

HIGH SEA WIND

EES Referral Preliminary Ecological Assessment



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REPORT

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31 July 2026

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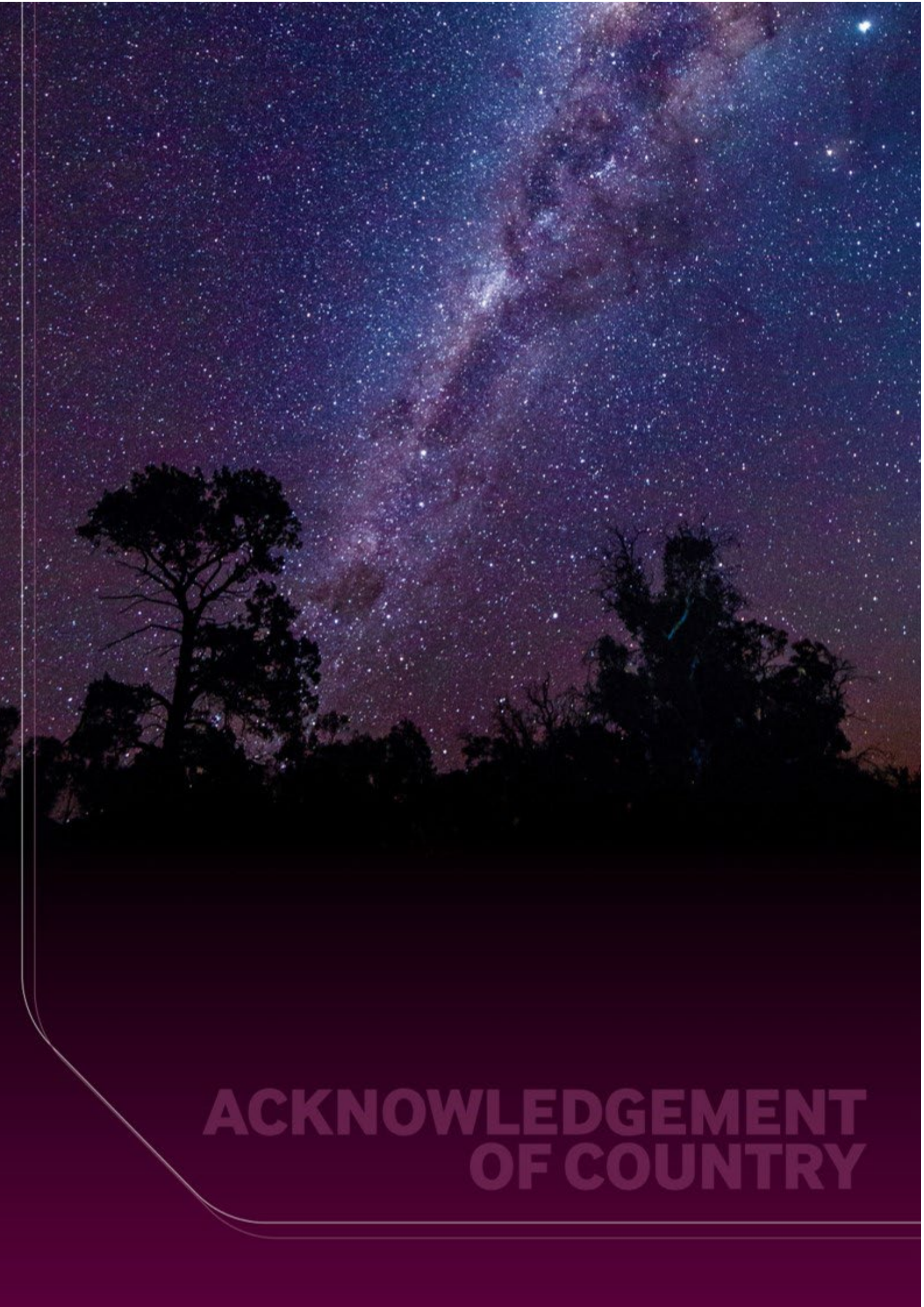
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ACKNOWLEDGEMENT OF COUNTRY

EXECUTIVE SUMMARY

In April 2024, Ocean Winds (a joint venture between EDP Renewables and ENGIE) was granted a feasibility licence by the Australian Government for around 150 km² in Commonwealth waters off Gippsland, Victoria to investigate development of a bottom-fixed offshore wind farm. The project, High Sea Wind is being proposed to deliver utility-scale generation capacity to Victoria. The project is being developed by High Sea Wind Pty Ltd, the local project delivery company for Ocean Winds.

The project is proposed in the Gippsland region in south-east Victoria. High Sea Wind includes an offshore wind farm in the Commonwealth marine area and associated transmission infrastructure spanning Victorian land and Victorian coastal waters.

A referral will be made for assessment under the *Environment Effects Act 1978* (Vic) for the transmission aspect of the High Sea Wind project, located in Victoria – High Sea Wind Transmission. It comprises the transmission infrastructure, in Victorian coastal waters and onshore, to VicGrid's onshore connection hub at Giffard and a shore crossing at McGaurans Beach.

This report provides a desktop assessment of the potential significant ecological effects of High Sea Wind Transmission to support the referral. The nearshore transmission investigation area (nearshore TIA) is located within the Gippsland Basin extending from the Victorian coastal waters' boundary to the mean high water and includes export cables and trenchless shore crossing, covering an area of 60.9 km². The onshore transmission investigation area (onshore TIA) includes onshore transition joint bays and onshore buried transmission cables connecting between the shoreline and VicGrids proposed terminal location at Giffard and covers an area of 73.15 km².

The land use across the onshore TIA is predominantly agriculture and forestry. The onshore TIA and nearshore TIA contain some interspersed areas of bushland and native vegetation, and coastal values containing ecological values. The project will aim to avoid or minimise impacts on these values during route selection and detailed design.

Key ecological values

The following key ecological values have been identified as being known or having the potential to occur within the onshore and nearshore TIA during the desktop assessment.

Native vegetation

The onshore investigation area is predominantly cleared coastal and agricultural land with some areas of bushland and coastal reserves. Approximately 587 hectares (ha) of native vegetation is modelled to occur within the onshore investigation area, comprising eight ecological vegetation classes (EVCs), the majority being Lowland Forest/Heathy Woodland Mosaic, Lowland Forest and Estuarine Wetland. This vegetation exists mainly along road reserves and in isolated patches.

Threatened ecological communities

One threatened ecological community (TEC) listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act) is modelled to occur within the southern portion of the onshore investigation area; the Coastal Moonah (*Melaleuca lanceolata* subsp. *Lanceolata*).

