avoid potential fragmentation through route selection and use of appropriate construction methods (i.e., trenchless construction) and mitigation measures. As a result, it is unlikely there will be fragmentation of a TEC.	Unlikely to be a significant impact
Adversely affect habitat critical to the survival of an ecological community	Following detailed assessment to identify the presence of TECs, there will be opportunity to avoid critical habitat through route selection and use of appropriate construction methods (i.e., trenchless construction) and mitigation measures. As a result, it is unlikely there will be adverse effects to habitat critical to the survival of a TEC.	Unlikely to be a significant impact
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Direct impacts to TECs will be avoided through route selection, and/or minimised through use of appropriate construction methods. The potential for indirect impacts, such as modification or destruction of abiotic factors necessary for the survival of a TEC, will be managed through the implementation of a CEMP and OEMP for construction and operation, including measures for pest plants and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes).	Unlikely to be a significant impact
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Direct impacts to TECs will be avoided through route selection, and/or minimised through use of appropriate construction methods. The potential for indirect impacts, such as substantial changes in the species composition of an occurrence of a TEC, will be managed through the implementation of a CEMP and OEMP for construction and operation, including measures for pest plants and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes).	Unlikely to be a significant impact

Significant Impact Criteria **An action is likely to have a significant impact on a threatened ecological community if there is a real chance or possibility that it will:**	Preliminary assessment of impacts to Threatened Ecological Communities (TECs)	Potential significance of impact
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Direct impacts to TECs will be avoided through route selection, and/or minimised through use of appropriate construction methods. The potential for indirect impacts, such as assisting invasive species to become established, or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants will be managed through the implementation of a CEMP and OEMP for construction and operation.	Unlikely to be a significant impact
Interfere with the recovery of an ecological community	Direct impacts and indirect impacts to TECs, and habitat for TECs, will be avoided through route selection, and/or minimised through use of appropriate construction methods. The implementation of a CEMP and OEMP for construction and operation, should reduce the risk of the Project interfering with the recovery of a TEC.	Unlikely to be a significant impact

Threatened ecological communities considered in Table 6.4:

– Natural Damp Grassland of the Victorian Coastal Plains
– Subtropical and Temperate Coastal Saltmarsh (STCS)

Table 6.5 Potential for significant impacts to migratory species within the onshore cable investigation area

Significant Impact Criteria **An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:**	Preliminary assessment of impacts to migratory species	Potential significance of impact
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Important habitat for migratory species is likely to include reserves such as Lake Denison and its associated estuarine habitats, Ninety Mile Beach and Jack Smith Lake, as well as freshwater wetlands and waterways. Further detailed assessments will be carried out to identify the presence of important habitat for migratory species, and guide refinement of Project design. Substantial modification of important habitat will be avoided through route selection, and/or minimised through use of appropriate construction methods. A CEMP and OEMP will be used to manage construction and operation and reduce risks to important habitat for migratory species, such that substantial modification is unlikely.	Unlikely to be a significant impact
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Important habitat for migratory species within the onshore CIA is susceptible to invasive species. The implementation of a CEMP and OEMP for construction and operation, including measures for pest plants and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes), should reduce the likelihood of invasive species establishing in important habitats for migratory species.	Unlikely to be a significant impact
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	Detailed assessments, including on ground assessment, will be carried out to identify migratory species, their habitats and lifecycles, and to refinement of Project design. A CEMP and OEMP will be used to manage construction and operation, with the timing of works designed to avoid seriously disrupting the lifecycle of an ecologically significant proportion of a population of a migratory species as far as possible.	Unlikely to be a significant impact

Migratory species considered in Table 6.5:

Australian Gull-billed Tern *Gelochelidon nilotica macrotarsa*, Bar-tailed Godwit *Limosa lapponica baueri*, Caspian Tern *Hydroprogne caspia*, Common Greenshank *Tringa nebularia*, Common Sandpiper *Actitis hypoleucos*, Common Tern *Sterna hirundo*, Crested Tern *Thalasseus bergii*, Curlew Sandpiper *Calidris ferruginea*, Double-banded Plover *Charadrius bicinctus*, Eastern Curlew *Numenius madagascariensis*, Fork-tailed Swift *Apus pacificus*, Glossy Ibis *Plegadis falcinellus*, Great Knot *Calidris tenuirostris*, Greater Sand Plover *Charadrius leschenaultia*, Grey Plover *Pluvialis squatarola*, Latham's Snipe *Gallinago hardwickii*, Lesser Sand Plover *Charadrius mongolus*, Little Tern *Sternula albifrons*, Marsh Sandpiper *Tringa stagnatilis*, Oriental Plover *Charadrius veredus*, Osprey *Pandion haliaetus*, Pacific Golden Plover Pluvialis fulva, Pectoral Sandpiper *Calidris melanotos*, Pin-tailed Snipe *Gallinago stenura*, Red Knot *Calidris canutus*, Red-necked Stint *Calidris ruficollis*, Ruddy Turnstone *Arenaria interpres*, Sharp-tailed Sandpiper *Calidris acuminata*, Swinhoe's *Snipe Gallinago megala*, White-throated Needletail *Hirundapus caudacutus*, White-winged Black Tern *Chlidonias leucopterus*

Table 6. Potential for significant impacts to Wetlands of International Importance (Ramsar sites) near the onshore cable investigation area

Significant Impact Criteria **An action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:**	Preliminary assessment of impacts to Ramsar Wetlands	Potential significance of impact
Areas of the wetland being destroyed or substantially modified	Direct impacts are not expected due to the distance of Ramsar wetlands from the onshore CIA. The potential for indirect impacts (i.e., downstream impacts) will be managed via a CEMP and OEMP for construction and operation.	Unlikely to be a significant impact
A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland	Substantial and measurable changes to the hydrological regime of a Ramsar wetland are not expected due to the distance of Ramsar wetlands from the onshore CIA.	Unlikely to be a significant impact
The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected	Direct impacts are not expected due to the distance of Ramsar wetlands from the onshore CIA. A CEMP and OEMP will be used to manage construction and operation, with the timing of works designed to avoid seriously affecting the habitat or lifecycle of native species, including migratory birds, invertebrate fauna and fish species, dependent on a Ramsar wetland, as far as possible.	Unlikely to be a significant impact
A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	Direct impacts are not expected due to the distance of Ramsar wetlands from the onshore CIA. The implementation of a CEMP and OEMP for construction and operation, will further reduce the risk of indirect (i.e., downstream) impacts from the Project resulting in a substantial and measurable change in the water quality of a Ramsar wetland.	Unlikely to be a significant impact
An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.	The potential for indirect impacts, such as establishment or spread of an invasive species that is harmful to the character of a Ramsar wetland will be managed through the implementation of a CEMP and OEMP for construction and operation.	Unlikely to be a significant impact

Ramsar wetlands considered in **Error! Reference source not found.**:

– Corner Inlet
– Gippsland Lakes

6.3.3 EE Act preliminary assessment

The Ministerial guidelines for assessment of environmental effects under the *Environment Effects Act 1978* (EE Act) provide a range of criteria that can be used to determine whether an Environment Effects Statement (EES) would be required for a project (DTP 2023).

Many of the listed potential effects that may warrant a referral are related to flora and fauna. There are also other triggers such as social, economic and other environmental triggers that may need to be considered for the Project. There are two types of referral criteria: 1) individual potential environmental effects; and 2) a combination of potential environmental effects.

A preliminary assessment of the Project against the relevant ecological referral criteria is provided in Table 6.6 Only referral criteria relevant to ecological values in the onshore CIA have been considered. Table 6.6 details the assessment of the potential impacts of the Project firstly against individual referral criteria, and subsequently against the combined referral criteria.

This preliminary assessment has considered a broad study area and is based on desktop information and a rapid site assessment from publicly accessible land to inform the onshore route selection and identify opportunities to avoid and minimise impacts. Further detailed ecology assessments are required and will be carried out for the project to assess the proposed route and enable a more detailed assessment of ecological values, potential impacts and to inform actions to avoid and minimise adverse effects.

Provided the recommended mitigation measures are adopted and areas where native vegetation (EVCs), populations and habitat for threatened communities and threatened and/or migratory species are known to occur or have potential to occur are avoided, it is unlikely the Project will satisfy the individual or combination criteria and result in significant effects under EE Act. This assessment will need to be refined once detailed ecological assessments have been undertaken and the onshore cable construction corridor and construction methods are confirmed.

Table 6.6 Preliminary assessment of potential impacts in relation to Ministerial guidelines for assessment of environmental effects under the EE Act (ecology criteria only)

Relevant referral criteria	Project specifics	Potential to trigger criteria	Potential mitigation measures	Potential for residual effects to trigger criteria
Individual potential environmental effects				
Potential removal, destruction or lopping of 10 hectares or more of native vegetation, that consists of, or comprises a combination of: – An ecological vegetation class (EVC) classified as endangered; or – An EVC that is classified as vulnerable (with a condition score of 0.5 or more) or rare (with a condition score of 0.6 or more); and – That is not authorised for removal under an approved forest management plan or fire protection plan	The majority of the onshore CIA (approximately 88.5%) comprises previously cleared land currently used for agriculture and agroforestry. However, the onshore CIA is modelled to contain up to 716 ha of native vegetation, comprising six EVCs: – Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01) (Depleted) – Estuarine Wetland (EVC 10) (Least Concern) – Lowland Forest (EVC 16) (Vulnerable) – Swamp Scrub (EVC 53) (Endangered) – Riparian Scrub (EVC 191) (Vulnerable) – Lowland Forest/Heathy Woodland Mosaic (EVC 698) (Vulnerable) Five of these EVCs were identified during the rapid site assessment, along with two additional EVCs: – Coast Banksia Woodland (EVC 02) (Vulnerable) – *South Gippsland* Plains Grassland (EVC 132_62) (Endangered) As there has only been a rapid site assessment of publicly accessible land at the time of the preparation of this report, the current extent and condition of native vegetation within the onshore CIA cannot yet be confirmed. However, given there is no native vegetation modelled for 88.5% of the onshore CIA, there is scope to design the onshore cable construction corridor that predominantly avoids and minimises impacts to areas of native vegetation.	Depending on the location of the alignment, it is possible that more than 10 ha of native vegetation may be removed that is either endangered, vulnerable or rare and meets the criteria thresholds.	**Prior to construction** During the detailed design phase of the Project, BMN intends to utilise cleared land and/or areas identified as containing low ecological values, as far as possible to avoid and minimise impacts to native vegetation. With approximately 88.5% of the onshore cable route investigation corridor identified as previously cleared land, there is opportunity to achieve this. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed on the onshore cable investigation corridor to confirm the type, extent and quality of native vegetation with potential to be directly or indirectly impacted by the onshore cable construction corridor. BMN will then design the construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). The onshore cable route construction corridor alignment will be designed to avoid areas of native vegetation and/or areas containing high ecological values, and to employ sensitive construction methods, such as horizontal directional drilling, (HDD) or direct pipe, to avoid impacts to native vegetation where avoidance through alignment design is not possible. BMN commits to designing the alignment to avoid and minimise native vegetation and habitat removal at the following locations: – Darriman H29 Reserve – Lake Denison and other mapped current wetlands – Giffard Flora and Fauna Reserve – McLoughlins Beach – Seaspray Coastal Reserve – areas of roadside native vegetation along Giffard Road, Giffard West Road, McGaurans Beach Road and Owens Lane. **Post construction** Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Residual effects are unlikely to trigger this criterion provided the recommended mitigation measures are implemented. Pending the results of detailed site assessments and the refinement of the onshore cable construction corridor and methods, it is likely that impacts associated with the Project could be limited to < 10 ha of native vegetation.
Potential clearing of an area determined as 'critical habitat' under the *Flora and Fauna Guarantee Act 1988*.	The onshore CIA does not contain any areas determined as critical habitat under the FFG Act.	There are no current determinations of critical habitat under the FFG Act in Victoria.	Not applicable	Not applicable
Potential for loss of a significant proportion (e.g., 1 percent or greater) of known remaining habitat or population of a threatened species within Victoria.	The onshore CIA may contain populations of and/or habitat for threatened flora and fauna species listed under the FFG Act.	It is possible that impacts may lead to the loss of a significant proportion of known remaining habitat or population of a threatened species within Victoria. A detailed site assessment of the potential impacted extent of the onshore CIA is required to determine which species may occur or utilise the area proposed to be impacted.	**Prior to construction** During the detailed design phase of the Project, BMN intends to utilise cleared land and/or areas identified as containing low ecological values, as far as possible to avoid and minimise impacts to threatened species listed under the FFG Act. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed on the onshore cable investigation corridor. A detailed ecological assessment will confirm areas of native vegetation and habitat for threatened species with the potential to be directly or indirectly impacted by the onshore cable construction corridor. BMN will then design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). The onshore cable construction corridor will be aligned to avoid areas of threatened species habitat as far as possible. Sensitive construction methods (e.g., HDD or direct pipe) will be employed to minimise impacts where the alignment cannot achieve avoidance. **Post construction** Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Residual effects are unlikely to trigger this criterion provided the potential mitigation measures are implemented. Pending the results of detailed site assessments and the refinement of the onshore cable construction corridor and construction methods, it is likely that impacts associated with the Project could avoid the loss of a significant proportion (e.g., 1 percent or greater) of the known remaining habitat or population of a threatened species within Victoria.

Relevant referral criteria	Project specifics		Potential to trigger criteria	Potential mitigation measures	Potential for residual effects to trigger criteria
Potential for long-term change to the ecological character of a wetland listed under the Ramsar Convention or in a Directory of Important Wetlands in Australia.	The onshore CIA occurs near two Ramsar sites, Gippsland Lakes and Corner Inlet: – Corner Inlet (approximately 21 km southwest of the onshore CIA) – Gippsland Lakes (approximately 9 km northeast of the onshore CIA) Jack Smith Lake State Game Reserve occurs immediately south of the onshore CIA (within 1 km) and is listed as a nationally important wetland.	It is possible that onshore impacts from the Project may result in effects or changes to Ramsar sites or a nationally important wetland. However, these effects/changes would be indirect and potentially gradual over an extended period (i.e., changes to water quantity or quality, vegetation structure or species that use the wetland such that its ecological character may change).	**Prior to construction** During the detailed design phase of the Project, BMN intends to utilise cleared land and/or areas identified as containing low ecological values, as far as possible to avoid potential impacts to Ramsar sites and nationally important wetlands. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed on the onshore cable investigation corridor. BMN will then design the construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). BMN commits to designing the alignment and using appropriate construction methods to avoid: – Indirect impacts to Ramsar wetlands (i.e., locate Project infrastructure away from waterways that flow into the Ramsar sites) or use appropriate construction methods (e.g., HDD or direct pipe) and other measures for erosion and sediment control to avoid impacts to these waterways – Impacts to habitat for migratory species and other bird species that may also use Ramsar sites and nationally important wetlands (i.e., situate project infrastructure outside of key areas of habitat for shorebirds and other wetland birds – such as coastal wetlands and the Lake Denison estuary) **Post construction** Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Provided the recommended mitigation measures are adopted and potential indirect impacts to Ramsar sites and nationally important wetlands are managed appropriately (i.e., avoiding or minimising impacts to waterways connected to these wetlands), it is unlikely the Project will result in long-term changes to the ecological character of Ramsar sites or nationally important wetlands.
Potential for extensive or major effects on the use and environmental values of water resources due to changes in water quality, water availability, stream flows, water system function, or regional groundwater levels, or the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.	Several waterways and waterbodies including freshwater and estuarine reaches, and wetlands are present in the onshore CIA that may be impacted directly or indirectly by the Project. In addition, Merrimans Creek, although outside of the onshore CIA, is known to support and provide habitat for threatened fish species and may be impacted by runoff from the onshore CIA.	Works may modify natural flow regimes and alter runoff patterns or contribute to impacts on water quality (e.g., erosion and sedimentation), etc., that impact on health or biodiversity over the long term.	BMN intends to design the project infrastructure within cleared land or areas containing low ecological values as far as possible to avoid impacts to environmental values and waterways/waterbodies. Once a preferred alignment for the onshore cable is identified, a detailed ecological assessment will be completed to confirm presence and location of waterways, waterbodies and wetlands with the potential to be directly or indirectly impacted by the onshore cable construction corridor. BMN will design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment (still to be completed). Mitigation measures may include: – Designing infrastructure within existing areas of disturbance or areas of low ecological value, wherever possible – Using appropriate construction methods, such as HDD or direct pipe, to minimise impacts to environmentally sensitive locations such as waterway crossings – Minimising the frequency and duration of drilling activities to reduce noise and vibration impacts – Conducting earthworks in a manner that mitigates the risk of acid sulphate soil disturbance, particularly in sensitive zones – Restricting the removal of riparian vegetation to maintain bank stability and prevent erosion – Installing sediment and erosion control measures such as sediment traps, and ensure all exposed soils are stabilised – Establishing protocols for chemical storage and spill response to prevent contamination of soil and water – Applying biosecurity procedures for all equipment and machinery to minimise the risk of spreading pathogens Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Provided the recommended mitigation measures are implemented and pending the results of the detailed ecological assessments and refinement of the onshore cable construction corridor and techniques, it is likely that impacts to environmental values and water resources can be managed.

Relevant referral criteria	Project specifics		Potential to trigger criteria	Potential mitigation measures	Potential for residual effects to trigger criteria
Combined potential environmental effects					
Potential removal, destruction or lopping of 10 hectares or more of native vegetation, unless it is authorised for removal under an approved forest management plan or fire protection plan.	The majority of the onshore CIA (approximately 88.5%) comprises previously cleared land used for agriculture and agroforestry. However, the onshore CIA is modelled to contain up to 716 ha of native vegetation, from five EVCs, with an additional three EVCs observed within the onshore CIA: – Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01) (Depleted) – Coast Banksia Woodland (EVC 02) (Vulnerable) – Estuarine Wetland (EVC 10) (Least Concern) – Lowland Forest (EVC 16) (Vulnerable) – Swamp Scrub (EVC 53) (Endangered) – South Gippsland Plains Grassland (EVC 132_62) (Endangered) – Riparian Scrub (EVC 191) (Vulnerable) – Lowland Forest/Heathy Woodland Mosaic (EVC 698) (Vulnerable) The confirmed current extent and condition of native vegetation within the onshore CIA is not currently known. However, given the extent of previously cleared land, opportunity is available to avoid impacts to areas of native vegetation.	Depending on the location of the alignment, it is possible that more than 10 ha of native vegetation may be removed.	BMN intends to design the project infrastructure within cleared land or areas containing low ecological values as far as possible to avoid and minimise direct and indirect impacts to native vegetation. With approximately 88.5% of the onshore CIA identified as previously cleared land, there is opportunity to achieve this. A detailed ecological assessment will be completed to confirm the type, extent and quality of native vegetation with potential to be impacted by the onshore cable construction corridor. BMN will design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment. The onshore cable construction corridor will be designed to avoid areas of native vegetation, and to employ sensitive construction methods, such as HDD or direct pipe, to avoid impacts to native vegetation where avoidance through alignment design is not possible. BMN commits to designing the alignment to avoid native vegetation removal at the following locations: – Darriman H29 Reserve – Lake Denison and other mapped current wetlands – Giffard Flora and Fauna Reserve – McLoughlins Beach – Seaspray Coastal Reserve – areas of roadside native vegetation along Giffard Road, Giffard West Road, McGaurans Beach Road and Owens Lane Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Provided the recommended mitigation measures are implemented and pending the results of detailed site assessments and the refinement of the onshore cable construction corridor and methods, it is likely that impacts associated with the Project could be limited to < 10 ha of native vegetation.
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 from loss or fragmentation of habitats; or – Potentially significant effects on habitat values of a wetland supporting migratory bird species	The onshore CIA may contain a significant area of a threatened ecological community, or a genetically important population/s of threatened flora and fauna species listed under the FFG Act. The onshore CIA contains coastal, estuarine and other wetland habitats that are known or likely to provide habitat for and/or support migratory bird species.	Depending on the onshore impacts associated with the Project, it is possible that the Project may lead to the potential loss of a significant area of a listed ecological community, the potential loss of a genetically important population of a threatened species or potential significant effects on habitat values of a wetland supporting migratory bird species. A detailed site assessment of the potential impacted extent of the onshore CIA is required to determine which species may occur or utilise the area proposed to be impacted.	BMN intends to design the project infrastructure within cleared land or areas containing low ecological values as far as possible to avoid and minimise impacts to threatened species listed under the FFG Act. A detailed ecological assessment will be completed to confirm areas of native vegetation and habitat for threatened species with potential to be impacted by the onshore cable construction corridor. BMN will design the onshore cable construction corridor and construction methods to respond as far as practicable to the recommendations of the detailed ecological assessment. The onshore cable construction corridor alignment will be designed to avoid areas of threatened species habitat, and to employ sensitive construction methods, such as HDD or direct pipe, to avoid impacts to threatened species habitat where avoidance through alignment design is not possible. Mitigation measures will be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project. These measures will detail the process(es) for avoiding and minimising impacts to native vegetation. If required, additional mitigation measures will be identified and included in the CEMP and OEMP as further project specifics are confirmed.	Ecological values within the onshore CIA are expected to be mostly located within discrete areas, such as within bushland reserves, coastal reserves, estuaries and waterways, and along roadsides, with most of the onshore CIA comprising disturbed areas used for agriculture and forestry. Further assessment is proposed to characterise these values and inform siting and design of infrastructure and measures to avoid or minimise the risk that the Project could lead to the potential significant impact on the relevant matters listed under the FFG Act. However, provided the potential mitigation measures are adopted and areas where known or potential, it is likely that the Project's onshore impacts to FFG Act-listed ecological communities, populations of threatened species and wetlands supporting migratory bird species can be avoided.

6.4 Mitigation measures

Whilst it may not be possible to completely avoid impacts to all onshore ecological values the Project should aim to have as small an environmental impact footprint as practicable. The Project should consider and apply design and mitigation measures according to the mitigation hierarchy:

– Avoid: Design the Project to prevent adverse environmental effects. This includes choosing alternative sites, routes, or technologies to avoid impacting sensitive areas
– Minimise: Where avoidance isn't possible, reduce the scale, intensity, or duration of impacts. This might involve construction timing, buffer zones, or modified techniques
– Mitigate/manage: Implement measures to control or lessen the effects during and after construction. Examples include erosion control, noise barriers, or pollution containment
– Rehabilitate/restore: Repair or restore affected environments post-impact. This could mean replanting vegetation, restoring waterways, or habitat enhancement
– Offset/compensate: Provide environmental offsets for residual effects that cannot be avoided or mitigated. These must deliver measurable conservation outcomes, often through habitat protection elsewhere

6.4.1 Avoid

The most effective measure to reduce potential project impacts on onshore ecological values is to avoid impacts to native vegetation, terrestrial and aquatic fauna and their habitat: Ultimately, the mitigation measure related to avoidance is:

– Avoid impacts to native vegetation, populations and habitat for threatened communities and threatened and/or migratory species (i.e., situate project infrastructure outside of key areas of habitat and apply appropriate buffer zones)

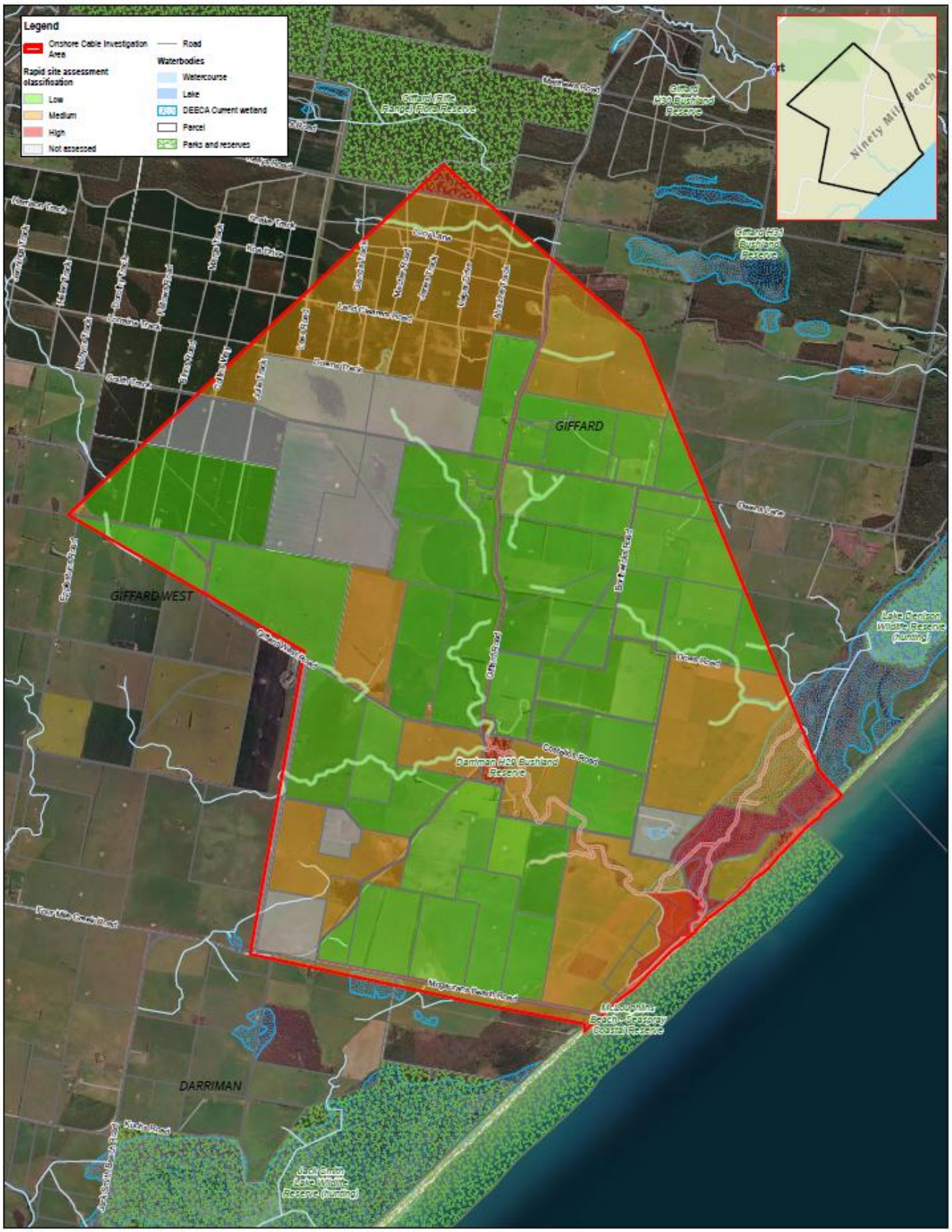
Based on the results of the desktop assessment and the rapid site assessment, the majority of parcels in the onshore CIA were found to have low ecological value (Figure 6.1).

Generally, this is due to the agriculture landscape that dominates much of the onshore CIA, with many parcels having limited native vegetation, and little habitat suitable for terrestrial and aquatic and/or migratory species listed under the EPBC Act or FFG Act (refer to section 4.2.2 for details of each category). The low value parcels provide an opportunity to locate and construct project infrastructure in areas where impacts to ecological values would be reduced, and more easily managed through the implementation of the mitigation measures discussed below. Parcels categorised as high or medium should be avoided, where possible, as they generally contain higher ecological values including native vegetation, threatened species and/or habitat for threatened species or TECs. It should be noted that although the colour-scale mapping was predominantly undertaken at the parcel scale, there are areas within each parcel that should also be avoided (Figure 6.1).

Overall, to minimise impacts on ecological values, the key areas to avoid within the onshore CIA include:

– Giffard (Rifle Range) Flora and Fauna Reserve
– Darriman H29 Bushland Reserve
– Lake Denison and associated estuarine habitats
– McLoughlins Beach – Seaspray Coastal Reserve
– DEECA mapped current wetlands and coastal wetlands
– Road Reserves and areas with roadside native vegetation along Giffard Road, Giffard West Road, McGaurans Beach Road and Owens Lane
– Areas near Ramsar sites or nationally important wetlands, including waterways that flow into these areas
– High value waterways
– Areas of native vegetation (EVCs) and other terrestrial and aquatic habitats that may or are considered likely to provide habitat for threatened or migratory species, and communities

BMN has committed to avoiding works within the Giffard (Rifle Range) Flora and Fauna Reserve, Darriman H29 Bushland Reserve and Lake Denison. Trenchless technology would be used to cross the McLoughlins Beach – Seaspray Coastal Reserve, and where practicable, for other sensitive areas such as waterway crossings.



Paper Size ISO A3

0 0.3 0.6 0.9 1.2

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 10/11/2026

Colour-scale map of onshore ecological values

Page 1 of 5
FIGURE 6.1

Paper Size ISO A3
0 0.1 0.2 0.3 0.4
Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 10/11/2026

Colour-scale map of onshore ecological values

Page 2 of 5
FIGURE 6.1

Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

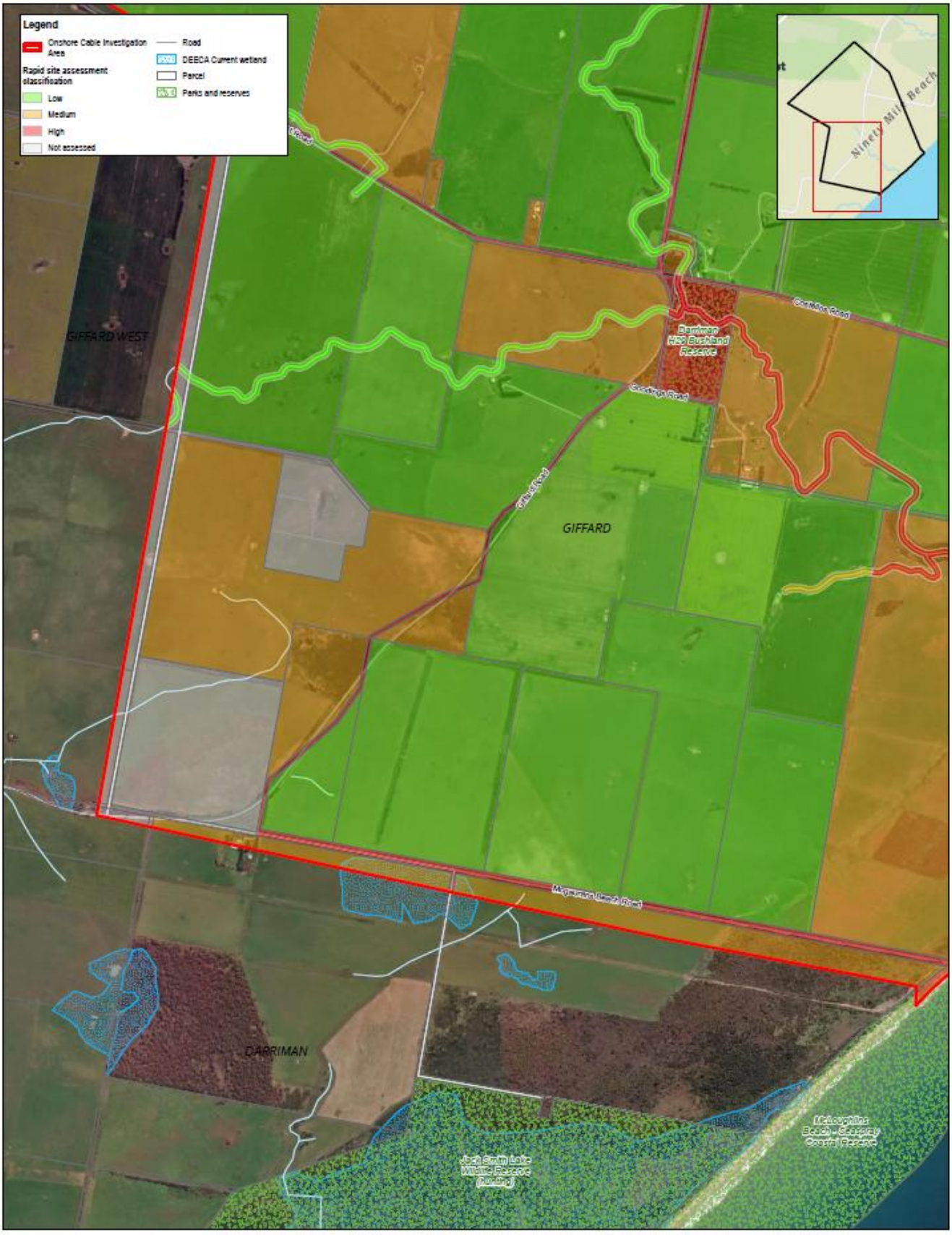
Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 10/11/2025

Colour-scale map of onshore ecological values

Page 3 of 5

FIGURE 6.1



Paper Size ISO A3

0 0.1 0.2 0.3 0.4

Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

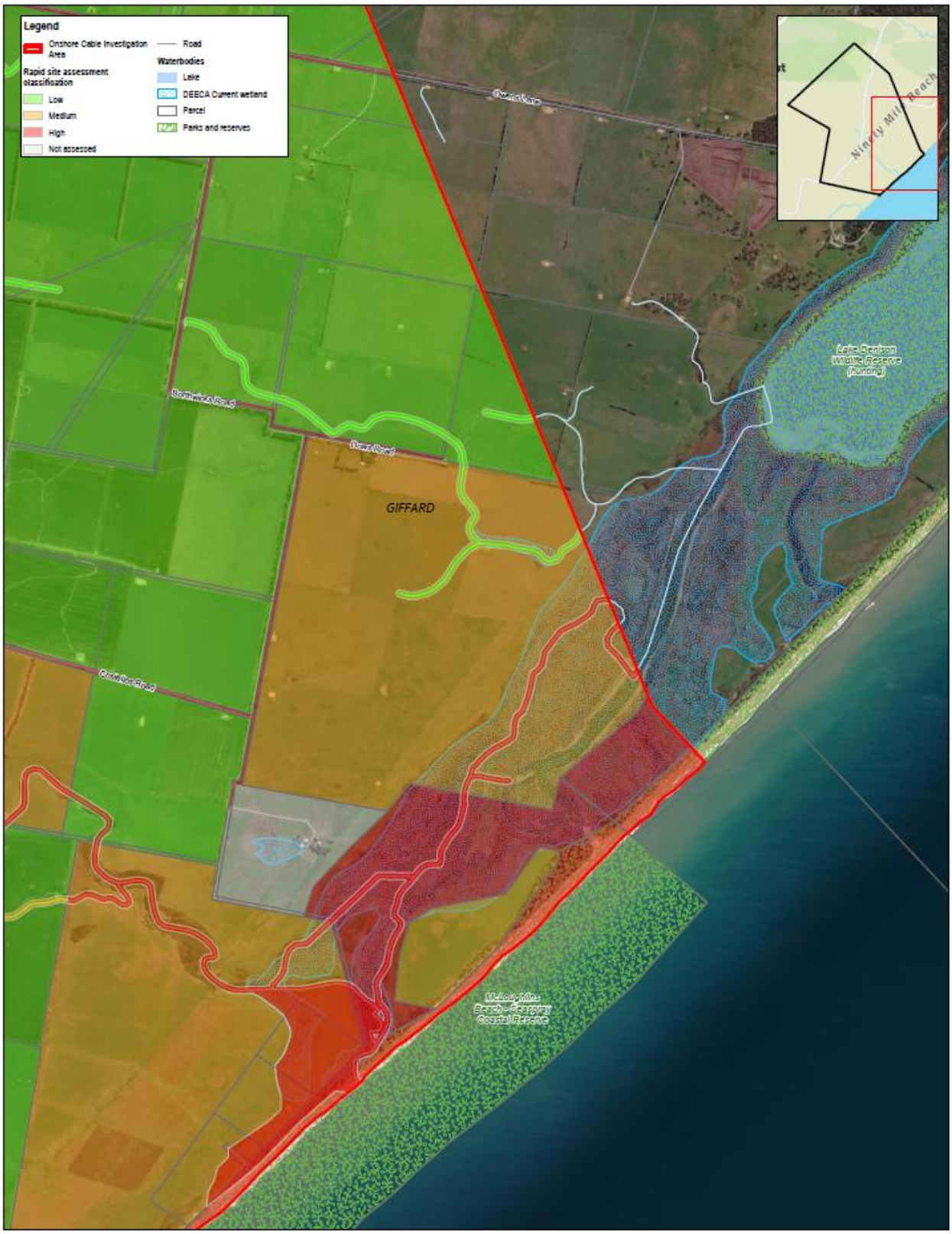
GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 10/11/2026