Threatened and migratory species

The desktop assessment identified 32 threatened terrestrial flora species and 51 threatened terrestrial fauna species under the FFG Act known or possible to occur within the referral area. Terrestrial fauna species include terrestrial birds, shorebirds, waterbirds, mammals, reptiles, fish and frogs. Habitats for threatened flora species include road reserves, wetlands and waterways. Habitats for threatened fauna species comprise woodlands, grasslands, coastal dunes and vegetation, and wetlands and waterways.

Desktop assessment identified 14 threatened marine fauna species under the FFG Act known or possible to occur within the referral area, including fish and sharks, marine mammals, marine turtles and seabirds. The nearshore investigation area is located within the South-East Marine Region which supports a wide array of marine species.

Wetlands and waterways

There are two Ramsar wetlands present within the region, however these are not located within the referral area. These are the Gippsland Lakes Ramsar site (approximately 8 kilometres from the investigation area) and the Corner Inlet Ramsar Site (approximately 5 kilometres from the investigation area).

There are no Nationally Important Wetlands within the referral area.

There are a number of State wetlands within the onshore referral area, as well as the presence of ephemeral waterways and estuarine systems.

Potential impacts

The potential effects of project activities onshore and within Victorian state waters on terrestrial and marine environmental values were assessed against the EES referral criteria in the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (8th edition, DTP 2023a).

A range of ecological values were confirmed as known or possibly occurring within the referral area. These values are mostly located within discrete areas such as within bushland reserves, coastal reserves, estuaries and waterways, and along road reserves.

As the majority of the onshore investigation area is highly modified in nature, with ecological values interspersed in discrete locations, there is scope for Ocean Winds to strategically avoid and minimise most impacts to ecological values during the route selection and detailed design phase of the project. With appropriate mitigation measures implemented to further reduce potential effects during construction and operation, the project can avoid significant effects on Victorian environmental matters and is unlikely to exceed the EES referral criteria described in the Ministerial Guidelines under the EE Act.

Recommendations

It is recommended that a range of mitigation measures are incorporated during construction and operation of the project. The project will incorporate the findings of the preliminary ecological assessment (this report) to inform the siting of project infrastructure, project design and selection of appropriate construction methods, with the aim to avoid and minimise effects to onshore and nearshore ecological values.

Key areas to avoid impacts on within the referral area include:

- Darriman H29 Reserve
- McLoughlins Beach – Seaspray Coastal Reserve
- Lake Denison and its associated estuarine habitats
- mapped current wetlands and high value waterways (e.g. Ramsar sites)
- areas of native vegetation on roadside reserves
- marine key ecological features and high-profile reef.

Once the location of project infrastructure is known, a more detailed desktop and site assessment would be undertaken for the project, including targeted surveys and cable burial risk assessment. The outcomes of detailed desktop and site assessment will be used to further refine project design, project planning and approvals, and construction detail, where appropriate. The outcomes may inform:

- detailed siting of project infrastructure
- selection of appropriate construction methods
- timing of construction activities
- likely requirements for project planning approvals and permits, including offsets or compensation requirements.

Details of mitigation measures will 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.

GLOSSARY

Term	Definition
Bioregion	A large area that has similar types of plants, animals and ocean conditions within its boundaries, but different from other similarly sized areas. Australia's bioregions are classified into 89 distinct regions based on shared natural features and ecosystems.
Gippsland Shoreline Renewable Energy Zone (GREZ)	A designated area in Gippsland, Victoria, for facilitating the development of offshore wind energy projects. The area focuses on underground cables connecting the offshore wind farms to the grid. The zone includes four specific shoreline crossing areas, where wind farm developers must locate their cables.
Key Ecological Feature (KEF)	Victoria's key ecological features (KEF) are areas of high ecological significance, encompassing rare, unique, or critical habitats that support biodiversity, ecosystem function and species life-history stages. Victoria's KEFs are identified through a science-based framework that prioritises ecologically significant areas within and adjoining Victorian coastal waters.
Mean high water	The arithmetic mean of the heights of all high waters observed over a defined tidal epoch and is the tidal datum used to define the seaward limit of landward coastal jurisdiction. It is the elevation from which measurements of the coastal waters boundary and shore-crossing interfaces are to be taken.
Nearshore cable investigation area (Victorian coastal waters)	The portion of the offshore transmission investigation area within Victorian coastal waters (Mean High Water to the coastal waters boundary at 3 nautical miles), including the nearshore elements of the shore-crossing elements (punch-outs). The Victorian Sector comprises nearshore routing and the marine works required to transition export cables from the marine domain to the shore-crossing interface. The nearshore export cable corridors and the nearshore export cable route will be refined through detailed design and will be contained within the nearshore cable investigation area.
Offshore export cable investigation area (Commonwealth waters)	The offshore export cable investigation area located in Commonwealth waters, extending from the seaward boundary of the offshore wind farm area to the Victorian coastal waters boundary (3 nautical miles). This investigation area is the planning envelope within which offshore export cable routing, route surveys, seabed investigations and cable installation activities in Commonwealth waters would be undertaken.
Onshore transmission investigation area	The system of electrical and associated infrastructure located within the Draft Gippsland Shoreline Renewable Energy Zone (GSREZ), extending from the mean high water mark to the proposed VicGrid onshore connection hub, that would connect High Sea Wind to the National Electricity Network (NEM).
Offshore wind farm area	The spatial area (approximately 150 km ² in extent) in Commonwealth waters off Victoria within which the turbines, foundations, inter-array and inter-connector cabling for High Sea Wind would be sited, installed and operated. The offshore wind farm area is the same extent as the awarded feasibility licence area.
Proponent	Ocean Winds (a joint venture between EDP Renewables and ENGIE)
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. 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, of which there are 66 Ramsar sites in Australia.
Referral area	The geographic area which is the subject of the EES referral. It includes Victorian land and waters.
Study area	The geographic extent of database searches, comprising the referral area plus a 10 kilometre buffer.
Threatened species (listed species)	Threatened species refers to species considered threatened in Victoria, for the purpose of this report. This includes species that are listed as Vulnerable,

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Term	Definition
	Endangered, or Critically Endangered in Victoria under the Victorian <i>Flora and Fauna Guarantee Act 1988</i> (FFG Act).
The project	High Sea Winds Offshore Wind Farm Project
VicGrid	Victoria's state authority responsible for planning and developing the electricity transmission network and renewable energy zones to support the state's energy transition. VicGrid are responsible for the development of the shared connection hub at Giffard for offshore wind connection into the National Electricity Market (NEM).
Victorian Biodiversity Atlas	The Victorian Biodiversity Atlas (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 non-vertebrate animals, fungi, vascular and non-vascular plants from terrestrial and aquatic environment, including marine waters to the three nautical mile statutory limit.