Colour-scale map of onshore ecological values

Page 4 of 5
FIGURE 6.1



Paper Size ISO A3
0 0.1 0.2 0.3 0.4
Kilometers

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA2020
Grid: GDA2020 Vicgrid

N

GHD

Blue Mackerel North Pty Ltd
Blue Mackerel Offshore Wind Farm EIA and Approvals

Project No. 12668248
Revision No. A
Date 10/11/2026

Colour-scale map of onshore ecological values

Page 5 of 5
FIGURE 6.1

6.4.2 Minimise and mitigate/manage

The potential mitigation measures presented in this section have considered guidance material such as the *Handbook for the development of renewable energy in Victoria* (DEECA 2025c), which provides guidance to avoid, minimise, mitigate and compensate for impacts on threatened bird and bat species. Similarly, the *Civil construction, building and demolition guide* (EPA 2023) has also been considered as it provides additional guidance related to impacts including erosion, sedimentation and dust. In addition to avoiding high ecological values as outlined above, the mitigation measures identified at this stage of the Project are:

- Where possible, locate project infrastructure in areas with existing disturbance and/or low ecological values;
- If areas of native vegetation or habitat cannot be avoided, limit impacts to areas of low ecological values and to the smallest extent that is reasonably practicable;
- Use appropriate construction methods, such as HDD or direct pipe, to minimise impacts to native vegetation, environmentally sensitive locations such as waterway crossings, habitat and/or populations of threatened species, migratory species or communities;
- Document the above mitigation measures for construction and operational stages of the Project in a CEMP and OEMP to outline the process for minimising impacts to threatened species and TECs. If required, identify and include additional mitigation measures in the CEMP and OEMP as further project specifics are confirmed. The CEMP and OEMP would include, as a minimum, information on the following mitigation measures:
  - Erosion and sediment control, and works to stabilised exposed soil to minimise impacts to waterways
  - Restrictions on the removal of riparian vegetation to maintain bank stability and prevent erosion
  - Minimising the frequency and duration of drilling activities to reduce noise and vibration impacts
  - Conducting earthworks in a manner that mitigates the risk of acid sulphate soil disturbance, particularly in sensitive zones
  - Applying biosecurity procedures for all equipment and machinery to minimise the risk of spreading pathogens (e.g., vehicle hygiene protocols)
  - Management and proper handling of fuels and other chemicals/contaminants to prevent spills (e.g., bunded storage areas, refuelling away from waterways, spill response protocols)
  - Pest plants and animal management (e.g., vehicle hygiene, proper handling and disposal of litter and wastes)
  - Retaining and/or replacing woody debris in aquatic and terrestrial habitats
  - Surveying and marking of hollow-bearing trees so that these are avoided during any required pre-construction clearance
  - Any gravel or other materials required for construction will be sourced from certified Phytophthora-free suppliers or sterilised prior to use (e.g. heat treatment or chemical disinfection)

6.4.3 Rehabilitate/restore

Depending on the location of the final alignment and associated works, some degree of rehabilitation may be required to restore works areas back to existing conditions, or to result in a net improvement. Any rehabilitation may need to consider measures such as:

- Restoration of landform and stability
  - Recontouring disturbed land to safe and stable conditions
  - Preventing erosion and ensuring long-term geotechnical stability
  - Managing drainage and hydrology to avoid future degradation
- Revegetation and habitat recovery
  - Replanting native vegetation using local species
  - Reseeding failed areas and controlling invasive species
  - Installing tree guards, fencing, and pest control measures to protect regrowth

– Monitoring and Adaptive Management
  - Regular monitoring to assess progress toward rehabilitation goals
  - Adjusting methods based on performance and environmental feedback
  - Reporting outcomes to regulatory bodies and stakeholders
– Integration with Offset Strategies (if required)
  - If full rehabilitation isn't feasible, biodiversity offsets may be needed to compensate for residual impacts

6.4.4 Offset/compensate

Biodiversity offsets are triggered when a proposed project is expected to impact via loss or degradation of native vegetation or habitat for threatened species or communities. The requirements for any offsets would be assessed once the alignment and scope of works for the Project is confirmed. Offsets may be triggered by:

– Native vegetation removal
  - If a project involves clearing native vegetation, especially in areas of high conservation value, it will likely require offsets under the *Planning and Environment Act 1987* and the Native Vegetation Removal Guidelines. This could include General Habitat Units and/or Species Habitat Units
– Impact on MNES
  - Projects that significantly impact EPBC Act-listed MNES must provide offsets

7. Conclusions

7.1 Ecological values summary

The onshore CIA is approximately 6,217 hectares (ha) of coastal and near coastal inland terrain and sits within the Seaspray Depression of the Gippsland Basin. The preliminary onshore ecological assessment identified that most of the land in the onshore CIA is disturbed and is mostly used for agriculture and forestry plantations with some areas preserved as bushland and coastal reserves.

The key ecological values identified for the onshore CIA include:

Native vegetation

– Approximately 716 ha of native vegetation is modelled to occur within the onshore CIA by DEECA, comprising six different EVCs (including two EVC mosaics). Five of the modelled EVCs and an additional two EVCs were identified within the onshore CIA during the rapid assessment:
  - Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01) (BCS-Depleted)
  - Coast Banksia Woodland (EVC 02) (BCS - Vulnerable)
  - Estuarine Wetland (EVC 10) (BCS - Least Concern)
  - Lowland Forest (EVC 16) (BCS - Vulnerable)
  - Swamp Scrub (EVC 53) (BCS - Endangered)
  - *South Gippsland* Plains Grassland (EVC 132_62) (BCS - Endangered)
  - Lowland Forest/Heathy Woodland Mosaic (EVC 698) (BCS – Vulnerable)

Threatened Ecological Communities (TECs)

– Two EPBC Act-listed TECs and two FFG Act-listed TECs are present, likely to or may occur within the onshore CIA:
  - *Natural Damp Grassland of the Victorian Coastal Plains* (NDGVCP) (EPBC Act - Critically Endangered) – **Likely** to occur at Darriman H29 Bushland Reserve
  - *Subtropical and Temperate Coastal Saltmarsh* (STCS) (EPBC Act - Vulnerable) – **Likely** to occur at Lake Denison modelled wetland and areas of modelled Estuarine Wetland (EVC 10)
  - Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland Community (FFG Act - Threatened) – **Confirmed** at McLoughlins Beach - Seaspray Coastal Reserve
  - Plains Grassland (South Gippsland) Community (FFG Act - Threatened) – **Confirmed** at Darriman H29 Bushland Reserve

Threatened species and migratory species

– Suitable habitat is likely to occur or may occur within the onshore CIA for 36 threatened flora species, 65 threatened fauna species listed under the EPBC Act and/or FFG Act and 31 migratory species listed under the EPBC Act

– Three species of threatened flora were confirmed present within the onshore CIA during the rapid site assessment:
  - *Dianella amoena* (Matted Flax-lily) (EPBC Act – Endangered, FFG Act – endangered)
  - *Calystegia soldanella* (Coast Bindweed) (FFG Act – endangered)
  - *Oxalis rubens* (Dune Wood-sorrel) (FFG Act – endangered)

– One threatened fauna species and one EPBC Act-listed migratory species were recorded within the onshore CIA during the rapid site assessment:
  - White-bellied Sea-Eagle (*Haliaeetus leucogaster*) (FFG Act – Endangered)
  - Double-banded Plover (*Charadrius bicinctus*) (EPBC Act – migratory)

– Key areas of habitat for threatened species and/or migratory species within the onshore CIA include:
  - Giffard (Rifle Range) Flora Reserve
  - Darriman H29 Bushland Reserve
  - Lake Denison and its associated estuarine habitats
  - McLoughlins Beach – Seaspray Coastal Reserve
  - DEECA mapped current wetlands
  - High value waterways
  - Road Reserves

Wetlands and waterways

– There are four wetlands mapped under the Current Wetlands layer within the onshore CIA totalling 218 ha
– There are two Wetlands of International Importance (Ramsar sites) relevant to the onshore CIA:
  - Corner Inlet (approximately 21 km southwest of the onshore CIA)
  - Gippsland Lakes (approximately 9 km northeast of the onshore CIA)
– A number of small ephemeral waterways and estuarine systems are present within the onshore CIA, although these are unlikely to support threatened fish species

7.2 Potential impacts to onshore ecological values

Although a range of ecological values were confirmed, likely to occur or may occur within the onshore CIA, these values are mostly located within discrete areas, such as within bushland reserves, coastal reserves, estuaries and waterways, and along roadsides. Therefore, there are opportunities to employ the mitigation hierarchy detailed in Section 6.4 to reduce the risk of impacts on onshore ecological values. Most ecological values are expected to be avoided early in the Project through appropriate design and siting of project infrastructure (i.e., shore crossing location, cable alignment) and impacts further reduced by using appropriate construction methods (e.g., HDD or direct pipe). BMN has committed to avoiding works within the Giffard (Rifle Range) Flora and Fauna Reserve, Darriman H29 Bushland Reserve and Lake Denison. Trenchless technology would be used to cross the McLoughlins Beach – Seaspray Coastal Reserve, and where practicable, for other sensitive areas such as waterway crossings. Other potential impacts during the construction and operational phase of the Project are expected to be managed through mitigation measures that would be detailed within a CEMP and OEMP.

Given the above, there is scope for the Project to avoid significant impacts on MNES and state matters covered by the referral criteria within the ministerial guidelines under the EE Act with respect to impacts on onshore ecological values. Further details are provided in sections 7.2.1 and 7.2.2.

7.2.1 Potential impacts to MNES under the EPBC Act

A preliminary assessment of potential impacts on Matters of National Environmental Significance (MNES) under the EPBC Act indicates that the Project has the potential to impact on the following MNES:

– Nationally threatened species and ecological communities (TECs)
– Migratory species
– Wetlands of International Importance (Ramsar sites)

A preliminary assessment of significant impacts under the EPBC Act Significant Impact Guidelines has identified that provided the potential mitigation measures outlined in Section 6.4 are adopted and areas where MNES are known to occur or have potential to occur are avoided, it is unlikely the Project will result in significant impacts to EPBC Act-listed ecological values. Given the preliminary nature of this assessment, a more detailed assessment would be undertaken once the location of the alignment and construction approaches are confirmed.

7.2.2 Potential environmental effects under the EE Act

A preliminary assessment of the Project against the referral criteria within the ministerial guidelines under the EE Act indicates that the Project presents potential for impact pathways that relate to three individual criteria and four combination criteria including:

– The removal of native vegetation
– Changes to the ecological character of a Ramsar wetland or important wetland in Australia
– Impacts to water resources and associated biodiversity
– Impacts to landscape values and condition
– Impacts to FFG Act-listed species or their habitat

However, provided the potential mitigation measures are adopted and areas where native vegetation (EVCs), populations and habitat for threatened communities and threatened and/or migratory species are known to occur or have potential to occur are avoided, it is unlikely the Project will satisfy the individual or combination criteria and result in significant effects under EE Act. Given the preliminary nature of this assessment, a more detailed assessment would be undertaken once the location of the alignment and construction approaches are confirmed.

8. Recommendations

It is recommended that BMN incorporate the findings of the preliminary onshore ecological assessment (this report) and any other assessments proposed to be undertaken (i.e., alignment selection report, detailed ecological assessment report) to inform the siting of project infrastructure, project design and selection of appropriate construction methods (e.g., HDD or direct pipe), with an aim to avoid and minimise impacts to onshore ecological values.

For this project, key areas to avoid and minimise impacts on within the onshore CIA include:

– Giffard (Rifle Range) Flora Reserve
– Darriman H29 Reserve
– McLoughlins Beach – Seaspray Coastal Reserve
– Lake Denison and its associated estuarine habitats
– Mapped current wetlands and high value waterways
– Areas of roadside native vegetation along Giffard Road, Giffard West Road, McGaurans Beach Road and Owens Lane

Once the location of project infrastructure is known (i.e., shore crossing location and onshore cable investigation corridor), undertake more detailed desktop and site assessment for the Project. This may involve undertaking detailed mapping of native vegetation and fauna habitat, seasonal targeted surveys for TECs, threatened flora, threatened fauna and migratory species in accordance with relevant survey guidelines

The outcomes of detailed site assessments and targeted flora and fauna surveys (if required) should be used to further refine project design, Project planning and approvals, and construction detail, where applicable. The outcomes may inform:

– the detailed siting of project infrastructure
– selection of appropriate construction methods (e.g. horizontal directional drilling (HDD) or direct pipe)
– timing of construction activities
– likely requirements for Project planning approvals and permits, including offsets or compensation requirements

Details of management and mitigation measures should be documented in the CEMP and OEMP prepared for the construction and operational stages of the Project.

References

Birdlife Australia (2023). Handbook of Australian, New Zealand and Antarctic Birds (HANZAB). Provided by Birdlife Australia. Available online at: https://hanzab.birdlife.org.au/

Cadwallader, P.L. (1979). Distribution of native and introduced fish in Seven Creeks river system. Australian Journal of Ecology 4, pp.361-385.

Chessman, B.C., and Williams, W.D. (1974). Distribution of fish in inland saline waters in Victoria, Australia. Australian Journal of Marine and Freshwater Research 25, pp.167-172.

Bachmann, M., Whiterod, N., Anderson, D and Veale, L. (2014). Regional status update of the dwarf galaxias (*Galaxiella pusilla*) in the South East of South Australia: Spring 2012–14. A report funded by the Nature Foundation SA Inc. Aquasave – Nature Glenelg Trust, Mount Gambier, South Australia.

Backhouse, G. and Jeanes, J. (1995) The Orchids of Victoria. Melbourne University Press. Melbourne.

Backhouse, G. N., & Vanner, C. A. (1978). Field observations of the Dwarf Galaxias *Galaxiella pusilla*. Unpublished report.

Backhouse, G., Jackson, J. and O'Connor, J. (2008). National Recovery Plan for the Australian Grayling *Prototroctes maraena*. Department of Sustainability and Environment, Melbourne.

Beck, J. (1985). Ecological notes on the burrowing crayfish *Geocharax* sp. and its association with *Galaxiella pusilla*. Unpublished manuscript.

Berra, T.M., (1982). Life history of the Australian grayling, *Prototroctes maraena* (Salmoniformes: Prototroctidae) in the Tambo River, Victoria. Copeia, pp.795-805.

Bishop, K.A. and Bell, J.D., (1978). Aspects of the biology of the Australian grayling *Prototroctes maraena* Günther (Pisces: Prototroctidae). Marine and Freshwater Research, 29(6), pp.743-761.

Commonwealth of Australia (2013). Matters of National Environmental Significance, Significant Impact Criteria Guidelines 1.1 *Environmental Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia Department of the Environment, Canberra.

Davies, Oates and Turnbull-Ward (2002). Ecological Vegetation Class Mapping at 1:25 000 in Gippsland. Published by the Department of Natural Resources and Environment, The State of Victoria

DCCEEW (2022) Revision of the Interim Biogeographic Regionalisation for Australia (IBRA), Version 5.1: Summary Report. Commonwealth Department of Climate Change, Energy, the Environment and Water. Available online: **https://www.dcceew.gov.au/sites/default/files/documents/revision-ibra-development-5-1-summary-report.pdf**

DCCEEW (2023). Directory of Important Wetlands in Australia. Commonwealth Department of Climate Change, Energy, the Environment and Water. Available online: **https://www.dcceew.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands**

DEECA 2024. Declared Protected Flora Guidelines. Victorian Department of Energy, Environment and Climate Action. Accessed 27 August 2025. Available online: https://www.environment.vic.gov.au/__data/assets/pdf_file/0032/704939/Declared_Protected_Flora_Guidelines.pd

DEECA (2025a) EVC Benchmarks – Gippsland Plain Bioregion. Victorian Department of Energy, Environment and Climate Action. Accessed 25 July 2025. Available online: **https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks**

DEECA (2025b). Guidelines for the removal, destruction or lopping or native vegetation. Victorian Department of Energy, Environment and Climate Action. August 2025. Available online: **https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf**

DEECA (2025c). Handbook for the development of renewable energy in Victoria. Guidance to avoid, minimise, mitigate and compensate for impacts to threatened bird and bat species. Victorian Department of Energy, Environment and Climate Action. May 2025.

DEECA (2025d). *Mapshare*. Retrieved from **https://spatialapps-prd-mapshare-platform-storage.s3-ap-southeast-2.amazonaws.com/WebmapMedia/HistoricPhotomap/STRADBROKE/872A.jpg**

DEECA (n.d.). *NatureKit 2.0.* Retrieved from **https://maps2.biodiversity.vic.gov.au/Html5viewer/index.html?viewer=NatureKit**

DELWP (2021). Threatened Species Assessment *Dinotoperla walkeri* Stonefly. Victorian Department of Environment, Land, Water and Planning.

DELWP (2023) Flora and Fauna Guarantee Act 1988 – Potentially Threatening Processes List. Victorian Department of Environment, Land, Water and Planning. May 2023.

DEPI (2010). Index of Stream Condition - The Third Benchmark of Victorian River Condition. Victorian Department of Environment and Primary Industries.

DoE (2015). *Approved Conservation Advice (including listing advice) for the Natural Damp Grassland of the Victorian Coastal Plains*. Australian Government Department of the Environment, Canberra.

DoE (2016) National Recovery Plan for the Orange-bellied Parrot *Neophema chrysogaster*. Australian Department of the Environment, Canberra.

Driessen, Michael; Brereton, R; Pauza, M (2011). Status and conservation of bats in Tasmania. University of Tasmania. Journal contribution. https://hdl.handle.net/102.100.100/566421

DSEWPaC (2013). Conservation Advice for Subtropical and Temperate Coastal Saltmarsh. Australian Department of Sustainability, Environment, Water, Population and Communities, Canberra.

DSEWPaC (2011). Corner Inlet Ramsar Site – Ecological Character Description. Available at: **https://www.dcceew.gov.au/sites/default/files/env/resources/97f19db6-cc7c-429b-9431-7577f1d99907/files/13-ecd-ch-1-2.pdf**

DSEWPaC (2010). Gippsland Lakes Ramsar site - Ecological Character Description. Available at: https://www.dcceew.gov.au/sites/default/files/env/resources/0c0185c8-8e0b-4194-a6ca-d0f795bef410/files/21-ecd.pdf

DTP (2023). Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (8th ed.). Victorian Department of Transport and Planning.

EPA (2021). Guideline for Environmental Management (GEM) – Rapid Bioassessment Methodology for Rivers and Streams. Environmental Protection Agency, State Government of Victoria. Publication 604.2.

EPA (2023). Civil construction, building and demolition guide. Environmental Protection Agency, State Government of Victoria. Publication 1834.1.

GHD (2025a) Blue Mackerel Cultural Heritage Desktop Assessment (Draft). Report for Blue Mackerel North Pty Ltd.

GHD (2025b) Preliminary Assessment Report Marine Ecology – Blue Mackerel Offshore Windfarm (Draft). Report for Blue Mackerel North Pty Ltd.

Gomon, M. F., and Bray, D. J. (2011). Fishes of Australia. Accessed online **https://fishesofaustralia.net.au/home/species/2129**

Gomon, M. F., Bray, D. J., and Kuiter, R. H. (2008). Fishes of Australia's Southern Coast. (Reed New Holland.)

Hammer, M.P., Bice, C.M., Hall, A., Frears, A., Watt, A., Whiterod, N.S., Beheregaray, L.B., Harris, J.O., & Zampatti, B.P. (2013). Freshwater fish conservation in the face of critical water shortages in the southern Murray–Darling Basin, Australia. Marine and Freshwater Research, 64, pp. 807–821.

Humphries, P. (1983). Aestivation in Galaxiella pusilla: A survival strategy in temporary wetlands. Unpublished thesis.

Humphries, P. (1986). *Seasonal drying of wetlands and its impact on fish populations*. Freshwater Ecology Journal, 2(1), 45–53

Jeanes, J. and Backhouse, G. (2006) Wild Orchids of Victoria, Australia. Melbourne. Aquatic Photographics.

Kuiter, R.H., Humphries, P.A. and Arthington, A.H. (1996). Family Nannopercidae, Pygmy perches. In, McDowall, R.M. (Ed). Freshwater Fishes of South-eastern Australia. Reed Books, Chatswood, NSW, pp. 168-175.

Littlejohn, M. J. (2001). Wetland connectivity and amphibian and fish survival strategies. Wetlands Australia, 5(2), 12–18

McDowall, R. M., & Frankenberg, R. S. (1981). The biology of Galaxiella pusilla (Mack). Australian Journal of Marine and Freshwater Research, 32(1), 1–10.

McDowall, R. M. (1996). Freshwater fishes of south-eastern Australia (2nd ed.). Reed Books.

McNeil, D.C., & Closs, G.P. (2007). Behavioural responses of a south-east Australian floodplain fish community to gradual hypoxia. Freshwater Biology, 52, pp. 412–420.

Papas, P. and Moloney, P. (2012). Victoria's wetlands 2009–2011: statewide assessments and condition modelling. Arthur Rylah Institute for Environmental Research Technical Report Series number 229. Department of Sustainability and Environment, Melbourne, Victoria, Australia.

Price, A.E., Stoffels, R.J., Weatherman, K.A., O'Keefe, R., & Müller, W. (2016). Structural habitat selection by southern pygmy perch (Nannoperca australis). Final report prepared for Murray Local Land Services by the Murray-Darling Freshwater Research Centre, MDFRC Publication 102/2016 May, pp. 26.

Romanowski, N. (2004). Wetland habitats: A practical guide to restoration and management. CSIRO Publishing.

Unmack, P.J., Hammer, M.P., Adams, M., & Dowling, T.E. (2011). A phylogenetic analysis of pygmy perches (Teleostei: Percichthyidae) with an assessment of the major historical influences on aquatic biogeography in southern Australia. Systematic Biology, 60, pp. 797–812.

Unmack, P.J., Hammer, M.P., Adams, M., Johnson, J.B., & Dowling, T.E. (2013). The role of continental shelf width in determining freshwater phylogeographic patterns in southeastern Australian pygmy perches (Teleostei: Percichthyidae). Molecular Ecology, 22, pp. 1683–1699.

Victorian Government (2021). Environment Reference Standard No. S245. Gazette No. S 245, 26 May 2021. Made under section 93 of the Environment Protection Act 2017. Accessed 25 July 2025. Available online: **https://www.gazette.vic.gov.au/gazette/Gazettes2021/GG2021S245.pdf**

WGCMA (2014). West Gippsland Waterway Strategy 2014-2022. West Gippsland Catchment Management Authority, Traralgon, Victoria, Australia.

WGCMA (2021). West Gippsland Regional Catchment Strategy 2021–2027. West Gippsland Catchment Management Authority, Traralgon, Victoria, Australia.

Woodward, G.M.A., & Malone, B.S. (2002). Patterns of abundance and habitat use by Nannoperca obscura (Yarra pygmy perch) and Nannoperca australis (southern pygmy perch). Proceedings of the Royal Society of Victoria, 114, pp. 61–72.

Walsh, N.G. and Entwisle, T.J. (1994). Flora of Victoria Vol. 2, Ferns and Allied Plants, Conifers and Monocotyledons, pp. 356–627. Inkata Press, Melbourne.

Walsh, N.G. and Entwisle, T.J. (1996). Flora of Victoria Vol. 3, Dicotyledons Winteraceae to Myrtaceae, pp. 90–101. Inkata Press, Melbourne.

Walsh , N.G. and Entwisle, T.J. (1999). Flora of Victoria Vol. 3, Dicotyledons Winteraceae to Myrtaceae, pp. 912–930. Inkata Press, Melbourne.

Appendices

Appendix A

Protected matters search tool output

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 01-Oct-2025

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	85
Listed Migratory Species:	54

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	92
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	13
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	23
Key Ecological Features (Marine):	None
Biologically Important Areas:	10
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Corner inlet	Within 10km of Ramsar site	In buffer area only
Gippsland lakes	Within Ramsar site	In feature area

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Falco hypoleucos](#) Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Fregetta grallaria grallaria](#) White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Grantiella picta](#) Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Halobaena caerulea](#) Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Limosa lapponica baueri](#) Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Thinornis cucullatus cucullatus](#) Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
[Galaxiella pusilla](#) Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Endangered	Species or species habitat likely to occur within area	In feature area
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
[Heleioporus australiacus flavopunctatus](#) Southern Owl Frog, Southern Giant Burrowing Frog [92014]	Endangered	Species or species habitat may occur within area	In buffer area only
[Litoria aurea](#) Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Litoria raniformis](#) Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Uperoleia martini Martin's Toadlet [1873]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Antechinus minimus maritimus Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat known to occur within area	In feature area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In feature area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat likely to occur within area	In feature area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat may occur within area	In feature area
Prostanthera galbraithiae Wellington Mintbush [64959]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat known to occur within area	In feature area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Xerochrysum palustre			
Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Lissolepis coventryi			
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula albifrons Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharias taurus			
Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Species or species habitat known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In feature area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Stercorarius antarcticus as Catharacta skua](#) Brown Skua [85039]		Species or species habitat may occur within area	In buffer area only
[Sterna striata](#) White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area	In feature area
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
[Hypselognathus rostratus](#) Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
[Kaupus costatus](#) Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
[Kimblaeus bassensis](#) Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In feature area
[Leptoichthys fistularius](#) Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Syngnathoides biaculeatus](#) Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Darriman H29 B.R	Natural Features Reserve	VIC	In feature area
Darriman H33 B.R	Natural Features Reserve	VIC	In buffer area only
Giffard (Rifle Range) F.R.	Nature Conservation Reserve	VIC	In feature area
Giffard H30 B.R	Natural Features Reserve	VIC	In buffer area only
Giffard H31 B.R	Natural Features Reserve	VIC	In buffer area only
Gippsland Lakes Coastal Park	Conservation Park	VIC	In buffer area only
Holey Plains	State Park	VIC	In buffer area only
Jack Smith Lake W.R	Natural Features Reserve	VIC	In buffer area only
Lake Denison W.R	Natural Features Reserve	VIC	In buffer area only
Ninety Mile Beach	Marine National Park	VIC	In buffer area only
Stradbroke F.F.R.	Nature Conservation Reserve	VIC	In buffer area only
Warrigal Creek SS.R.	Natural Features Reserve	VIC	In buffer area only
Woodside H28 B.R	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
Gippsland RFA	Victoria	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Jack Smith Lake State Game Reserve	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Aurora Green Offshore Wind Farm Preliminary Surveys	2024/09968		Completed	In buffer area only
Blue Mackerel North Offshore Wind Farm Marine Surveys	2024/09934		Completed	In feature area
Blue Marlin Offshore Wind Energy Project	2023/09532		Completed	In feature area
Gippsland Dawn Offshore Wind Project Geophysical and Geotechnical Investigations	2024/10030		Referral Decision	In buffer area only
Gippsland Offshore Wind Farm Marine Survey Investigations	2023/09682		Completed	In feature area
Gippsland Offshore Wind Transmission 2GW Project	2024/09980		Assessment	In feature area
Gippsland Renewable Energy Zone Project	2022/09346		Assessment	In feature area
Gippsland Skies Offshore Wind Project marine surveys (investigations)	2024/09991		Referral Decision	In feature area
Greater Gippsland Offshore Wind Project	2022/09379		Assessment	In feature area
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed	In feature area
Navigator North Offshore Wind Farm ? Early Marine Survey Investigations	2024/10093		Referral Decision	In feature area
Preliminary Site Investigations for Great Eastern Offshore Wind Project	2024/09890		Referral Decision	In buffer area only
Seadragon Offshore Wind, Early Marine Surveys	2023/09670		Completed	In feature area
Seadragon Offshore Wind Farm	2022/9163		Completed	In feature area

Controlled action

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Star of the South Offshore Wind Farm Project	2020/8650	Controlled Action	Guidelines Issued	In feature area
Thomson River Mercury Recovery Project	2010/5734	Controlled Action	Completed	In buffer area only
Not controlled action				
Development of Turrum Oil Field and associated infrastructure	2003/1204	Not Controlled Action	Completed	In feature area
Gippsland Basin Seismic Programme	2004/1866	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Golden Beach gas field development	2003/1031	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Southern Flanks 2D Marine Seismic Survey	2010/5288	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Biologically Important Areas

[Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In buffer area only
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In buffer area only
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In buffer area only
Sharks			
Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area

Bioregional Assessments			[Resource Information]
SubRegion	BioRegion	Website	Buffer Status
Gippsland	Gippsland Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

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

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix B

Threatened flora - preliminary likelihood of occurrence assessment

Key to Table:

EPBC Act Codes: VU (Vulnerable), EN (Endangered), CR (Critically Endangered)

FFG Act Codes: vu (Vulnerable in Victoria), en (Endangered in Victoria), cr (Critically Endangered in Victoria)

Native to Victoria but individuals recorded may be outside of the natural distribution for this species

Source

VBA	Victorian Biodiversity Atlas
PMST	Protected Matters Search Tool
VBA recs:	Number of records within 10 km of the onshore CIA
VBA last:	Year of last record within 10 km of the onshore CIA

Habitat descriptions are taken from Flora of Victoria Volumes 2-4 (Walsh and Entwistle, 1992) unless otherwise noted.

Table B.1 Preliminary likelihood of occurrence assessment for threatened flora species within the onshore cable investigation area

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Acacia howittii	Sticky Wattle		vu	VBA	3	2023	Confined to eastern Victoria from the upper Macalister River area near Mt Howitt south to near Yarram and east to near Tabberabbera; collections from near Daylesford and Melbourne are presumably of cultivated origin.	**May**	Limited suitable habitat may occur within intact areas of Lowland Forest associated with Darriman H31 Reserve, along Giffard West Road and riparian vegetation associated with the unnamed creek within the onshore CIA.
Althenia marina	Sea Water-mat		cr	VBA	2	1990	Occurs in marine intertidal (mid-eulittoral) areas of western Port Phillip Bay on muddy substrates with *Zostera muelleri* and *Ruppia maritima.*	**May**	Some suitable habitat may occur associated with permanent saline water associated with the Lake Denison modelled wetland and Estuarine wetland (EVC 10).
Amphibromus fluitans	River Swamp Wallaby-grass	VU		VBA, PMST	3	2004	Grows mostly in permanent swamps and lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels. Principally occurring along the Murray River between Wodonga and Echuca, however, has a rare to uncommon distribution throughout Victoria, excluding the far east and north west.	**Likely**	Suitable habitat likely to occur within the onshore CIA associated with mapped current wetlands (freshwater and vegetated farm dams. Recent records within 5km of onshore CIA. Potential individuals identified at one wetland located in the road reserve along West Giffard Road during the rapid field assessment.
Austrostipa rudis subsp. *australis*	Veined Spear-grass		en	VBA	1	1983	Uncommon, mostly in cool areas of moderate altitude, in open forest on sandy or sandstone derived soils.	**Likely**	Suitable habitat associated with modelled areas of Lowland Forest and Heathy Woodland. Although only known from one record within the onshore study area, subspecies *A. rudis* subsp. *australis* is similar to the more commonly recorded *A. rudis* subsp. *rudis*. Numerous *A. rudis* species observed within areas of roadside vegetation during the rapid assessment that are potential *Austrostipa rudis* subsp. *australis.*