ABBREVIATIONS

Abbreviation	Definition
BIA	Biological important area
DEECA	Department of Environment Energy and Climate Action (Victoria)
DELWP	Department of Environment Land Water and Planning (Victoria) (now DTP/DEECA)
DTP	Department of Transport and Planning (Victoria)
EE Act	<i>Environmental Effects Act 1978</i>
EES	Environmental effects statement
EPBC Act	<i>Environment Protection Biodiversity and Conservation Act 1999</i>
EVC	Ecological Vegetation Class
FeAST	Feature activity sensitivity tool
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
FLA	Feasibility licence area
GW	Gigawatt
GSREZ	Gippsland shoreline renewable energy zone
ha	Hectare
HSW	High Sea Wind
KEF	Key Ecological Feature (Victoria)
km	Kilometre
kV	Kilovolt
LGA	Local government area
m	Metre
MHW	Mean high water
MNES	Matter of national environmental significance
NEM	National electricity market
NM	Nautical miles
OWFA	Offshore wind farm area
PMST	Protected matters search tool
TEC	Threatened ecological community
TIA	Transmission investigation area
TSB	Territorial sea baseline
VBA	Victorian Biodiversity Atlas

1 INTRODUCTION

1.1 Overview

In April 2024, Ocean Winds (a joint venture between EDP Renewables and ENGIE) was granted a feasibility licence by the Australian Government for around 150 km² in Commonwealth waters off Gippsland, Victoria to investigate development of a bottom-fixed offshore wind farm. The project, High Sea Wind is being proposed to deliver utility-scale generation capacity to Victoria. The project is being developed by High Sea Wind Pty Ltd, the local project delivery company for Ocean Winds.

The project is proposed in the Gippsland region in south-east Victoria. High Sea Wind includes an offshore wind farm in the Commonwealth marine area and associated transmission infrastructure spanning Victorian land and Victorian coastal waters.

Projects in Victoria that could have a significant effect on the environment should be referred to the Victorian minister for Planning for determination as to whether an Environmental Effects Statement (EES) is required under the *Environment Effects Act 1978* (Vic). Referral criteria are set out in the *Ministerial guidelines for the assessment of environmental effects under the Environmental Effects Act 1978* (DTP, 2023a) (the 'Ministerial Guidelines').

A referral will be made for the transmission aspect of the High Sea Wind project, located in Victoria – High Sea Wind Transmission. It comprises the transmission infrastructure, in Victorian coastal waters and onshore, to VicGrid's onshore connection hub at Giffard and a shore crossing at McGaurans Beach.

For the purpose of the EES referral, the project location is an investigation area extending from the boundary of Victorian coastal waters (three nautical miles from the high-water mark), between Reeves Beach and Seaspray, to 11 kilometres inland as shown in Figure 2-1.

The project has also been referred under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) for a decision as to whether it is a 'controlled action' for potential significant impacts to matters of national environment significance (MNES).

1.2 Purpose and scope of this report

This report provides a desktop assessment of the potential significant ecological effects due to the project within the Victorian land and waters. It compares potential significant effects against individual and combined referral criteria as described in the Ministerial Guidelines by:

- identifying and characterising environmental values within the study area of the project
- determining the likelihood of occurrence of any significant flora and fauna species and/or ecological communities within the study area
- identifying the plausible impact pathways from the proposed project activities as described in the project description
- for species that are likely to occur, determining if there is an impact or risk pathway and if it is likely to result in a significant environmental effect

The proposed High Sea Wind project would be constructed across Victorian and Commonwealth jurisdictions, but this report only describes the potential effects of the High Sea Wind Transmission component onshore and in Victorian waters, as relevant to the EE Act. This includes:

- buried subsea export cables and cable protection, from the offshore boundary of Victorian coastal waters to the shore crossing
- export cables at the shore crossing using trenchless construction methods, and associated jointing bays
- buried onshore export cables, and associated infrastructure, from the shore crossing to the VicGrid onshore connection hub.

VicGrid oversees land acquisition and is seeking the necessary approvals for Gippsland offshore wind transmission project including the onshore connection hub. The Victorian Government is currently evaluating the function of deepwater ports, such as the Victorian Renewable Energy Terminal at the Port of Hastings, to facilitate the construction and assembly of offshore wind projects in Victoria. It is expected that the port will

undertake expansion or upgrade works to accommodate various developments and offshore wind farm initiatives. As a result, the connection hub and port infrastructure are not included within the scope of this report or the EES referral.

2 PROJECT DESCRIPTION

Ocean Winds holds a feasibility licence from the Australian Government to investigate the potential development of a bottom-fixed offshore wind farm in an area of about 150 km² in Commonwealth waters off Gippsland, Victoria. The project, High Sea Wind is being proposed to deliver utility-scale generation capacity to Victoria. The project is being developed by High Sea Wind Pty Ltd, the local project delivery company for Ocean Winds.

The offshore wind farm area would be located in the Gippsland Declared Area OEI0-01-2022, approximately 76.3 kilometres from the coast as shown in Figure 2-1 **Error! Reference source not found.**