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Caladenia aurantiaca	Orange-tip Finger-orchid		en	VBA	7	2003	Scattered across south Gippsland and East Gippsland in coastal and hinterland areas. Found mainly in open forest and heathy woodlands but also extending into adjacent heathlands. Substrates are generally well-drained sandy loams, rich in decaying vegetable matter (Backhouse and Jeanes, 1995).	**May**	Suitable habitat associated within modelled areas of Lowland Forest and Heathy Woodland. Known from seven records within the onshore study area. Nearby records largely occur within Mullungdung State Forest. Areas of Lowland Forest and Heathy Woodland may provide suitable habitat within the onshore CIA, particularly in Giffard and Darriman Reserves.
Caladenia tessellata	Thick-lipped Spider-orchid	VU	vu	PMST			Occurs in coastal and hinterland areas east from Port Phillip Bay, growing in heathlands, heathy woodland and open forests in well-drained sand and clay loams (Backhouse and Jeanes, 1995).	**May**	Although no records occur within the onshore study area, the onshore CIA occurs within the species known distribution in Victoria and potential habitat occurs within the coastal barrier dunes of the onshore CIA.
Calochilus imberbis	Naked Beard-orchid		cr	VBA	1	2000	Scattered across southern Victoria except for the South West, and with a single record from the northern Goldfields. Found in direr woodlands, open forests and heathlands on well-drained gravelly sand and clay loams (Backhouse and Jeanes, 1995). Flora of Victoria (Walsh and Entwisle, 1992) also state this species is co-extensive with *C. robertsonii* and possibly merely a growth form of that species, in which the labellum remains undifferentiated.	**May**	Known from one record within the onshore study area within Mullungdung State Forest. Additional records occur outside of the onshore study area within the State Forest and further east towards Gippsland Lakes Coastal Park. Areas of intact Lowland Forest and Heathy Woodland may provide suitable habitat within the onshore CIA
Calystegia soldanella	Sea Bindweed		en	Identified during rapid site assess-ment	July 2025 (GHD)		An uncommon sand-binding trailer of coastal dunes, mostly eastward from Lakes Entrance, with isolated westerly records for Apollo Bay, Wilsons Promontory and Walkerville.	**Confirmed**	This species was identified during the rapid site assessment in July 2025. Whilst there are no existing database records of this species within the onshore study area, the onshore CIA is within the known range for this species and the lack of local records is likely as a result of poor survey effort across the area.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Commersonia prostrata	Dwarf Kerrawang	EN	en	VBA, PMST	34	2012	Very rare, confined in Victoria to swampy land and lake margins in the Rosedale-Stradbroke-Providence Ponds area. (Walsh and Entwisle 1996). Recently recorded populations in Dutson Downs, Gippsland. A known fire ephemeral, often emerging after fire or other disturbance (e.g. inundation or mechanical disturbance).	**Likely**	A cluster of records occurs approximately 3 km from the onshore CIA. Suitable habitat occurs within the onshore CIA, this species may be present in association with wetlands and areas where recent disturbance has occurred.
Corybas fimbriatus	Fringed Helmet-orchid		en	VBA	1	2023	Confined to southern Victoria east from Melbourne, generally near the coast. Found mostly in coastal areas under closed scrublands, open forests and heathy woodlands. Favours sandy ground in moist, shaded situations, often growing in leaf and bark litter under bracken, sedges and shrubs (Backhouse and Jeanes, 1995).	**May**	Known from one record within the onshore study area within Mullungdung State Forest. Additional records occur outside of the onshore study area within Honey Plains State Park and further east towards Gippsland Lakes Coastal Park. Areas of intact Lowland Forest and Heathy Woodland may provide suitable habitat within the onshore CIA.
Dianella amoena	Matted Flax-lily	EN	cr	PMST			Grasslands and grassy woodlands.	**Confirmed**	Although no records occur within the onshore study area suitable habitat occurs within the Darriman Bushland Reserve, where the species was recorded during the rapid assessment. Further suitable habitat occurs along roadsides and additional areas of native grassland that may occur within the onshore CIA.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Dianella longifolia var. *grandis* s.l.	Glaucous Flax-lily		cr	VBA	1	2000	Occurs in lowland plains grassland and grassy woodlands (e.g. Volcanic Plain and Riverina) as well as around rocky outcrops at higher altitudes than the var. longifolia (e.g. between Swifts Creek and Omeo, Benambra-Corryong district, Don River near Launching Place).	**May**	Known form a single record in the onshore study area approximately 9 km west of the onshore CIA within an area of modelled Grassy Forest. Although Grassy Forest or Woodland is not modelled to occur within the onshore CIA, areas of intact or degraded/derived grassland forms of Lowland Forest and grassland Darriman Reserve. Additional suitable habitat occurs along roadsides and additional areas of native grassland that may occur within the onshore CIA.
Diuris punctata var. *punctata*	Purple Diuris		en	VBA	2	2003	Distributed widely on low altitude plains from quite near the coast to well inland. Found in grasslands and grassy woodlands on rich, heavy, sandy loams. These soils may be inundated during winter months (Backhouse and Jeanes, 1995).	**Likely**	Previously recorded on a roadside just outside of the onshore CIA. *Diuris* sp. leaves were recorded along roadside vegetation outside of the onshore CIA during the rapid assessment within proximity to the previous record of the species. Suitable habitat may occur within the onshore CIA along roadsides, within Darriman Reserve and areas of native grassland should they occur.
Dodonaea procumbens	Trailing Hop-bush	VU		PMST			Largely confined in Victoria to the south-west (Penola-Dergholm area, Grampians, Lake Fyans) with outlying occurrences near Castlemaine, Avoca, Skipton, Camperdown and extraordinary disjunctions near Sale where very rare and in perhaps also in the upper Murray River area (represented by a single, 1883 specimen of uncertain provenance).low open-forest and grasslands on sands and clays.	**May**	Although not known from the onshore study area, recent records (2011) occur in Heathy Woodland in the Gippsland Plains Coastal Park. Although potential habitat is marginal Areas of intact and degraded/treeless forms Lowland Forest and Heathy Woodland may provide suitable habitat within the onshore CIA.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Eucalyptus arenicola	Gippsland Lakes Peppermint		en	VBA	5	2000	Occurs in coastal and near-coastal areas in the Gippsland Lakes region in sandy soils.	**May**	The nearest record for this species occurs in Giffard Flora Reserve which intersects with the onshore CIA in the north-west corner. Areas of intact Lowland Forest and Heathy Woodland may provide suitable habitat within the onshore CIA.
Eucalyptus bosistoana	Coast Grey-box		en	VBA	121	2023	Occurs mostly on loamy soils east from Woodside, around the Gippsland Lakes and near the coast, extending inland further east along the Cann and Genoa River valleys.	**Likely**	Numerous recent records occur within the onshore study area predominantly within Mullungdung State Forest with the nearest record within 5 km of the onshore CIA. Suitable habitat occurs within the onshore CIA.
Eucalyptus fulgens	Green Scentbark		en	VBA	2	2003	Occurs east from Healesville and Woori Yallock to the Latrobe Valley near Driffield.	**Likely**	Suitable habitat occurs within the onshore CIA within the Giffard Flora Reserve which intersects with the onshore CIA. Known from two records within the onshore study area
Eucalyptus kitsoniana	Bog Gum		cr	VBA	1	2012	Victorian endemic, occurring on coastal lowlands from Yarram west to Cape Otway, and Mt Richmond near Portland. It also occurs on top of Mt Oberon (Wilson Promontory) and on Snake Is. An inland collection from near Woohlpooer (west of Grampians).	**Unlikely**	Although suitable habitat occurs within Giffard Flora Reserve, the majority of the nearest records are west of Yarram, which is approximately 35 km south west of the onshore CIA. however one outlying record occurs approximately 10 km south west the onshore CIA.
Glycine latrobeana	Clover Glycine, Purple Clover	VU	vu	PMST			Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands.	**Unlikely**	No nearby records occur within the onshore study area and no Plains Grassland or Plains Grassy Woodland is predicted to occur within the onshore CIA. It is unlikely that this species would occur in the onshore CIA owing to improbable occurrence of suitable habitat.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Grevillea chrysophaea	Golden Grevillea		vu	VBA	3	2000	Victorian endemic growing mostly in eucalypt woodland or heath in silty sand to sandy loam in the Brisbane Ranges, and in the Gippsland area around Traralgon, Woodside, Licola.	**May**	The most recent record (2000) within the onshore study area occurs within Mullungdung State Forest with the nearest record within 5km of the onshore CIA. Areas of intact Lowland Forest and Heathy Woodland may provide suitable habitat within the onshore CIA.
Lachnagrostis robusta	Salt Blown-grass		en	VBA	1	1998	Occurs around margins of salt lakes and saline depressions mostly across the Volcanic Plain, with eastern outliers near Tooradin and Seaspray and a few sites west of the Grampians (Douglas, Natimuk areas).	**Likely**	Although known form only one record within the onshore study area from >25 years prior, suitable habitat for this species associated with Estuarine Wetland occurs within the onshore CIA. *Lachnagrostis* sp. individuals were detected in association with areas of Estuarine Wetland (EVC 10) during the rapid assessment. Insufficient material was present to ID to species level.
Lachnagrostis semibarbata var. *filifolia*	Purple Blown-grass		en	VBA	2	1991	Virtually co-extensive with the nominate variety, but known further east near the Gippsland Lakes east of Sale.	**May**	Although nearby records within the onshore study area are limited and the most recent from >25 years prior, suitable habitat for this species associated with Estuarine Wetland occurs within the onshore CIA.
Lepidium hyssopifolium	Basalt Pepper-cress	EN	en	PMST			Collected from scattered sites on the volcanic plain, but now much reduced from its former range and recorded recently only from e.g. Moorabool, Winchelsea, Bacchus Marsh, Woodend, Trentham. Most recent collections are from disturbed, rather weedy sites. One collection from near Port Fairy is noteworthy for its occurrence in a slightly saline estuary amongst saltmarsh and fringing sedgeland.	**Unlikely**	Known predominantly from Melbourne and surrounds with no records within >150 km of the onshore CIA. Suitable habitat unlikely to occur within the onshore CIA., although known from one outlier record from saline vegetation in western Victoria. Unlikely to occur in the onshore CIA given the uncertainty around affinity with saline habitat and significant distance between records and the onshore CIA.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Leptorhynchos elongatus	Lanky Buttons		en	VBA	1	1994	Largely confined in Victoria to eastern uplands (Benambra, Omeo etc.) where occasional in grassy *Eucalyptus pauciflora* woodlands. Rare further west (e.g. near Castlemaine) in dry open-forest.	**May**	Suitable habitat occurs within the onshore CIA. Known from one record within the onshore study area within the Giffard Flora Reserve which intersects with the north-west corner of the onshore CIA.
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle		en#	VBA	1	2010	Mainly confined to near coastal sandy heaths, scrubs, slightly raised above saltmarsh, riparian scrubs, rocky coastlines and foothill outcrops eastwards from about Marlo. Occurrences to the west are naturalized.	**May**	The accepted distribution for this species is eastward from Marlo, occurrences of this species within the onshore CIA are likely to be the result of plantings or recruits from planted individuals. Although this species may occur within the onshore CIA this species will not be considered further.
Oxalis rubens	Dune Wood-sorrel		en	VBA	2	2003	Confined to coastal dunes and scrub, growing on stabilised sand-dunes, in *Banksia integrifolia* woodland, and beaches among *Spinifex sericeus*. Flowers throughout the year.	**Confirmed**	Known from a recent record (2003) approximately 500 m from the onshore CIA. Large continuous areas of suitable habitat occurs within the onshore CIA along the barrier dunes. This species was recorded during the rapid assessment along the coastal foredune and is likely to occur broadly within that environment within the onshore CIA
Poa billardierei	Coast Fescue		en	VBA	1	1979	Of scattered occurrence on coastal sand dunes from near Nelson in the far south-west to the NSW border, but infrequently collected in recent times and possibly being displaced by the superficially similar, introduced Marram-grass (*Ammophila arenaria).*	**Likely**	Although only known from a single record >45 years prior east of Seaspray. Large continuous areas of suitable habitat occurs within the onshore CIA along the barrier dunes amongst Coastal Dune Scrub and Coastal Dune Grassland associated with McLoughlins Beach - Seaspray Coastal Reserve. This species is likely often overlooked and despite the absence of recent records, this species likely occurs within the onshore CIA. Potential *P. billardieriei* observed along the coastal barrier dune during the rapid assessment.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Pomaderris discolor	Eastern Pomaderris		en	VBA	1	2000	Confined in Victoria to moist lowland forests and rainforest margins from near Sale eastwards, but uncommon to rare. Flowers September to October.	**May**	The most recent record (2000) within the onshore study area occurs within Mullungdung State Forest with the nearest record within 5km of the onshore CIA. Areas of intact Lowland Forest and Riparian Scrub along waterways may provide suitable habitat within the onshore CIA.
Pomaderris pilifera subsp. *pilifera*	Striped Pomaderris		en	VBA	1	2000	Scattered from Warburton area eastwards, south of the Dividing Range with an isolated occurrence between Mitta Mitta and Tallangatta in the north-east of the State. Usually in dryish open-forest or woodland, usually on shallow soils, occasionally fringing watercourses.	**May**	The most recent record (2000) within the onshore study area occurs within Mullungdung State Forest. Areas of intact Lowland Forest and Riparian Scrub, particularly along waterways may provide suitable habitat for this species within the onshore CIA.
Posidonia australis	Fibre-ball Weed		en	VBA	2	1960	In Victoria, only recorded from Barwon Heads, Jack Smith Lake and Corner Inlet. It grows in shallow water up to c. 15 m deep, in sandy soil with rhizomes just below the substrate surface.	**May**	An aquatic marine and estuarine species. Although known from one record in Jack Smith Lake recorded >65 years prior, suitable habitat may occur within the Estuarine wetland west of Lake Denison.
Prasophyllum spicatum	Dense Leek-orchid	VU	cr	PMST			Widespread but sporadic across Victoria, growing in heath and heathy woodland (Jeanes and Backhouse 2006). Found in grasslands, heathlands and heathy woodlands on well-drained sand and clay loams (Backhouse and Jeanes, 1995).	**May**	Although not recorded previously within the onshore study area, suitable habitat for this species occurs within Giffard Flora and Fauna Reserve and Darriman H29 Bushland Reserve.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Prostanthera galbraithiae	Wellington Mint-bush	VU	en	PMST			Endemic to the Holey Hill - Dutson area (south of Sale), in heathy open forest, usually on gravelly sand.	**Unlikely**	Highly localised to two locations within Victoria within intact areas of Heathy Woodland, with the largest population located 15 km of the onshore study area. A number of additional records occur approximately 25 km east of the onshore CIA within the Gippsland Lakes Coastal Park. Although some small areas of suitable habitat may occur within the onshore CIA, given the highly localised and restricted distribution of the species, it is unlikely that it would occur or persist within the onshore CIA.
Pseudanthus ovalifolius	Oval-leaf Pseudanthus		vu	VBA	1	2000	Occurs on dry sandy, or shallow, shaly soils	**May**	Known from one record within the onshore study area. within Mullungdung State Forest. Areas of Heathy Woodland and areas of native vegetation on sandy soils may provide suitable habitat for this species.
Pterostylis chlorogramma	Green-striped Greenhood	VU	en	VBA, PMST	119	2023	Currently known from the South West and Gippsland regions of Victoria. Grows in heathy woodlands and open forests on well-drained sandy loams (Backhouse and Jeanes, 1995).	**May**	Numerous records occur within Mullungdung State Forest, the nearest of located approximately 5 km from the onshore CIA. Areas of intact Lowland Forest and Heathy Woodland may provide suitable habitat for this species within the onshore CIA.
Pterostylis grandiflora	Cobra Greenhood		en	VBA	416	2023	Confined mainly to coastal and hinterland districts of eastern Victoria. Grows in shaded situations in open forests, often among small shrubs, grasses and bracken. Substrates are generally well-drained sand and clay loams (Backhouse and Jeanes, 1995).	**May**	Numerous records occur within Mullungdung State Forest, the nearest of located approximately 9 km from the onshore CIA. Areas of intact Lowland Forest and Heathy Woodland may provide suitable habitat for this species within the onshore CIA.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Senecio psilocarpus	Swamp Fireweed	VU		PMST			Rare in Victoria, restricted to a herb-rich few winter-wet swamps south and west from c. Ballarat, growing on volcanic clays or peat soils.	**Unlikely**	Although suitable habitat may occur on the edge of ephemeral/permanent wetlands, this species is known predominantly from Melbourne extending westwards with no records within approximately 150 km of the onshore CIA. Sthe onshore CIA is situated outside of its known distribution within Victoria.
Senecio spathulatus var. *lactifructus*	Coast Groundsel		en				Scattered on sandy coasts, on dunes where it forms low, broad clumps, on and east of Wilsons Promontory, but rather uncommon, possibly displaced to an extent by exotic Marram Grass (*Ammophila arenaria*) which has been widely planted as a sand-binder.	**May**	Although not recorded within the onshore study area, survey effort in the area is likely low and insufficient to rule out presence of this species. Suitable habitat is known to occur within the onshore study area and onshore CIA in association with the coastal barrier dune.
Thelymitra epipactoides	Metallic Sun-orchid	EN	en	PMST			Usually found in coastal and hinterland areas west from Bairnsdale, but extending well inland in the far-western part of the state. Grows primarily in mesic coastal heathlands, grasslands and woodlands, but is also found in drier inland heathlands, open forests and woodlands. Substrates may be moist or dry sandy loams (Backhouse & Jeanes 1995).	**May**	Although not known from the onshore study area, recent records (2013) occur in Heathy Woodland in the Gippsland Plains Coastal Park approximately 25 km east of the onshore CIA. Suitable habitat occurs along the coastal areas of the onshore CIA.
Thesium australe	Austral Toadflax	VU	en	PMST			Once widespread across Victoria, but all recent collections are from highland areas in the vicinity of Wulgulmerang and it is believed to have become extinct across most of its Australian range due to loss of habitat and grazing. Grows in grasslands, woodlands and herbfields, usually in damp situations	**Unlikely**	This species range across Victoria has been largely reduced and records confined to areas of higher elevation with an outlier record from 1855, occurring east of Bairnsdale (approximately 80 km from the onshore CIA. This species is unlikely to occur within the onshore CIA.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Triglochion minutissima			en				Scattered on damp saline soils near salt-lakes, and forming part of herbfield in coastal saltmarshes.	**May**	Although not recorded within the onshore study area, survey effort in the area is likely low and insufficient to rule out presence of this species. Plants displaying characteristics of this species were observed within low lying areas of Estuarine Wetland (EVC 10) during rapid assessment. Insufficient plant material available to confirm species identification.
Triglochin mucronata			en				Occurs in herbfields on damp saline soils of salt-flats and coastal saltmarshes.	**May**	Although not recorded within the onshore study area, survey effort in the area is likely low and insufficient to rule out presence of this species. Plants displaying characteristics of this species were observed within low lying areas of Estuarine Wetland (EVC 10) during rapid assessment. Insufficient plant material available to confirm species identification.
Xanthosia leiophylla	Parsley Xanthosia		en	VBA	1	1978	Uncommon in Victoria where known from sandy heathland and heathy woodland, mostly in the south-west, but also recorded from Wilsons Promontory.	**May**	Suitable habitat occurs within the onshore CIA. Known from one record within the onshore study area near to the Giffard Flora Reserve which intersects with the north-west corner of the onshore CIA. Despite not being recorded since 1978 in the onshore study area, suitable habitat occurs within the onshore CIA. Similarly this species is small, difficult to detect ands easily overlooked.
Xerochrysum palustre	Swamp Everlasting	VU	cr	PMST			Occurs in lowland swamps, usually on black cracking clay soils.	**Unlikely**	Marginal suitable habitat may exist within the onshore CIA, however, higher quality wetlands within the onshore CIA are coastal and associated with Estuarine Wetland habitat not typically occupied by this species.

Scientific name	Common name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Zieria veronicea subsp. *veronicea*	Pink Zieria		en	VBA	7	2012	Widespread in sandy mallee and mallee-heath communities of western Victoria, with disjunct populations around the Gippsland Lakes.	**May**	Known form recent nearby records approximately 7 km from the onshore CIA. Numerous records occur east of the onshore CIA within Heathy Woodland and coastal vegetation in the Gippsland Plains Coastal Park approximately 25 km east of the onshore CIA. This species may occur within the onshore CIA in coastal areas and intact areas of Lowland Forest and Heathy Woodland.

Appendix C

Threatened fauna - preliminary likelihood of occurrence assessment

Key to Table:

EPBC Act Codes: VU (Vulnerable), EN (Endangered), CR (Critically Endangered)

FFG Act Codes: vu (Vulnerable in Victoria), en (Endangered in Victoria), cr (Critically Endangered in Victoria),

Source

VBA Victorian Biodiversity Atlas

PMST Protected Matters Search Tool

NA Species not recorded in VBA and/or identified by the PMST but is known to occur in the broader locality and may occur in the onshore CIA

Count: Number of VBA records within 10 km of the onshore CIA

Last Record: Year of last VBA record within 10 km of the onshore CIA

Table C.1 Preliminary likelihood of occurrence assessment for threatened fauna species within the onshore cable investigation area

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Mammals									
Brush-tailed Phascogale	*Phascogale tapoatafa*		vu	VBA	1	1962	Prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabits heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.	**Unlikely**	Historical record in the onshore study area and suitable habitat present in the onshore CIA. However, few recent records in broader Gippsland locality (nearest post-2000 records near Erica – approximately 75 km from the onshore CIA) and the onshore CIA likely occurs beyond the current distribution of the species.
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	vu	PMST	0	-	Densely vegetated flowering and fruiting trees, mainly east of Melbourne. Roosts in dense gullies. Uses a wide range of habitats in Victoria, from lowland rainforest and coastal Stringybark forests to agricultural land and suburban gardens. Established colonies known in Melbourne, Geelong, Bendigo and Mallacoota.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA.
New Holland Mouse	*Pseudomys novaehollandiae*	VU	vu	PMST	0	-	Fire dependent. Inhabits a variety of habitats along the coast of south-eastern Australia, including coastal heath, sclerophyll forest, heathy woodland and coastal scrub habitats, usually with a high density of leguminous ground plants.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA. Known populations occur approximately 15 km northeast of the onshore CIA.
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	EN	en	PMST	0	-	Typically occurs in heathland, shrubland, heathy forest and woodland, and coastal scrub habitat across southern Victoria. Survival with foxes requires dense understorey vegetation.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA. Populations known to occur throughout the Gippsland locality.
Southern Greater Glider	*Petauroides volans*	EN	en	VBA	19	2022	Eucalypt-dominated low open forests on coast, tall forests and low woodland.	**May**	Recent records in the onshore study area and suitable habitat may be present in the onshore CIA. However, preferred tall, old-growth forest habitat unlikely to be present the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN	en	PMST	0	-	Preference for mature wet forest habitat that has been less disturbed by logging. Also occurs in wet sclerophyll forests, lowland forests, open and closed eucalypt woodlands, inland riparian and River Red-gum forests Woodlands, subalpine woodlands and coastal heathlands.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA. Preferred old-growth forest habitat unlikely to be present within the onshore CIA.
Swamp Antechinus	*Antechinus minimus maritimus*	VU	vu	PMST	0	-	Wet areas with dense closed ground cover. Typically in wet heath, heathy woodland, sedgeland and dense tussock grassland, usually at low elevation.	**Unlikely**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA. However, recent records within Gippsland locality are spatially restricted to Wilson's Promontory and onshore CIA is likely beyond the current distribution of the species.
White-footed Dunnart	*Sminthopsis leucopus*		vu	Habitat identified during rapid site assess-ment	0	-	Heathy woodlands and forest, coastal scrub and dune grassland.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA. Known populations occur in Holey Plains State Park approximately 12 km north of the onshore CIA.
Yellow-bellied Glider	*Petaurus australis*	VU	en	VBA, PMST	2	2006	Tall forest, coastal gullies, creek flats and forest mixed with woodland.	**May**	Relatively recent records in the onshore study area and suitable habitat may be present in the onshore CIA. However, preferred tall, old-growth forest habitat unlikely to be present within the onshore CIA.
Birds									
Australasian Bittern	*Botaurus poiciloptilus*	EN	cr	VBA, PMST	2	1979	Wetlands with tall, dense vegetation in permanent freshwater habitats, particularly when dominated by sedges, rushes and reeds. Also uses rice paddocks in north.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Australasian Shoveler	*Spatula rhynchotis*		vu	VBA	43	2020	Filter-feeding duck. Well vegetated larger wetlands, dams and lakes.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Australian Gull-billed Tern	*Gelochelidon nilotica macrotarsa*		en	VBA	1	1985	Shallow terrestrial wetlands and sheltered bays, estuaries, tidal mudflats and beaches. In Australia, mainly breeds in inland areas following floods.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Australian Little Bittern	*Ixobrychus dubius*		en	VBA	1	1996	Dense tall vegetation in swamps and wetlands.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Australian Painted Snipe	*Rostratula australis*	EN	cr	PMST	0	-	Generally in shallow, terrestrial freshwater wetlands with rank, emergent tussocks of grass, sedges and rushes. Occurs in well vegetated lakes, swamps, inundated pasture, saltmarsh and dams. Fresh to saline water. May use riverine forest.	**May**	Rare species, with no historical records in the onshore study area but suitable habitat likely to be present in the onshore CIA.
Barking Owl	*Ninox connivens*		cr	VBA	1	1980	Open woodlands and the edges of forests, often adjacent to farmland. Usually found in habitats dominated by eucalyptus, particularly red gum. Prefers woodlands and forests with a high density of large trees and particularly sites with hollows. Roost sites often near waterways or wetlands.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Bar-tailed Godwit	*Limosa lapponica baueri*	EN	en	VBA, PMST	4	1998	Non-breeding migrant to Australia during the austral summer. Mudflats, sandflats, estuaries, large wetlands. Coastal, but occasionally inland.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Black Falcon	*Falco subniger*		cr		0		Grassy woodlands. Also found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. It roosts in trees at night and often on power poles by day.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA .
Blue-billed Duck	*Oxyura australis*		vu	VBA	5	1989	Diving duck. Deep open water in wetlands, dams, lakes and slow-flowing rivers.	**May**	Historical records in the onshore study area and suitable habitat may be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Blue-winged Parrot	*Neophema chrysostoma*	VU		VBA, PMST	18	2019	Inhabits a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. Tends to favour grasslands and grassy woodlands and often found near wetlands both near the coast and in semi-arid zones. Breeds in Tasmania, coastal south-eastern South Australia and southern Victoria.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Brown Treecreeper	*Climacteris picumnus victoriae*	VU	vu	PMST	0	-	Forests and woodlands, mainly in drier areas. Threatened sub-species victoriae occurs mainly on southern watershed of Great Dividing Range, and along a narrow intergrade on the northern and western slopes, in a rough line from the Grampians, through Maryborough and to Albury.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA.
Caspian Tern	*Hydroprogne caspia*		vu	VBA	33	2021	Coastal areas and large inland wetlands and rivers. Exposed ocean beaches, sheltered coastal bays, harbours, lagoons, inlets, estuaries, usually with sandy or muddy margins. Breeds in a variety of coastal habitats including banks, ridges and beaches of sand and shell, often in open or among low or sparse vegetation.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*		vu	VBA	8	1999	Heathlands, woodlands and forests with a dense, shrubby understorey. From coast to mountains. Shy species that typically forages on or near the ground and therefore requires habitat with suitable structure.	**May**	Historical records in the onshore study area and suitable habitat may be present in the onshore CIA.
Common Greenshank	*Tringa nebularia*	EN	en	VBA, PMST	11	2012	Non-breeding migrant to Australia during the austral summer. Coastal mudflats, estuaries, salt marshes, mangroves, lakes and swamps.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Common Sandpiper	*Actitis hypoleucos*		vu	PMST	0	-	Non-breeding migrant to Australia during the austral summer. Uses a wide variety of coastal and inland wetlands with muddy margins, including lakes, rivers, sewage ponds.	**May**	No historical records in the onshore study area but suitable habitat likely to be present in the onshore CIA.
Curlew Sandpiper	*Calidris ferruginea*	CR	cr	VBA, PMST	17	2020	Non-breeding migrant to Australia during the austral summer. Regular visitor to Victoria. Occurs in a variety of wetland habitats with fringing mudflats including bays, coastal lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Diamond Firetail	*Stagonopleura guttata*	VU	vu	PMST	0	-	Occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. Prefers areas with relatively low tree density (including few large logs and litter cover) but a high grass cover. Generally, absent from very wet and very dry areas.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA.
Eastern Curlew	*Numenius madagascariensis*	CR	cr	VBA, PMST	2	2009	Non-breeding migrant to Australia during the austral summer. Coastal. Sheltered coastal habitats, usually with large sand flats or intertidal mudflats with seagrass, estuaries, open sandy beaches. Occasionally on coastal rock platforms.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Eastern Great Egret	*Ardea alba modesta*		vu	VBA	26	2020	Saltwater and freshwater wetlands, lakes, dams, river margins, estuaries and mudflats.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Fairy Tern	*Sternula nereis*	VU	cr	PMST	0	-	Coastal areas. Inhabits coastal environments including intertidal mudflats, sand flats and beaches. Nests above high-water mark on sandy shell-grit beaches.	**May**	No historical records in the onshore study area but suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Freckled Duck	*Stictonetta naevosa*		en	VBA	3	2017	Filter-feeding duck. Well vegetated shallow wetlands.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN	en	VBA, PMST	15	2023	Tends to frequent tall forests and woodlands with dense shrubby understoreys in the mountains during the summer breeding period. In winter, tends to move to lower altitudes into drier, more open forests and woodlands. Often seen by roadsides and in parks and gardens of urban areas. Requires tall trees for nest hollows.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Glossy Black-cockatoo	*Calyptorhynchus lathami lathami*	VU	vu	PMST	0	-	Strongly associated with Allocasuarina, upon which it feeds. Also in native and introduced pine woodlands, buloke.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA. However, extensive stands of Sheoaks (*Allocasuarina* or *Casuarina* spp.) unlikely to occur within the onshore CIA.
Great Knot	*Calidris tenuirostris*	VU	vu	VBA	1	1998	Non-breeding migrant to Australia during the austral summer. Coastal. Mainly found on intertidal mudflats, sandflats and sandy beaches.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Greater Sand Plover	*Charadrius leschenaultii*	VU	vu	PMST	0	-	Non-breeding migrant to Australia during the austral summer. Coastal. Exposed sandflats and mudflats, estuaries, open sandy beaches. High tide roost sites are often located on beaches.	**May**	No historical records in the onshore study area but suitable habitat likely present in the onshore CIA.
Grey Falcon	*Falco hypoleucos*	VU	vu	PMST	0	-	Inland wooded watercourses and woodland. Generally rare.	**Highly Unlikely**	Rare species, usually recorded in arid inland areas.
Grey Goshawk	*Accipiter novaehollandiae*		en	VBA	1	1980	Woodlands, forests and riparian habitats, mainly in wetter areas.	**May**	One historical record in the onshore study area and suitable habitat may be present in the onshore CIA.
Grey Plover	*Pluvialis squatarola*	VU	vu	VBA	1	1981	Non-breeding migrant to Australia during the austral summer. Coastal. Mudflats, saltmarsh, tidal reefs and estuaries.	**May**	One historical record in the onshore study area and suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Ground Parrot	*Pezoporus wallicus*		en	VBA	1	1980	Dense coastal heathlands and wet heathlands.	**May**	One historical record in the onshore study area and suitable habitat may be present in the onshore CIA.
Hooded Plover	*Thinornis cucullatus cucullatus*	VU	vu	VBA, PMST	11	2019	Breeding resident in Victoria. Prefers sandy, broad, flat ocean beaches. Prefers beachcast seaweed for feeding activities and sparsely vegetated back dunes for shelter and nesting.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Hooded Robin	*Melanodryas cucullata cucullata*	EN	vu	PMST	0	-	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA.
King Quail	*Synoicus chinensis*		en	VBA	1	1975	Dense heaths and grasslands.	**May**	Single historical record in the onshore study area and suitable habitat may be present in the onshore CIA.
Latham's Snipe	*Gallinago hardwickii*	VU	vu	VBA, PMST	8	2007	Non-breeding migrant to Australia during the austral summer. Uses a wide variety of permanent and ephemeral wetlands, generally freshwater wetlands with cover. Also recorded along creeks, rivers and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Lesser Sand Plover	*Charadrius mongolus*	EN	en	PMST	0	-	Non-breeding migrant to Australia during the austral summer. Coastal, but occasionally inland. Exposed sandflats and mudflats, estuaries, open sandy beaches. High tide roost sites are often located on beaches.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA.
Little Eagle	*Hieraaetus morphnoides*		vu	VBA	4	2005	Widespread over diverse habitats across most of Australia, from coastal to inland forest, woodland, open scrub and tree-lined watercourses. Most abundant where open country mixes with wooded or forested hills.	**Likely**	Relatively recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Little Egret	*Egretta garzetta nigripes*		en	VBA	6	2017	Uses wide range of wetlands, mudflats, estuaries. Typically prefers shallows of wetlands for foraging. Occasionally in small waterways or wet grassland areas.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Little Tern	*Sternula albifrons*	VU	cr	VBA, PMST	2	1981	Coastal areas. Mostly recorded in sheltered coastal environments, including bays, lagoons and estuaries. Nests on sandy substrates containing much shell-grit.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Magpie Goose	*Anseranas semipalmata*		vu	VBA	1	1999	Seasonal wetlands and flooded fields. Aquatic and terrestrial habitat, mostly in wetlands on flood plains. Historically occurred in SE Australia, but extinct in Victoria by early 1900s. Re-introduction attempts have had mixed results.	**May**	One historical record in the onshore study area and suitable habitat may be present in the onshore CIA.
Marsh Sandpiper	*Tringa stagnatilis*		en	VBA, PMST	4	1982	Non-breeding migrant to Australia during the austral summer. Estuaries, and coastal and inland shallow wetlands.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Musk Duck	*Biziura lobata*		vu	VBA	21	2007	Diving duck. Deep open water in wetlands, dams, lakes and slow-flowing rivers.	**Likely**	Recent records in the onshore study area and suitable habitat may be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Orange-bellied Parrot	*Neophema chrysogaster*	CR	cr	VBA, PMST	12	2020	Winter migrant to coastal Victoria and South Australia from breeding areas in south-west Tasmania. Forages in coastal or near-coastal areas such as saltmarshes, coastal dunes, pastures, shrublands, estuaries, islands and beaches.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Pacific Golden Plover	*Pluvialis fulva*		vu	VBA, PMST	10	2017	Non-breeding migrant to Australia during the austral summer. Usually in coastal habitats including mudflats, sandflats, rocky shores and saltmarsh. Also sub-coastal wetlands and sewage ponds.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Painted Honeyeater	*Grantiella picta*	VU	vu	PMST	0	-	Dry open forests and woodlands, strongly associated with mistletoe (including mistletoe in Acacia).	**May**	Species typically associated with dry forest/woodlands of central and northern Victoria, but species is known to occur in East Gippsland around Lake Tyers. No historical records in the onshore study area but species is known to occur in East Gippsland and suitable habitat may be present in the onshore CIA.
Pilotbird	*Pycnoptilus floccosus*	VU	vu	VBA, PMST	1	1975	Wet eucalypt and temperate rainforest, alpine and coastal woodland in dense undergrowth with abundant debris.	**May**	One historical record in the onshore study area and suitable habitat may be present in the onshore CIA.
Powerful Owl	*Ninox strenua*		vu	VBA	10	2008	Open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys. Especially along watercourses. Sometimes found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old-growth trees and large hollows to nest.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Red Knot	*Calidris canutus*	VU	vu	VBA, PMST	6	1998	Non-breeding migrant to Australia during the austral summer. Coastal. Typically occurs on intertidal mudflats, sandflats and sandy beaches of sheltered coasts, and a range of other coastal and near-coastal environments such as lakes, lagoons, pools and pans, sewage ponds and saltworks. Inland lakes and swamps less commonly used.	**May**	Historical records in the onshore study area and suitable habitat may be present in the onshore CIA.
Regent Honeyeater	*Anthochaera phrygia*	CR	cr	PMST	0	-	Open forests and woodlands. Generally absent from very wet and very dry areas. Dry woodlands and forests dominated by Box Ironbark eucalypts. May be restricted to the Chiltern-Mt Pilot National Park (north-east Victoria) following population decline and range contraction.	**Unlikely**	No historical records in the onshore study area and the species is now likely restricted to north-east Victoria.
Ruddy Turnstone	*Arenaria interpres*	VU	en	VBA	7	2017	Non-breeding migrant, regular to Victoria. Typically coastal, on intertidal mudflats, sandflats and sandy beaches, rocky shores and intertidal reefs.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Sharp-tailed Sandpiper	*Calidris acuminata*	VU	vu	VBA, PMST	23	2021	Non-breeding migrant to Australia during the austral summer. Regular visitor to Victoria. Prefers muddy edges of shallow fresh or brackish wetlands with inundated or emergent low vegetation.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Square-tailed Kite	*Lophoictinia isura*		vu		0		Woodland and open forest in drier areas. Flies low and effortlessly just above the canopy hunting for nestlings.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Swift Parrot	*Lathamus discolor*	CR	cr	VBA, PMST	2	2017	Winter migrant to Victoria (and other parts of SE Australia) from breeding areas in Tasmania. In Victoria, prefers dry, open eucalypt forests and woodlands, especially Box Ironbark Forest in north-central Victoria. Occasionally recorded in urban parks, gardens, street trees and golf courses with flowering ornamental trees and shrubs.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*		en	VBA	35	2019	Coastal, marine and inland. Estuaries, beaches, large wetlands, including deep freshwater swamps, lakes, reservoirs, billabongs and rivers. Uses tall trees in or near water for breeding.	**Confirmed**	Species recorded at Darriman H29 Bushland Reserve during the rapid site assessment.
White-throated Needletail	*Hirundapus caudacutus*	VU	vu	VBA, PMST	10	2019	Almost exclusively aerial within Australia, occurring over most types of habitat, particularly wooded areas. Less often seen over open farm paddocks but has been recorded in vineyards flying between the rows of trees.	**Likely**	Recent records in the onshore study area and species likely to use the airspace of the onshore CIA.
Reptiles									
Glossy Grass Skink	*Pseudemoia rawlinsoni*		en	VBA	3	1977	Swamp and lake edges, saltmarshes, boggy creeks with dense vegetation.	**May**	Historical records in the onshore study area and suitable habitat may be present in the onshore CIA.
Lace Monitor	*Varanus varius*		en	VBA	15	2017	Partly arboreal. Occurs in well-timbered areas, from dry woodland to southern temperate forests. Lays eggs in hollows.	**Likely**	Recent records in the onshore study area and suitable habitat may be present in the onshore CIA.
Swamp Skink	*Lissolepis coventryi*	EN	en	VBA, PMST	1	1997	Swamp scrub habitat in cool, temperate, low-lying areas, including wetlands, river margins, lakes, swamp margins and estuarine areas with a dense shrub layer, particularly in near-coastal areas across southern Victoria. Often associated with stands of paperbark and tea-tree, usually in heathy or scrubby areas.	**May**	Historical records in the onshore study area and suitable habitat may be present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Frogs									
Giant Burrowing Frog	*Heleioporus australiacus flavopunctatus*	EN	cr	PMST	0	-	Most common in Hawkesbury Sandstone in Sydney region. Also occurs south to eastern Victoria. Tolerates sandstone, granite or basalt; uses sandy banks near water. Eggs laid out of water in moist burrows in sandy clay banks of creeks, dams or ephermeral pools in forests.	**Unlikely**	No historical records in the onshore study area and suitable habitat unlikely to be present in the onshore CIA. Nearest VBA records located over 50 km from the onshore CIA and the onshore CIA is likely to be beyond the current distribution of the species.
Green and Golden Bell Frog	*Litoria aurea*	VU		PMST	0	-	Open vegetated wetlands, flooded paddocks, drains, farm dams, river pools.	**May**	No historical records in the onshore study area but suitable habitat may be present in the onshore CIA.
Growling Grass Frog	*Litoria raniformis*	VU	vu	VBA, PMST	9	1977	Requires a matrix of well-connected permanent and semi-permanent waterbodies, including open vegetated wetlands, flooded paddocks, drains, farm dams and river pools, generally containing abundant submerged and emergent vegetation with little shade. Within lowland grasslands, woodlands and open forests.	**May**	Historical records in the onshore study area and suitable habitat may be present in the onshore CIA.
Martin's Toadlet	*Uperoleia martini*	EN	en	VBA, PMST	1	1998	East coast of Vic to south-eastern corner of NSW. Forest, woodland, shrubland and cleared land. Breeds in densely vegetated swamps, flooded grassland and ponds. Breeds mainly after rain during Summer and Autumn.	**May**	One historical record in the onshore study area and suitable habitat is present in the onshore CIA.
Southern Toadlet	*Pseudophryne semimarmorata*		en	VBA	41	2021	Moist soaks, depressions, dams and watercourses in woodland and open forest and heathlands, with sufficient litter or other ground cover. Adults shelter beneath leaf litter and other debris. Eggs and tadpoles develop in depressions that flood following autumn rains.	**Likely**	Recent records in the onshore study area and suitable habitat is present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Fish									
Australian Grayling	*Prototroctes maraena*	VU	vu	VBA, PMST	2	1976	Occurs in coastal rivers and streams in south-eastern Australia (Backhouse et al. 2008). Usually prefer cool and clear waters, gravel substrates, and alternating pool and riffle habitats (Bishop and Bell 1978; Berra 1982; Backhouse et al. 2008). Although adults prefer moderate to fast-flowing water they can be found in pools (Gomon & Bray 2011).	**Unlikely**	Historical records in the onshore study area but suitable habitat is not present in the onshore CIA.
Dwarf Galaxias	*Galaxiella pusilla*	EN	en	PMST	0	-	Typically inhabits shallow, slow-flowing or still freshwater environments such as swamps, drains, and creek backwaters, often among dense vegetation (Backhouse & Vanner 1978; McDowall & Frankenberg 1981). These habitats may dry out seasonally, making connectivity to permanent water sources crucial for population persistence (Humphries 1986). The species is often found near burrowing crayfish (*Geocharax* sp.), whose burrows may offer refuge during dry periods (Beck 1985; McDowall 1996). It may also undergo aestivation to survive drought conditions (McDowall & Frankenberg 1981; Humphries 1983; Beck 1985; McDowall 1996; Littlejohn 2001; Romanowski 2004).	**Unlikely**	No historical records in the onshore study area but the PMST suggests species or species habitat likely to occur. However, no suitable habitat is present in the onshore CIA.
Flinders Pygmy Perch	*Nannoperca sp. 1*		vu	VBA	12	2023	Inhabits still or slow-flowing waters with abundant aquatic vegetation, including lakes, ponds and slow-flowing rivers and creeks, along with pools in moderately-flowing streams (Kuiter et al. 1996, Woodward and Malone 2002). It is also found in areas of moderate flow in larger streams, and can persist in isolated pools as streams dry (Raadik unpublished data).	**Unlikely**	Historical records in the onshore study area but suitable habitat is not present in the onshore CIA.