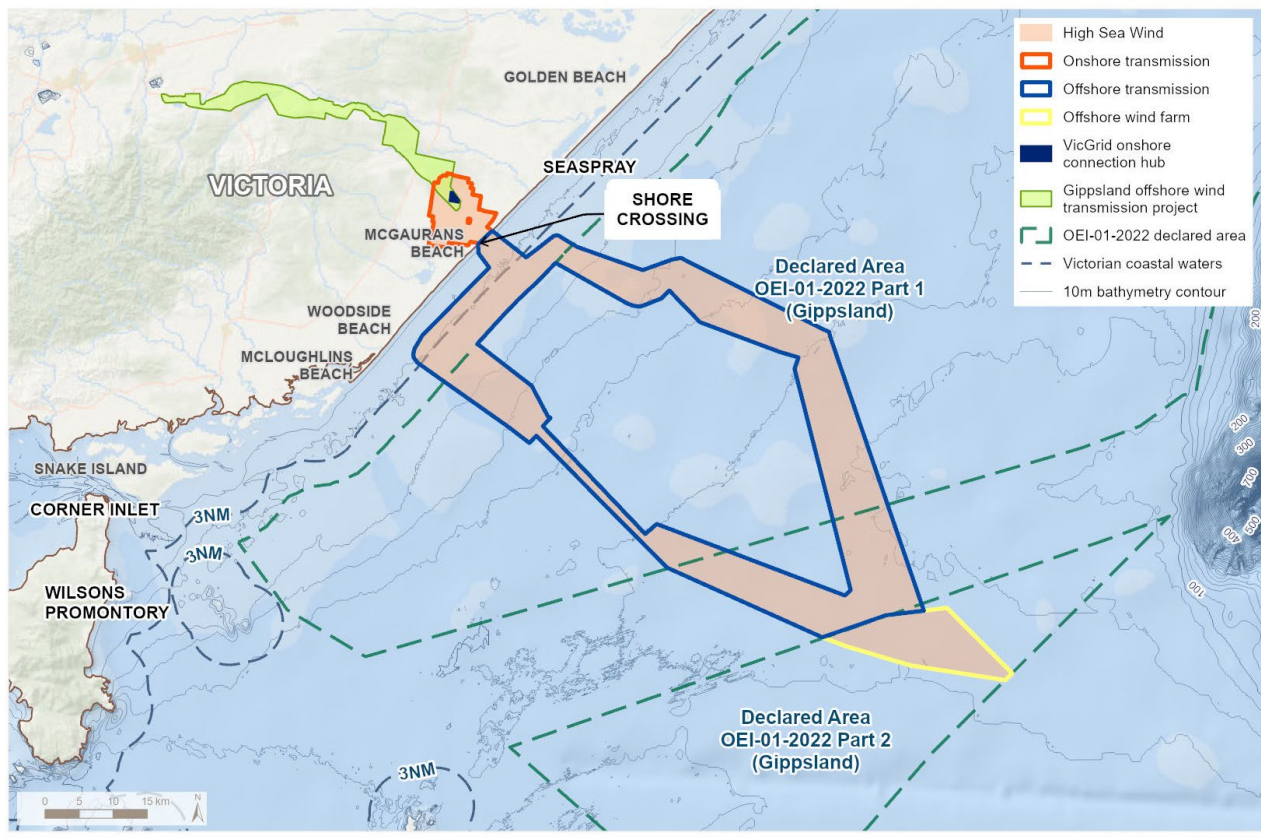


Figure 2-1 Project overview

2.1 Project areas and components

2.1.1 High Sea Wind

High Sea Wind would include the following key components, as shown in Figure 2-2 and described further in Table 2-1:

- the offshore wind farm, including bottom-fixed wind turbines, substations and inter-array and inter-connector cables, in Commonwealth waters which commence three nautical miles seaward from the territorial sea baseline (shoreline).
- the offshore transmission, to export from the offshore wind farm area to the onshore transmission, located across Commonwealth waters and Victorian coastal waters.
- a shore crossing to connect the onshore and offshore transmission, proposed to be located at McGaurans Beach, located across Victorian coastal waters and Victorian land.

- the onshore transmission, on Victorian land from McGaurans Beach, to connect to VicGrid's onshore connection hub.

These components would be located across four key areas, shown in Figure 2-2:

1. Offshore Wind Farm Area (OWFA) - Commonwealth waters
2. Offshore transmission investigation area ('offshore TIA') - Commonwealth waters, from the OWFA to the Victorian coastal water boundary
3. Nearshore transmission investigation area ('nearshore TIA') - Victorian coastal waters, from 3 nautical miles to the mean high water (MHW))
4. Onshore transmission investigation area ('onshore TIA') – Victorian land, from MHW to VicGrid onshore connection hub.

Table 2-1 describes the key infrastructure within each project area.

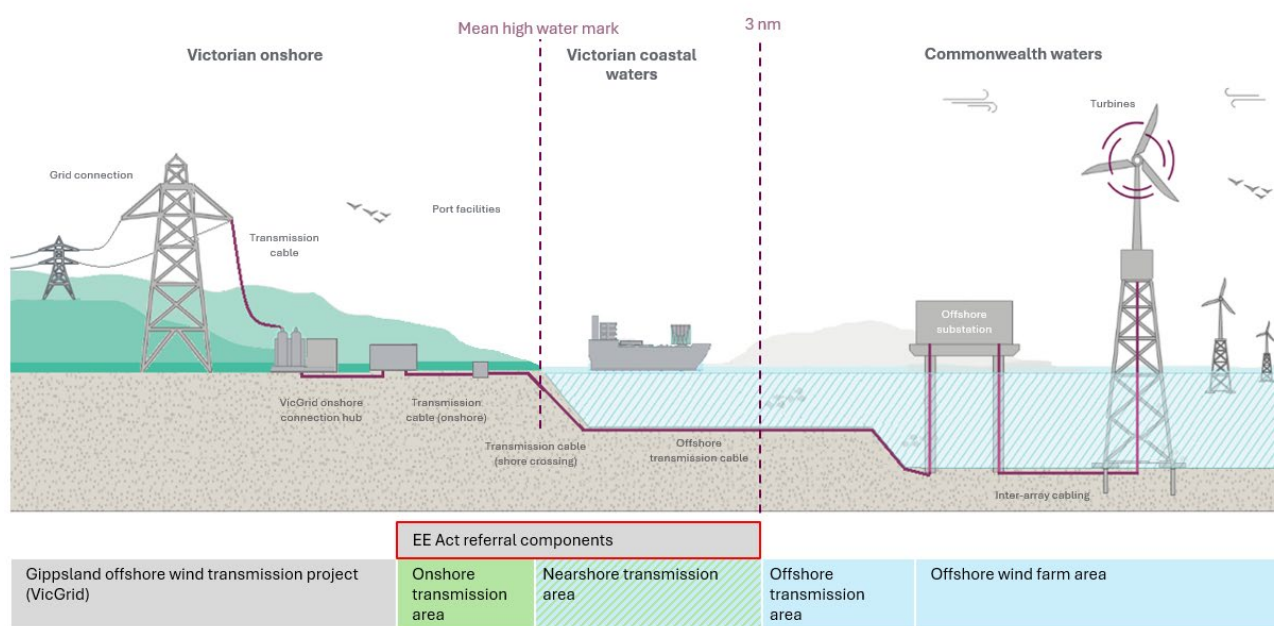


Figure 2-2 Project components and jurisdictional areas

Table 2-1 Project areas and key infrastructure

Project area	Key infrastructure
High Sea Wind offshore wind farm area	- Up to 117 wind turbine generators installed on fixed foundations - Network of subsea inter-array and inter-connector cables connecting between turbines and substations - Up to 5 offshore substation platforms installed on fixed foundations
Offshore transmission investigation area	Export cables buried or protected by armouring, extending 71 kilometres from the offshore wind farm to Victorian coastal waters.
Nearshore transmission investigation area	- Up to 5 export cables buried or protected by armouring, extending from the Victorian coastal waters boundary (3 NMs) to the mean high water. - Trenchless shore crossing infrastructure offshore from McGaurans beach.
Onshore transmission investigation area	- Trenchless shore crossing infrastructure onshore from McGaurans beach. - Onshore transition joint bays where the trenchless shore crossing connects onshore at McGaurans beach. - Onshore buried transmission cables connecting between the shoreline (MHW) and VicGrid's proposed terminal location at Giffard.

2.1.2 High Sea Wind Transmission

For the purpose of referral and assessment under the EE Act, High Sea Wind Transmission comprises the installation, operation and decommissioning of the components on Victorian land and within Victorian coastal waters:

- buried subsea export cables and cable protection, from the offshore boundary of Victorian coastal waters to the shore crossing
- export cables at the shore crossing using trenchless construction methods, and associated jointing bays
- buried onshore export cables, and associated infrastructure, from the shore crossing to the VicGrid onshore connection hub.

The nearshore transmission investigation area (TIA) and onshore TIA are therefore the areas that form the EES referral area and are relevant to the assessment of the potential environmental effects of High Sea Wind Transmission in this report.

2.1.3 Nearshore transmission investigation area

The nearshore TIA covers an area of 60.9 km² (6,091 ha) and comprises the offshore export cables and seaward components of the shore crossing that lie within Victorian coastal waters (MHW to the coastal waters boundary, 3 NM). The exact location of the shore crossing and the export cable(s) have not been determined at this stage, however this area is being investigated for suitability.

Up to five buried, high-voltage cables would export electricity from the offshore windfarm. The investigation area provides options for cable routes to the northeast or the southwest of the Blue Mackerel North and Iberdrola Australia OW 2 (Aurora Green) licence areas. The overall lengths of these route options are similar, however the southwest option is potentially longer in Victorian coastal waters. The export cable route from the Victorian coastal waters boundary to the shore crossing is expected to be between five and 23 kilometres long, depending on final route selection. The width of direct disturbance of cable installation is indicatively 15 metres per cable, widening to 20 metres where cable protection is required. The cables would be installed separately, within a wider corridor up to 1.200 metres wide.

The most likely export system would use 275 kV high voltage alternating current. Where possible, cables would be buried to reduce exposure and potential for interaction with the marine environment or other marine users. In locations where burial is not feasible, cable protection systems including mattresses or rock dumping may be used for cable protection. Final construction methods, burial depths and protection requirements will be refined following geotechnical, environmental and heritage investigations and confirmation of the electrical design.

2.1.4 Onshore transmission investigation area

The onshore TIA covers an area of 73.15 km² (7,315 ha) and comprises the underground export cables and landward components of the shore crossing.

A trenchless shore crossing would be constructed to minimise disturbance to intertidal and coastal environments. This may be horizontal directional drilling (HDD) or direct pipe. The crossing would be located within the GSREZ shore crossing area at McGaurans Beach. A work area approximately 100 metres by 200 metres would be required onshore for construction of the crossing. The exact site location will be selected to avoid sensitive ecological and cultural heritage values as far practicable.

Up to five buried high voltage export cable circuits would run from the shore crossing to the VicGrid onshore connection hub. The linear distance from the shore crossing location to the connection hub is around six kilometres. The onshore cable corridor will be up to 100 metres wide, to accommodate up to five trenches, inclusive of an indicative 20 metres on either side for linear access and spoil storage during construction. Additional workspace may be required at select locations for bends, crossings, laydown areas or side access. The exact alignment will be developed considering landholder engagement, environmental values and heritage constraints. Trenching would be the primary installation method, with HDD or other trenchless techniques potentially used at sensitive waterways, areas of high ecology value, critical road crossings and heritage locations. Cable ducting, spacing and trench width will be sized to conservative electrical parameters until final electrical design is confirmed. Following installation, the cables would site within an operating easement indicatively 50 m wide, subject to design.

Transition joint bays (up to one per cable) would be constructed on the onshore side of the shore crossing. These underground concrete enclosures would house the cable joints, terminations, and associated civil and electrical equipment to connect the subsea export cables to the onshore export cables. Following reinstatement, only the access points are expected to be visible on the surface.

Additional underground jointing bays will be constructed along the onshore export cable route, where cable connections are required. Jointing bays will be designed to have minimal permanent surface footprint.

2.2 Construction activities

The construction program is indicative and assumes the earliest commencement in 2031. It is expected that onshore construction duration would be one year with shore crossing works estimated at six months and installation of export cables in Victorian coastal waters about six months. Onshore works would be scheduled to align with offshore construction activities.

Final construction methods, burial depths and protection requirements will be refined following geotechnical, environmental and heritage investigations and confirmation of the electrical design

2.2.1 Nearshore transmission investigation area

Installation of the offshore export cables would be undertaken within the defined nearshore TIA, and would likely include:

- cable laying
 - mobilisation of specialised cable laying and support vessels.
 - seabed preparation to remove potential obstructions to cable laying within a corridor of up to 625 metres wide.
 - sequential cable-laying from the extent of Victorian coastal waters to the shore crossing.
 - burial of cables where possible using mechanical trenchers or jetting, with a target burial depth of at least one metre
- installation of cable protection
 - where burial cannot be achieved, engineered cable protection such as rock placement, mattresses or concrete covers would be installed
 - cable protection would also be installed if cables cross other subsea infrastructure
- offshore construction of the shore crossing (trenchless)
 - positioning of cable and support vessels which may include dynamically positioned vessels and/or jack-up vessels
 - excavation of punch-out pits
 - retrieval and connection of a drilled conduit to the offshore cable end
 - final jointing and testing
 - feed of cable for pull-through to the onshore connection point
- Survey, testing and commissioning
- Vessel transit through coastal waters, between local ports and offshore construction area.

2.2.2 Onshore transmission investigation area

Construction of the onshore transmission components would include the following activities:

- establishment of the onshore construction site
 - survey and mark out of the site, access tracks, no-go zones
 - fencing, signage and farm infrastructure relocation

- clearing and levelling of the construction of site access and laydown areas
- minor upgrades to local roads
- Delivery of plant and equipment
- Vegetation removal undertaken in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA 2025)
- cable laying
 - clear and grade of the cable route
 - delivery and stringing cables
 - excavation and preparation of the cable trenches (up to two metres depth) and joint bays
 - installation of onshore cables, backfill and compaction.
 - Cable burial, protection and reinstatement. Where burial is shallow (<1 metre) or risk of disturbance is high, protection measures (such as concrete slabs, rock armour, marker systems or CPS) will be applied
- installation of the shore crossing – trenchless construction (HDD or direct pipe). Where HDD is adopted, this activity is likely to include:
 - drill site establishment
 - excavation of punch-in and return pits
 - drilling pilot hole from onshore to offshore
 - reaming
 - cable pull through
- construction of termination compounds and installation of equipment
- removal of temporary construction facilities, equipment, waste and materials
- reinstatement of topsoil and reseeding
- testing, connection and commissioning of the system.