Common name	Scientific name	EPBC	FFG	Source	Count	Last record	Habitat	Likelihood of occurrence	Justification
Southern Pygmy Perch	*Nannoperca australis*		vu	VBA	2	1971	Inhabits temperate river systems in southeastern Australia. Prefers shallow, low-gradient waterways or floodplains with slow flowing or still water and aquatic vegetation or snags (Cadwallader 1979; Humphries 1995; Woodward and Malone 2002; Unmack et al., 2011; 2013; Hammer et al., 2013; Price et al., 2016). Has a limited tolerance of salinity and prefers waters with salinity less than 3.3 ppt (Chessman and Williams 1974), however it can tolerate a broad range of temperatures and extremely low dissolved oxygen levels (McNeil and Closs 2007).	**Unlikely**	Historical records in the onshore study area prior to distinction between lineages. Only Murray-Darling Basin lineage threatened. Suitable habitat is not present in the onshore CIA.

Appendix D

Migratory species (under the EPBC Act) - preliminary likelihood of occurrence assessment

Key to Table:

Source

VBA	Victorian Biodiversity Atlas
PMST	Protected Matters Search Tool
Count:	Number of VBA records within 10 km of the onshore CIA
Last Record:	Year of last VBA record within 10 km of the onshore CIA

Table D.2 Preliminary likelihood of occurrence for EPBC Act-listed migratory species within the onshore cable investigation area

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
Australian Gull-billed Tern	*Gelochelidon nilotica macrotarsa*	1	1985	VBA	Shallow terrestrial wetlands and sheltered bays, estuaries, tidal mudflats and beaches. In Australia, mainly breeds in inland areas following floods.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Bar-tailed Godwit	*Limosa lapponica baueri*	4	1998	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Mudflats, sandflats, estuaries, large wetlands. Coastal, but occasionally inland.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Caspian Tern	*Hydroprogne caspia*	33	2021	VBA	Coastal areas and large inland wetlands and rivers. Exposed ocean beaches, sheltered coastal bays, harbours, lagoons, inlets, estuaries, usually with sandy or muddy margins. Breeds in a variety of coastal habitats including banks, ridges and beaches of sand and shell, often in open or among low or sparse vegetation.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Common Greenshank	*Tringa nebularia*	11	2012	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Coastal mudflats, estuaries, salt marshes, mangroves, lakes and swamps.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Common Sandpiper	*Actitis hypoleucos*			PMST	Non-breeding migrant to Australia during the austral summer. Uses a wide variety of coastal and inland wetlands with muddy margins, including lakes, rivers, sewage ponds.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA.
Common Tern	*Sterna hirundo*	4	2022	VBA	Mainly coastal when not breeding. Uses offshore waters, ocean beaches, estuaries and large lakes. Occasionally seen in freshwater swamps, floodwaters, sewage farms and brackish and saline lakes.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
Crested Tern	*Thalasseus bergii*	36	2021	VBA	Occurs along coasts and estuaries; very rarely further inland or on freshwater ponds/lagoons.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Curlew Sandpiper	*Calidris ferruginea*	17	2020	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Regular visitor to Victoria. Occurs in a variety of wetland habitats with fringing mudflats including bays, coastal lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Double-banded Plover	*Charadrius bicinctus*	13	2020	VBA, PMST	Breeds in New Zealand; regular winter migrant to Victoria. Occurs in a variety of habitats including bays, mudflats, saltmarshes.	**Confirmed**	Species recorded in estuarine habitats in the onshore CIA during the rapid site assessment.
Eastern Curlew	*Numenius madagascariensis*	2	2009	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Coastal. Sheltered coastal habitats, usually with large sand flats or intertidal mudflats with seagrass, estuaries, open sandy beaches. Occasionally on coastal rock platforms.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Fork-tailed Swift	*Apus pacificus*			PMST	Aerial species, occurring over a wide range of environments, predominantly over open country but sometimes over forests and urban landscapes.	**May**	No historical records in the onshore study area but species may use the airspace of the onshore CIA.
Glossy Ibis	*Plegadis falcinellus*	2	1985	VBA	Wetlands, dams, flooded fields, mudflats, mangroves.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
Great Knot	*Calidris tenuirostris*	1	1998	VBA	Non-breeding migrant to Australia during the austral summer. Coastal. Mainly found on intertidal mudflats, sandflats and sandy beaches.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Greater Sand Plover	*Charadrius leschenaultii*			PMST	Non-breeding migrant to Australia during the austral summer. Coastal. Exposed sandflats and mudflats, estuaries, open sandy beaches. High tide roost sites are often located on beaches.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA.
Grey Plover	*Pluvialis squatarola*	1	1981	VBA	Non-breeding migrant to Australia during the austral summer. Coastal. Mudflats, saltmarsh, tidal reefs and estuaries.	**May**	One historical record in the onshore study area and suitable habitat present in the onshore CIA.
Latham's Snipe	*Gallinago hardwickii*	8	2007	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Uses a wide variety of permanent and ephemeral wetlands, generally freshwater wetlands with cover. Also recorded along creeks, rivers and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.	**Likely**	Recent records in the onshore study area and suitable habitat likely to be present in the onshore CIA.
Lesser Sand Plover	*Charadrius mongolus*			PMST	Non-breeding migrant to Australia during the austral summer. Coastal, but occasionally inland. Exposed sandflats and mudflats, estuaries, open sandy beaches. High tide roost sites are often located on beaches.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA.

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
Little Tern	*Sternula albifrons*	2	1981	VBA, PMST	Coastal areas. Mostly recorded in sheltered coastal environments, including bays, lagoons and estuaries. Nests on sandy substrates containing much shell-grit.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Marsh Sandpiper	*Tringa stagnatilis*	4	1982	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Estuaries, and coastal and inland shallow wetlands.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Oriental Plover	*Charadrius veredus*	1	1983	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Semi-arid regions, open grasslands, claypans and gibber plains. Less often in marine or estuarine habitats.	**May**	Historical record in the onshore study area and suitable habitat present in the onshore CIA.
Little Curlew	Numenius minutus			PMST	Non-breeding migrant to Australia during the austral summer. Common in northern Australia, though rarely occurs in Victoria. Open, wet grasslands and plains, also coastal and estuarine areas.	**Unlikely**	Species range includes the onshore CIA and known from nearby Lake Wellington though no records from within the onshore study area and known to only be a rare visitor to Victoria.
Osprey	*Pandion haliaetus*	6	1998	PMST	Found on the coast and in terrestrial wetlands of tropical and temperate Australia and off-shore islands, occasionally ranging inland along rivers. Uncommon in Victoria.	**May**	Historical records in the onshore study area and suitable habitat likely to be present in the onshore CIA.

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
Pacific Golden Plover	*Pluvialis fulva*	10	2017	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Usually in coastal habitats including mudflats, sandflats, rocky shores and saltmarsh. Also, sub-coastal wetlands and sewage ponds.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Pectoral Sandpiper	*Calidris melanotos*			PMST	Non-breeding migrant to Australia during the austral summer. Occurs in a variety of wetland habitats with fringing mudflats including bays, coastal lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands. Mostly recorded from Port Phillip Bay and Murray River region.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA.
Pin-tailed Snipe	*Gallinago stenura*	0	-	PMST	Rare, non-breeding summer migrant to Western Australia.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA. Species rarely recorded in southern Victoria.
Red Knot	*Calidris canutus*	6	1998	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Coastal. Typically occurs on intertidal mudflats, sandflats and sandy beaches of sheltered coasts, and a range of other coastal and near-coastal environments such as lakes, lagoons, pools and pans, sewage ponds and saltworks. Inland lakes and swamps less commonly used.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
Red-necked Stint	*Calidris ruficollis*	38	2024	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Regular visitor to Victoria. Occurs in a variety of wetland habitats with fringing mudflats including bays, coastal lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Ruddy Turnstone	*Arenaria interpres*	7	2017	VBA	Non-breeding migrant, regular to Victoria. Typically coastal, on intertidal mudflats, sandflats and sandy beaches, rocky shores and intertidal reefs.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Sharp-tailed Sandpiper	*Calidris acuminata*	23	2021	VBA, PMST	Non-breeding migrant to Australia during the austral summer. Regular visitor to Victoria. Prefers muddy edges of shallow fresh or brackish wetlands with inundated or emergent low vegetation.	**Likely**	Recent records in the onshore study area and suitable habitat present in the onshore CIA.
Swinhoe's Snipe	*Gallinago megala*	0	-	PMST	Rare, non-breeding summer migrant to northern Australia.	**May**	No historical records in the onshore study area but suitable habitat present in the onshore CIA. Species rarely recorded in southern Victoria.
White-throated Needletail	*Hirundapus caudacutus*	10	2019	VBA, PMST	Almost exclusively aerial within Australia, occurring over most types of habitat, particularly wooded areas. Less often seen over open farm paddocks but has been recorded in vineyards flying between the rows of trees.	**Likely**	Recent records in the onshore study area and species likely to use the airspace of the onshore CIA.

Common name	Scientific name	Count	Last record	Source	Areas of potential habitat	Likelihood of occurrence	Justification
White-winged Black Tern	*Chlidonias leucopterus*	3	1998	VBA	Coastal areas and large inland wetlands and rivers. Seasonal migrant to Australia. Uses coastal, subcoastal and terrestrial wetlands including bays, estuaries, swamps and floodplains. Most Victorian records are from Gippsland Lakes and western shoreline of Port Phillip Bay.	**May**	Historical records in the onshore study area and suitable habitat present in the onshore CIA.
Yellow Wagtail	*Motacilla flava*	0	-	PMST	Migrates from northern hemisphere. Uses open grassy and waterside habitats in wintering grounds, occasionally in Australia, and in migration. Breeds on Arctic tundra from Alaska to Russia. Ground-dwelling. Often seen near water. Rarely sighted in Australia; most sightings in coastal and northern Australia.	**Unlikely**	No historical records and species rarely recorded in Victoria or Australia.

Appendix E

Summary of aquatic habitat conditions at rapid site assessment locations

Table E.3 Summary of aquatic ecology habitat assessment

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM1	-38.416619° 147.083680°		Shallow channel beneath bridge. Approximately 6m wide. High vegetation cover encroaching channel with no indication of eroding banks. Land use upstream of site is grazing. Silty substrate and unknown flow characteristics.	N	N – Terrestrial vegetation succession apparent indicating site has been dry for a prolonged period.
BM2	-38.414016° 147.082910°		Shallow channel beneath bridge. Two isolated pools approximately 8 m long/wide. High vegetation cover at site with patches of *Phragmites sp.* Pool choked with *Azolla sp.* No indication of eroding banks. Land use upstream of site is grazing. Silty substrate with boulders under bridge and unknown flow characteristics.	Y	N – Pools too small to support threatened species for prolonged periods. Potential to act as refugia for short term.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM3	-38.411613° 147.083387°		Channel morphology unknown. Likely to be shallow (<1 m) with bank width of approximately 6 m. Likely to have high erosion due to livestock access. Riparian extent scattered with native vegetation. Likely to have silty substrate with minimal instream habitat suck as logs, aquatic vegetation and rocks. Unknown flow characteristics.	N	N – Dry.
BM4	-38.443079° 147.066613°		Likely to be a narrow rivulet during high flows but mostly dry throughout the year. Silty substrate with no riparian or aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Dry.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM5	-38.437431° 147.114603°		Wetland/saltmarsh habitat with low riparian canopy cover. Likely to support shallow wide pools with emergent vegetation during high flows. Substrate consisting of sand and silt. Erosion likely upstream of site due to livestock access. Logs and complex habitat structure from macrophytes evident. Unlikely to support riffles or runs.	N	N – Dry.
BM6	-38.436821° 147.114373°		Wetland/saltmarsh habitat with low riparian canopy cover (isolated shrubs, high ground cover). Likely to support shallow wide pools with emergent vegetation during high flows. Substrate consisting of sand and silt. Erosion likely upstream of site due to livestock access. Logs and complex habitat structure from macrophytes evident. Unlikely to support riffles or runs.	N	N – Dry.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM7	-38.436224° 147.115110°		Wetland/saltmarsh habitat with low riparian canopy cover (isolated shrubs, high ground cover). Likely to support shallow wide pools with emergent vegetation (choked with *Phragmites sp*.) during high flows. Channel likely to be 6-8 m wide during high flows. Substrate consisting of sand and silt. Erosion likely upstream of site due to livestock access. Logs and complex habitat structure from macrophytes evident. Unlikely to support riffles or runs.	N	N – Dry.
BM8	-38.435448° 147.116623°		Wetland/saltmarsh habitat with low riparian canopy cover (scattered shrubs, high ground cover). Two remnant pools approximately 3m deep. Channel likely to be 6-8m wide during high flows. Saltmarsh vegetation and high in algae. Sand and silt substrate with complex habitat structure created by logs and macrophytes. Macroinvertebrates and small fish observed at pool margins.	Y	N – Isolated pools. EC too high.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM9	-38.435001° 147.117589°		Wetland/saltmarsh habitat with low riparian canopy cover (isolated shrubs, high ground cover). Unknown channel depth. Channel likely to be 6-8 m wide during high flows. Likely to consist of sand and silt substrate with minimal complex habitat structure created by logs and macrophytes. Banks likely to be eroded due to livestock access. Likely to consist of runs and pools.	Y	N – Single large, isolated pool.
BM10	-38.424894° 147.129545°		Inlet to sea with stream widths between 50-80 m. Braiding evident. Sandbar approximately 150 m blocking access to coastal waters. Erosion evident on sandy banks. No riparian canopy cover. Scattered shrubs and high ground cover present. Algal bloom observed. High in snags and coarse particulate organic matter. High erosion upstream due to grazing further upstream. Flow characteristics consist of pools.	Y	N – Outflow from lake Denison.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM11	-38.410703° 147.065178°		Likely to be a narrow rivulet during high flows but mostly dry throughout the year. Silty substrate with no riparian or aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	Y	N – Receding pool.
BM12	-38.390863° 147.026707°		Culvert approximately 4m wide. Substrate consisting of silt and sand. Minimal erosion evident upstream of crossing. Downstream of crossing enters grazing land which may experience erosion due to livestock access. Narrow band of riparian vegetation with pine plantation upstream. High in snags and coarse particulate organic matter. Flow characteristics likely to consist mostly of pools	N	N – Dry.
BM13	-38.394890° 147.084491°		Likely to be a narrow rivulet during high flows but mostly dry throughout the year. Silty substrate with narrow band of riparian vegetation. No aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Dry.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM14	-38.390508° 147.085338°		Likely to be a narrow rivulet during high flows but mostly dry throughout the year. Silty substrate with narrow band of riparian vegetation. No aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Dry.
BM15	-38.383484° 147.089271°		Likely to be a narrow rivulet during high flows leading into farm dam. Silty substrate with no riparian or aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Channel leading to farm dam dry.
BM16	-38.384159° 147.094904°		Likely to be a narrow rivulet during high flows leading into farm dam. Silty substrate with no riparian or aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Dry.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM17	-38.399804° 147.102702°		Likely to be a narrow rivulet during high flows leading into farm dam. Silty substrate with no aquatic vegetation. Some riparian vegetation on roadside. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Channel leading to farm dam dry.
BM18	-38.405377° 147.112281°		Likely to be a narrow rivulet during high flows but mostly dry throughout the year. Silty substrate with no riparian or aquatic vegetation. No instream habitat features. Highly eroded due to livestock access. Unlikely to support pools, riffle or runs.	N	N – Channel leading to farm dam dry.
BM19	-38.369896° 147.090436°		Crossing approximately 4 m wide. Substrate consisting of silt and sand. Minimal erosion evident upstream of crossing. Downstream of crossing enters grazing land which may experience erosion due to livestock access. Narrow band of riparian vegetation with pine plantation upstream. No aquatic plants, snags or nogs evident. Flow characteristics likely to consist mostly of pools.	N	N – Dry.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM20	-38.357145° 147.092354°		Culvert approximately 4m wide. Substrate consisting of silt and sand. Minimal erosion evident upstream of crossing. Downstream of crossing enters grazing land which may experience erosion due to livestock access. Narrow band of riparian vegetation with pine plantation upstream. High in snags and coarse particulate organic matter. Flow characteristics likely to consist mostly of pools.	N	N – Dry.
BM21	-38.415120° 147.084084°		Channel width estimated between 4-20 m during high flows. Substrate consisting of sand and silt. Low erosion at site with continuous canopy cover. High in shrub and groundcover density. Encroaching terrestrial vegetation. Snags, logs and coarse particulate organic matter present. Remnant pool depleted with crayfish mounds indicating some moisture still available.	N	N – Dry.

Site name	Coordinates (Lat, Long)	Photo	Habitat description	Water present (Y/N)	Evidence of threatened aquatic species (Y/N)
BM22 – Reference habitat Merriman Creek (outside onshore CIA)	-38.329621° 147.106391°		Stream width approximately 4 m wide with pools and riffles. Approximately 1 m deep. High riparian canopy cover with dense shrubs and ground cover. Snags, logs and coarse particulate organic matter evident. Substrate mixed but predominantly sand. Aquatic vegetation present (*Phragmites sp. Vallisneria sp*.). No erosion evident on banks. Sections of bank with invasive Blackberry.	Y	Y – Pools and riffles with riparian vegetation present.