2.3 Operational activities

The operational life of the project is expected to be up to 40 years, which is the maximum term of a commercial licence for offshore wind farms under the OEI Act.

During operation, project activities for the operation, monitoring and maintenance of transmission infrastructure within Victorian land and waters would include:

- routine inspections of export cable and ad-hoc maintenance activities as required
- use and maintenance of onshore infrastructure and property, including onshore easement vegetation management
- ongoing infrastructure performance and environmental monitoring

2.4 Decommissioning activities

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. The decommissioning plan will address how infrastructure will be decommissioned in accordance with guidelines and regulations at the time.

Decommissioning activities will be similar in type and scale to the construction methods and will involve plant, vessels and equipment. Decommissioning activities would be reviewed in discussion with the transmission system operator and regulator at the time, considering any other existing or proposed future use. It is anticipated that decommissioning will include:

- marine export cables:

- any unburied cables will be designed to allow for structures above the seabed to be removed
 - buried cables will 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 to avoid impacts to the landholders and the environment that could arise from removal
- any above ground infrastructure and jointing bays would either be removed or repurposed and the site rehabilitated
- mitigation and monitoring.

3 METHODOLOGY

This section outlines the methodology used for this assessment, including the definition of spatial areas relevant to the EES referral, the process and databases used for the desktop review, the assessment of the likelihood of species occurrence, and the approach for impact assessment.

3.1 Terminology

The terminology used by the Department of Transport and Planning (DTP) in its EES referral form template and Ministerial Guidelines, as well as terminology specific to native vegetation as defined by the Victorian Planning Provisions has been applied throughout this report.

Specific terminology related to the areas assessed within this report are included in Table 3-1.

Table 3-1 Terminology used in this Preliminary Environmental Assessment Report.

Term	Description
Nearshore transmission investigation area ('nearshore TIA')	The area being investigated for the delivery of offshore transmission infrastructure through Victorian coastal waters, extending from the MHW to the Victorian coastal waters boundary, three nautical miles offshore. This area would contain export cables and the offshore aspects of the trenchless shore crossing.
Onshore transmission investigation area ('onshore TIA')	The area being investigated for the delivery of the onshore transmission infrastructure. It extends from the MHW to the VicGrid onshore connection hub near Giffard. It would contain the onshore aspects of the shore crossing and underground transmission cables as well as supporting and ancillary infrastructure.
Project site	The area directly impacted by the proposed activities (refer Section 2), noting this extent is markedly smaller than the referral area, where the proposed activities may occur. This includes: - Onshore transmission corridor up to 100 metres wide - Nearshore export cable corridor up to 625 metres wide.
Referral area	The total area under consideration in the referral, comprising the onshore transmission investigation area and the nearshore transmission investigation area within Victorian land and waters. The area includes the potential direct and indirect disturbance footprint/s, as well as avoidance area/s and is shown in Figure 3-1.
Study area	The study area refers to the referral area (the area we are seeking referral for) plus a 10 kilometre buffer for database searches as shown in Figure 3-1.

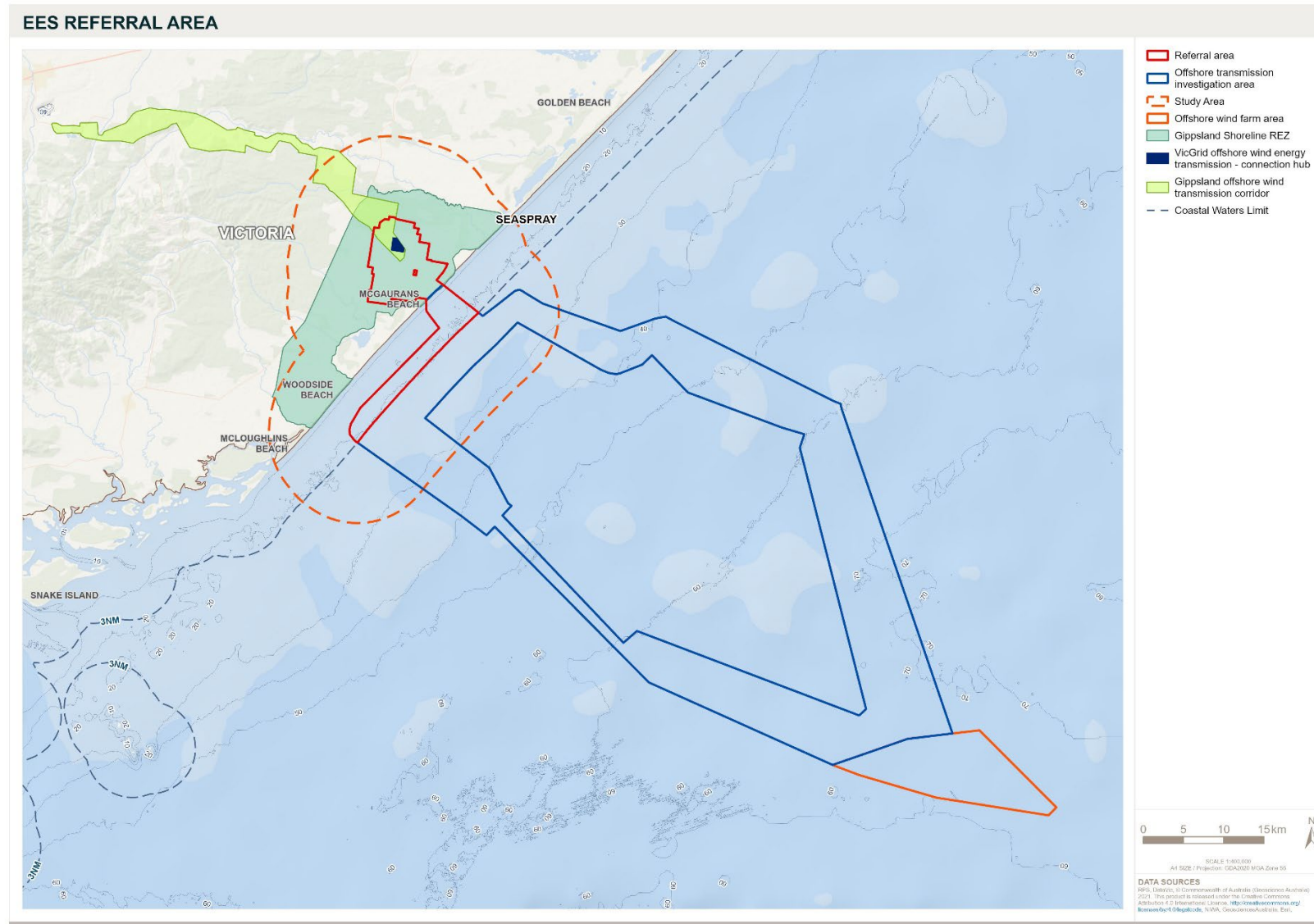


Figure 3-1 Referral area and study area

3.1.1 Species 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, terrestrial fauna refers to all species that use the onshore environment landward of the MHW (i.e., mammals, avifauna, reptiles, frogs, invertebrates and fish). Marine fauna refers to all species that use the nearshore and offshore marine environments seaward of the MHW (including marine mammals, avifauna, fish and invertebrates).

Where species do not have a single well-recognised common name, scientific names are also given throughout (rather than only when first introduced) to make it clear which species is being referred to.

3.1.2 Native vegetation

Under the Victorian Planning Provisions (Clause 73-01 of planning schemes), the term 'native vegetation' is defined as '*plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses*'. The *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA, 2025), divides native vegetation into three categories:

- Patch:
 - an area where $\geq 25\%$ of the total perennial understorey plant cover is native, or
 - an area with ≥ 3 native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
 - any mapped wetland included in the *Current wetlands map* (available on DECCA's NVR Map).
- Patch tree:
 - a native canopy tree within a patch. A canopy tree is a mature tree (i.e. is able to flower) that is > 3 metres in height and is normally found in the upper layer of the relevant Ecological Vegetation Class.
- Scattered tree:
 - a native canopy tree that does not form part of a remnant patch.

The extent of native vegetation is the area of land covered by a patch and/or a scattered tree, measured in hectares.

3.1.3 Ecological vegetation classes

Native vegetation in Victoria is mapped in units known as Ecological Vegetation Classes (EVCs). An EVC has a bioregional conservation status of endangered, vulnerable, depleted, least concern or rare. Each EVC occurs under a common regime of ecological processes within a given biogeographic range and may contain multiple floristic communities.

Native vegetation condition is represented by the condition score. The condition score of native vegetation is a measure of how close native vegetation is to its mature, natural state, as represented by benchmarks for the relevant EVC. The condition score indicates how well the native vegetation can sustain itself and the species that live in, or depend on it.

Under the referral criteria as provided in the Ministerial Guidelines, potential removal, destruction or lopping of 10 ha or more of native vegetation that consists of an EVC classified as endangered, vulnerable (with a condition score of 0.5 or more) or rare (with a condition score of 0.6 or more) warrant referral.

3.1.4 Threatened species and ecological communities

For the purpose of this report 'threatened species' refers to those species listed as threatened under the FFG Act. 'Threatened communities' refers to communities of flora and fauna that are listed as threatened under the FFG Act. Listing status under the FFG Act are shown in Table 3-2.

Species or communities that have a likelihood rating of known or possible are only considered within the impact assessment if they are listed under the FFG Act.

Table 3-2 FFG Act listing categories

FFG Act	Listing category
Threatened species	Extinct (ex)
	Critically Endangered (cr)
	Endangered (en)
	Vulnerable (vu)
	Conservation dependant (cd)
Threatened communities	Threatened (thr)

3.1.5 Avifauna

Avifauna species have been grouped as shown in Table 3-3. As shorebirds and waterbirds occupy habitat predominately within the onshore TIA (although movement can occur within the marine environment), they are discussed within the terrestrial fauna section (Section 4.6) of this report.

Table 3-3 Avifauna species groupings

Species Group	Definition
Seabird	A bird species that lives most of its life at sea, gets its food resources from it and with adaptations to survive in the marine environment (e.g. salt glands, webbed feet). Typical breeding habitat comprises continental or offshore islands, although coastal species may breed on mainland habitats. Includes, for example, albatross, gannets, penguins, petrels and shearwaters. For the purposes of this assessment, terns, gulls, osprey and sea-eagle are categorised as seabirds, despite some species also exploiting terrestrial habitats and/or food sources.
Shorebird	A bird species in the suborder Charadrii that feeds by wading in intertidal areas or on the fringes of wetlands. Includes plovers, oystercatchers, sandpipers and allies. Typically long-legged in relation to body size and without webbing between the toes.
Terrestrial bird	A bird species that is adapted to live and feed, almost exclusively, in terrestrial habitats. Includes species that undertake movements over ocean habitat and/or feed aerially on insects that may be carried offshore. Includes, for example, songbirds, parrots, cuckoos and swifts.
Waterbird	A bird species that habitually lives on or around water with legs that are adapted to swimming, diving or wading. Includes, for example, ducks, egrets and herons.

3.1.6 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).

The extent of wetlands within the referral area has been determined by using the DEECA modelled current wetlands dataset (WETLAND_CURRENT_NVR).

According to the *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA, 2025), areas mapped by DEECA as a current wetland are classified as a patch of remnant native vegetation.

3.2 Preliminary assessment

3.2.1 Identification of environmental values

A desktop review of government databases and publicly available spatial datasets, listed below, was undertaken to identify the environmental values either known to be or potentially present within the referral area. This review examined the known and modelled biodiversity values within 10 kilometres of the referral area, as well as planning controls under the Wellington Planning Scheme relevant to biodiversity.

- **Victorian Biodiversity Atlas (VBA)** – provides a list of threatened flora and fauna species recorded within a 10 kilometre radius of the Referral Area.
- **Protected Matters Search Tool (PMST)** – although targeted at EPBC Act listed species, the PMST search tool was used to identify FFG listed species that are potentially present, but not recorded in the VBA database (Appendix B).
- **NatureKit** – provides GIS mapping, maintained by the Department of Energy, Environment and Climate Action (DEECA) including modelled mapping of extent and pre-1750 Ecological Vegetation Classes (EVCs) and known threatened species records.
- **Native Vegetation Removal Map (NVR Map)** (DEECA, 2026b) – provides the Location Map, the Current Wetland Layer, the Strategic Biodiversity Score and the Native Vegetation Condition Score for the Referral Area, maintained by DEECA.
- **VicPlan** – is an online tool maintained by the Department of Transport and Planning (DTP) that provides mapping of Planning Scheme controls including those related to biodiversity (DTP, 2025)
- **VicFlora** - online database created and maintained by the Royal Botanic Gardens Melbourne and provides information on Victorian flora species including habitat requirements and distribution (Royal Botanic Gardens Victoria, 2025).
- **Birddata** database maintained by birdlife Australia
- **CoastKit** (DEECA, 2026c) – online mapping service maintained by DEECA that provides a central repository for marine and coastal data. The Feature Activity Sensitivity Tool (FeAST) tool operates within CoastKit and provides marine habitat mapping within Victorian coastal waters.
- **Victorian Marine Key Ecological Features Framework** (Ferns et al, 2025)– provides mapping of marine Key Ecological Features (KEFs), which are areas of ecological significance.
- Aerial imagery and topographic maps of the study area.