Appendix F

Preliminary assessment of the potential for the Project to contribute to EPBC Act and FFG Act threatening processes

Table F.4 Preliminary assessment of the Project's potential to contribute to key threatening processes under the EPBC Act

Key EPBC Act threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute to threatening processes
Aggressive exclusion of birds from potential woodland and forest habitat by over-abundant noisy miners (*Manorina melanocephala*).	Although not recorded during the rapid site assessment, Noisy Miners are likely to occur in the onshore CIA.	No – The Project is not expected to increase Noisy Miner populations within the onshore CIA. Areas of habitat for most birds that could be impacted by Noisy Miners (i.e., extensive forest/woodlands) are expected to be avoided by the Project. If required, management measures including pest plants and animal controls will reduce the risk.
Competition and land degradation by feral goats.	It is unlikely that feral goats are present in the onshore CIA.	No – The Project is not expected to increase or introduce feral goat populations within the onshore CIA. If required, management measures including pest plants and animal controls will reduce the risk.
Competition and land degradation by feral rabbits.	Rabbits were confirmed present in the onshore CIA during the rapid site assessment and evidence of existing disturbance was observed.	No – The Project is not expected to increase rabbit populations within the onshore CIA. If required, management measures including pest plants and animal controls will reduce the risk.
Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*).	*Phytophthora cinnamomi* - commonly known as cinnamon fungus or dieback - is present in Gippsland, particularly in its coastal forests.	**Yes** – However management measures such as the washing of plant and other equipment used during construction will reduce the risk of *Phytophthora cinnamomi* spread.
Fire regimes that cause declines in biodiversity.	Some high valued areas of vegetation and habitat (terrestrial and aquatic) identified for Victorian fauna within the onshore CIA.	No – Construction and operation of the Project not expected to alter the frequency of fires. The onshore CIA is largely cleared of vegetation in many areas. Fire risks will be managed during construction and operation.
Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South.	Not applicable	No
Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations.	Not applicable	No
Infection of amphibians with chytrid fungus resulting in chytridiomycosis.	Chytrid fungus has been detected in Gippsland, and amphibians including frogs known in the onshore CIA.	**Yes** – However, management measures such as washing of plant and vehicles would be used during construction to reduce risks associated with spread of Chytrid fungus.
Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris.	Not applicable – this assessment focuses on onshore areas	No

Key EPBC Act threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute to threatening processes
Invasion of northern Australia by Gamba Grass and other introduced grasses	Not applicable - Gamba Grass (*Andropogon gayanus*) is not currently found in Gippsland. It is a highly invasive tropical grass that has become a major environmental weed in northern Australia.	No
Land clearance.	Areas of native vegetation occur within the onshore CIA, including some high value areas of habitat (terrestrial and aquatic) identified for Victorian flora and fauna within the onshore CIA.	**Yes** – Potential for the loss of further habitat due to factors such as vegetation clearing during construction.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.	Some high valued areas of habitat (terrestrial and aquatic) identified for Victorian flora and fauna within the onshore CIA.	No – Management measures such as the washing of plant and other equipment, and pest plants and animal controls will reduce the risk.
Loss of biodiversity and ecosystem integrity following invasion by the Yellow Crazy Ant (*Anoplolepis gracilipes*) on Christmas Island, Indian Ocean.	Not applicable – outside onshore CIA.	No
Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases.	Some emission of greenhouses gases will occur during the construction of the Project through the use of plant and other equipment. During operation, the Project would contribute to reducing greenhouse gases using wind power.	No – The terrestrial environment is already disturbed by agricultural and urban land uses. A terrestrial climatic habitat refers to a land-based environment shaped primarily by its climate conditions, which in turn influence the types of organisms that can live there. The Project is not expected to alter any climatic habitat within the onshore CIA.
Novel biota and their impact on biodiversity.	Some high valued areas of habitat (terrestrial and aquatic) and biodiversity values within the onshore CIA.	No – Management measures such as the washing of plant and other equipment, and pest plants and animal controls will reduce the risk.
Predation by exotic rats on Australian offshore islands of less than 1000 km^2 (100,000 ha).	Not applicable – outside onshore CIA.	No
Predation by feral cats.	Feral cats are likely already present in the onshore CIA.	No – The Project is not expected to increase the predation of native wildlife by cats. Management measures including pest plants and animal controls will reduce the risk including actions such as maintain a clean works area free of litter and waste that may attract cats to construction areas.
Predation by the European red fox (*Vulpes vulpes*).	Evidence of the introduced Red Fox (scats) was recorded during the rapid site assessment in the onshore CIA.	No – The Project is not expected to increase the predation of native wildlife by the introduced Red Fox. Management measures including pest plants and animal controls will reduce the risk including actions such as maintain a clean works area free of litter and waste that may attract cats to construction areas.

Key EPBC Act threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute to threatening processes
Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs.	Feral pigs may be present in the onshore CIA (but no records within 10 km in the VBA).	No – The Project is not expected to increase the feral pig population. Management measures including pest plants and animal controls will reduce the risk.
Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species.	Spread through feather dust, droppings, saliva, and contaminated surfaces. Importantly, it can survive for months or years in nest hollows, aviaries, or on equipment and can be spread by direct contact or indirectly via contaminated objects.	No – Management measures such as the washing of plant and other equipment will reduce the risk.
The biological effects, including lethal toxic ingestion, caused by Cane Toads (*Bufo marinus*).	Not applicable - mostly confined to northern and eastern Australia, with their southernmost populations reaching northern New South Wales. Gippsland's cooler, temperate climate is not ideal for cane toads, which prefer warm, humid environments.	No
The reduction in the biodiversity of Australian native fauna and flora due to the red imported fire ant, *Solenopsis invicta* (fire ant).	Not applicable - known distribution in Australia is restricted to parts of southeast Queensland, especially around Brisbane.	No

Table F.5 Preliminary assessment of the Project's potential to contribute to processes identified as potentially threatening under the FFG Act

FFG Act potentially threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute FFG Act threatening processes
Alteration to the natural flow regimes of rivers and streams.	Lotic (i.e., flowing) waterways present in the onshore CIA.	No – Trenchless construction preferred option at environmentally sensitive locations such as waterway crossings so no structures (e.g., cofferdams) required that would alter natural flows. All waterways highly intermittent and already altered due to presence of farm dams on drainage lines.
Alteration to the natural temperature regimes of rivers and streams.	Lotic (i.e., flowing) waterways present in the onshore CIA.	No – Existing waterways currently in poor to moderate condition within the onshore CIA due to agricultural and urban land use pressures. Minimal shading in many waterway reaches due to historical clearance of riparian vegetation.
Collection of native orchids.	Native orchids are likely to be present in the onshore CIA.	**Yes** – Potential for the loss of native orchids particularly if remnant patches of native vegetation cannot be avoided.
Degradation and loss of habitats caused by feral horses (*Equus caballus*).	Not applicable - feral horses are not present in onshore CIA.	No
Degradation of native riparian vegetation along Victorian rivers and streams.	Lotic (i.e., flowing) waterways present in the onshore CIA with native riparian vegetation along some reaches.	**Yes** – Potential for the loss of further native riparian vegetation depending on final alignment.
Habitat fragmentation as a threatening process for fauna in Victoria.	Some high valued areas of habitat (terrestrial and aquatic) identified for Victorian fauna within the onshore CIA.	**Yes** – Potential for the loss of further habitat due to factors such as vegetation clearing during construction leading to fragmentation of fauna habitat.
High frequency fire resulting in disruption of life cycle processes in plants and animals and loss of vegetation structure and composition.	Some high valued areas of vegetation and habitat (terrestrial and aquatic) identified for Victorian fauna within the onshore CIA.	No – Construction and operation of the Project not expected to alter the frequency of fires. The onshore CIA largely cleared of vegetation in many areas. Fire risks will be managed during construction and operation.
Human activity which results in artificially elevated or epidemic levels of Myrtle Wilt within Nothofagus-dominated Cool Temperate Rainforest.	Not applicable – cool temperate rainforest (EVC 31) not modelled in the onshore CIA and was not observed during the site assessment	No
Inappropriate fire regimes causing disruption to sustainable ecosystem processes and resultant loss of biodiversity.	Some high valued areas of vegetation and habitat (terrestrial and aquatic) identified for Victorian fauna within the onshore CIA.	No – Construction and operation of the Project not expected to alter the frequency of fires. The onshore CIA largely cleared of vegetation in many areas. Fire risks will be managed during construction and operation.
Incidental catch (or bycatch) of seabirds during longline fishing operations.	Not applicable to the onshore CIA.	No

FFG Act potentially threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute FFG Act threatening processes
Increase in sediment input into Victorian rivers and streams due to human activities.	Lotic (i.e., flowing) waterways present in the onshore CIA and construction works likely to occur in near or adjacent areas.	No – Management measures such as sediment and erosion controls would be used during construction to limit the input of sediment to waterways. No additional sediment inputs expected during operation. The waterways already flow through a highly modified agriculture landscape with high sediment inputs due to issues such as a lack of riparian vegetation and cattle access.
Infection of amphibians with Chytrid fungus, resulting in chytridiomycosis.	Chytrid fungus has been detected in Gippsland, and amphibians including frogs known in the onshore CIA.	No – Management measures such as washing of plant and vehicles would be used during construction to reduce risks associated with spread of Chytrid fungus.
Input of organotins to Victorian marine and estuarine waters.	Organotins have been widely used in industry including as biocides (e.g., antifouling paints to prevent marine growth) and agriculture (e.g., fungicides). It is not currently known if they will be used as a biocide in onshore areas, or if they have previously been used for agricultural purposes.	To be confirmed – if organotins are planned to be used in onshore areas during construction there may be potential for the Project to contribute to this threatening process.
Input of petroleum and related products into Victorian marine and estuarine environments.	The refuelling and maintenance of plant and other equipment will be required during construction of the Project.	No – Management measures such as refuelling away from waterways in bunded area will reduce the risk of the inputs of fuels and related products into waterways.
Input of toxic substances into Victorian rivers and streams.	Toxic substances (e.g., chemicals and other potential contaminants) will likely be required during construction of the Project.	No – Management measures such as proper handling and storage will reduce the risk of the inputs of toxic substances into waterways.
Introduction and spread of *Spartina* to Victorian estuarine environments.	*Spartina* sp. is present in Gippsland, particularly in the Corner Inlet Ramsar site, where it's considered a serious environmental threat.	No – Management measures such as the washing of plant and other equipment will reduce the risk of Spartina spread into waterways.
Introduction of live fish into waters outside their natural range within a Victorian river catchment after 1770.	Not applicable – the transport or introduction of fish will not occur during construction or operation of the Project.	No
Invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg.	Blackberries are already present throughout Gippsland and the onshore CIA.	**Yes** – However management measures such as the washing of plant and other equipment used during construction will reduce the risk of Blackberry spread.
Invasion of native vegetation by 'environmental weeds'.	Several environmental weeds are already present throughout Gippsland and the onshore CIA.	**Yes** – However management measures such as the washing of plant and other equipment during construction will reduce the risk of the spread of environmental weeds.
Invasion of native vegetation communities by Tall Wheat-grass *Lophopyrum ponticum*.	Tall Wheat-grass are already present throughout Gippsland.	No - Management measures such as the washing of plant and other equipment will reduce the risk of Tall Wheat-grass spread.

FFG Act potentially threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute FFG Act threatening processes
Loss of biodiversity as a result of the spread of Coast Wattle (*Acacia longifolia* subsp. *sophorae*) and Sallow Wattle (*Acacia longifolia* subsp. *longifolia*) into areas outside its natural range.	Coast Wattle is locally indigenous in Gippsland, but Sallow Wattle is only considered indigenous in East Gippsland.	No - Coast Wattle is already present throughout Gippsland so there is no risk of spread into areas outside its natural range. Management measures such as the washing of plant and other equipment will reduce the risk of Sallow Wattle spread.
Loss of biodiversity in native ant populations and potential ecosystem integrity following invasion by Argentine Ants (*Linepithema humile*).	Argentine Ants are known to already occur in Gippsland.	No – Management measures including pest plants and animal controls will reduce the risk of invasion by Argentine Ants. The species is already known to occur in Gippsland.
Loss of coarse woody debris from Victorian native forests and woodlands.	Native forest and woodlands that contain coarse woody debris occur within the onshore CIA.	**Yes** – Coarse woody debris may need to be removed from forest/woodlands to facilitate project construction. However, the location of the transmission alignment and other project infrastructure are expected to avoid native forests and woodlands that contain coarse woody debris as far as reasonably practicable, with most (if not all) coarse woody debris expected to be retained on site.
Loss of hollow-bearing trees from Victorian native forests.	Native forests that contain coarse hollow-bearing trees occur within the onshore CIA.	**Yes** – Hollow-bearing trees may need to be removed from forests to facilitate project construction. However, BMN has committed to designing the onshore cable construction corridor and methods to avoid native forests that contain hollow-bearing trees as far as reasonably practicable, with most (if not all) hollow-bearing trees expected to be retained on site. Pending the results of detailed site assessments and the refinement of the onshore cable construction corridor and methods, hollow-bearing trees will be identified for protections.
Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases.	Some emission of greenhouses gases will occur during the construction of the Project through the use of plant and other equipment. During operation, the Project would contribute to reducing greenhouse gases using wind power.	No – The terrestrial environment is already disturbed by agricultural and urban land uses. A terrestrial climatic habitat refers to a land-based environment shaped primarily by its climate conditions, which in turn influence the types of organisms that can live there. The Project is not expected to alter any climatic habitat within the onshore CIA.
Poisoning of native wildlife by anticoagulant rodenticides.	Rodents and other native fauna that may consume rodenticides (including those that may be exposed second-hand, i.e., owls) are likely to be present in the onshore CIA.	No – anticoagulant rodenticides are unlikely to be deployed for the Project. If rodenticides are required, they should be deployed carefully within enclosed bait stations and products used should be wildlife friendly.

FFG Act potentially threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute FFG Act threatening processes
Predation of native wildlife by the cat, *Felis catus*.	Feral cats are likely already present in the onshore CIA.	No – The Project is not expected to increase the predation of native wildlife by cats. Management measures including pest plants and animal controls will reduce the risk including actions such as maintain a clean works area free of litter and waste that may attract cats to construction areas.
Predation of native wildlife by the introduced Red Fox *Vulpes vulpes*.	Evidence of the introduced Red Fox (scats) was recorded during the rapid site assessment in the onshore CIA.	No – The Project is not expected to increase the predation of native wildlife by the introduced Red Fox. Management measures including pest plants and animal controls will reduce the risk including actions such as maintain a clean works area free of litter and waste that may attract cats to construction areas.
Prevention of passage of aquatic biota as a result of the presence of instream structures.	Lotic (i.e., flowing) waterways present in the onshore CIA.	No – Trenchless construction preferred option at environmentally sensitive locations such as waterway crossings so no structures (e.g., cofferdams) required that would alter natural flows or create barriers.
Reduction in biodiversity of native vegetation by Sambar (*Cervus unicolor*).	Sambar are well established in Gippsland and may be present in the onshore CIA.	No – The Project is not expected to result in a reduction of biodiversity due to Sambar populations within the onshore CIA. Areas of biodiversity that could be impacted by Sambar (i.e., extensive forest/woodlands) are expected to be avoided by the Project. If required, management measures including pest plants and animal controls will reduce the risk.
Reduction in biodiversity resulting from Noisy Miner (*Manorina melanocephala*) populations in Victoria.	Although not recorded during the rapid site assessment, Noisy Miners are likely to occur in the onshore CIA.	No – The Project is not expected to result in a reduction of biodiversity due to an increase in Noisy Miner populations within the onshore CIA. Areas of biodiversity that could be impacted by Noisy Miners (i.e., extensive forest/woodlands) are expected to be avoided by the Project. If required, management measures including pest plants and animal controls will reduce the risk.
Reduction in biomass and biodiversity of native vegetation through grazing by the Rabbit *Oryctolagus cuniculus*.	Rabbits were confirmed present in the onshore CIA during the rapid site assessment.	No – The Project is not expected to increase rabbit populations within the onshore CIA. If required, management measures including pest plants and animal controls will reduce the risk.
Removal of wood debris from Victorian streams.	Lotic (i.e., flowing) waterways present in the onshore CIA, with woody debris providing habitat in some reaches.	No – Trenchless construction preferred option at environmentally sensitive locations such as waterway crossings so no removal of woody debris from stream is required.
Soil and vegetation disturbance resulting from marble mining.	Not applicable	No

FFG Act potentially threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute FFG Act threatening processes
Soil degradation and reduction of biodiversity through browsing and competition by feral goats (*Capra hircus*).	It is unlikely that feral goats are present in the onshore CIA.	No – The Project is not expected to increase or introduce feral goat populations within the onshore CIA. If required, management measures including pest plants and animal controls will reduce the risk.
Soil erosion and vegetation damage and disturbance in the alpine regions of Victoria caused by cattle grazing.	Not applicable	No
Spread of *Pittosporum undulatum* in areas outside its natural distribution.	While *Pittosporum undulatum* is native to parts of East Gippsland, it has become a highly invasive environmental weed across much of the region, including South Gippsland.	No – The Project is not expected to spread *Pittosporum undulatum* outside its natural distribution given it is already present throughout South Gippsland. Management measures such as the washing of plant and other equipment will reduce the risk of Sallow Wattle spread.
The discharge of human-generated marine debris into Victorian marine or estuarine waters.	No applicable – although the Project will involve offshore construction activities, debris is not expected to reach estuarine waters. The intermittent closure of the estuary mouths would also reduce risk of debris entering onshore areas.	No
The introduction and spread of the Large Earth Bumblebee *Bombus terrestris* into Victorian terrestrial environments.	Not applicable – the species is not currently established in Gippsland or anywhere on mainland Australia.	No
The introduction of exotic organisms into Victorian marine waters.	Lotic (i.e., flowing) waterways present in the onshore CIA, that connect to the ocean when estuary mouths are open.	No – If required, management measures including pest plants and animal controls will reduce the risk of exotic organisms reaching the ocean. Management measures such as the washing of plant and other equipment will reduce the risk.
The spread of *Phytophthora cinnamomi* from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority.	*Phytophthora cinnamomic* - commonly known as cinnamon fungus or dieback - is present in Gippsland, particularly in its coastal forests.	**Yes** – However management measures such as the washing of plant and other equipment used during construction will reduce the risk of *Phytophthora cinnamomi* spread.
Threats to native flora and fauna arising from the use by the feral honeybee *Apis mellifera* of nesting hollows and floral resources.	Not applicable – feral honeybees will not be used as part of the Project.	No
Use of Phytophthora-infected gravel in construction of roads, bridges and reservoirs.	The Project may require gravel during construction for components such as minor upgrades to local roads and the construction of trenchless construction work site.	No – Gravel will be sourced from certified Phytophthora-free suppliers or sterilised prior to use (e.g. heat treatment or chemical disinfection). Management measures such as the washing of plant and other equipment will reduce the risk.

FFG Act potentially threatening process	Relevance to onshore cable investigation area	Potential for the Project to contribute FFG Act threatening processes
Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.	Several wetlands and other waterways are present within the onshore CIA.	No – Trenchless construction preferred option at environmentally sensitive locations such as waterway crossings so there will be no alteration to natural flows. The alignment will also aim to avoid wetland areas.

ghd.com

The Power of Commitment