3.2.2 Likelihood of occurrence

Following the identification of environmental values listed under the FFG Act potentially within the study area, a likelihood of occurrence assessment was undertaken to refine the desktop list using species- and site-specific habitat information.

The likelihood of occurrence assessment considers a range of information to determine whether a species or community is expected to occur within the referral area. Species and communities were assigned a likelihood ranking based on the definitions presented in Table 3-4.

er if there is habitat present in the referral area. The exception is for nomadic species and birds that are recorded within the study area and have the potential to be moving through the area, even if there is no habitat present. These species are given a likelihood of possible.

Species and communities that are assigned a likelihood ranking of ‘unlikely’ were not considered further within the existing conditions or the impact assessment as they are considered unlikely to occur in the referral area and therefore unlikely to be impacted by the proposed project.

The full list of environmental values within the study area is contained in Appendix A, including the assessment of likelihood of occurrence.

Table 3-4 Likelihood of occurrence

Ranking	Description	Considered within the impact assessment
Known to occur	Environmental value has been recorded within the referral area within 10 years, based on reliable historical records. AND Suitable habitat is present within the study area.	In
Possible	Environmental values that may be present within the study area but not regularly recorded (ie, last recorded within the last 11 to 30 years) or not recorded within the referral area AND suitable habitat is present within the study area, OR there is potential for the species to be moving through the area, even if there is no habitat present. This includes nomadic species, species that are present in large numbers infrequently (for example species that experience boom and bust cycles or irruptive bird species), and species that have not been largely sampled. .	In
Unlikely	Environmental values that have not been historically recorded within the study area, OR there is no record of suitable habitat within the study area to support them OR the marine area is outside of the species known range.	Out

3.2.3 Identification of plausible impact pathways and mitigation

Impact pathways that have the potential to result in environmental effects are provided in Section 5.1. Impact pathways were identified from the project description (refer Section 2), as well as:

- Key environmental factors for offshore windfarm environmental impact assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (DCCEEW, 2023g).
- Planning Guidelines for Development of Wind Energy Facilities Energy (DTP, 2023b), associated with transmission.
- Publicly available environmental impact assessments for offshore wind projects.

3.2.3.1 Inherent mitigations

This assessment has been developed considering the application of the mitigation hierarchy shown in Figure 3-2 as described in the *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA, 2025) and the Guidance - Key Environmental Factors for Offshore Windfarm Environmental Impact Assessment Under the *Environment Protection and Biodiversity Conservation Act 1999* (DCCEEW, 2023g).

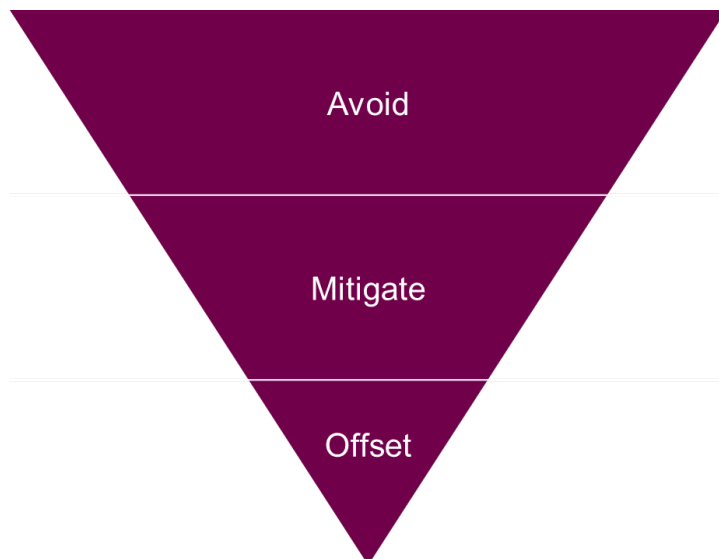


Figure 3-2 Mitigation hierarchy

3.2.3.2 Strategies to avoid impacts

The project area has been selected to avoid significant effect to threatened species and communities to the greatest extent feasible at this initial phase of the project. This includes considering features such as habitat value, extent of native vegetation, proximity to wetlands of international importance (i.e. Ramsar wetlands) and heritage in landfall, onshore and offshore cable corridor route identification and assessment. Outcomes of design decisions that avoid or mitigate potential significant effects to environmental values include:

- **Shore crossing at McGaurans Beach**

Three technically and environmentally feasible shore crossing sites were identified within the draft VicGrid Gippsland Shoreline Renewable Energy Zone (GSREZ) proposed shoreline crossing areas (VicGrid, 2025). The three shortlisted shore crossing locations (Reeves Beach, McGaurans Beach and Seaspray Beach) were assessed using constraints analysis and resistance mapping to identify the shore crossing location with the least impact to identified values, including FFG listed species and native vegetation.

Excluding shore crossing connection at Reeves Beach avoids impacts to critical and supporting components of the nearby Corner Inlet Ramsar site from construction of the offshore cables, the shore crossing site itself and onshore transmission corridor.

Excluding shore crossing connection at Seaspray Beach avoids impacts to values of the Ninety Mile Beach Australian Marine Park from shore crossing construction activities.

- **Avoidance of wetlands area at McGaurans Beach**

The referral area boundary was sited north of Jack Smith Lakes and McGaurans Beach Road to avoid wetland habitat and native vegetation.

- **Darriman H29 Bushland Reserve excluded from the referral area**

The Darriman H29 Bushland Reserve has been excluded from the referral area to avoid impacts to native vegetation and threatened species. The project will avoid this area entirely.

- **Size of referral area**

The extent of the referral area provides for selection of a transmission corridor within the area to avoid environmental sensitivities. Future environmental assessments will provide further data that allows the project to avoid, or if not possible, minimise impacts to native vegetation and threatened species below ecological triggers defined by the EES referral criteria.

3.2.4 Impact assessment

A high-level impact assessment was conducted to identify potential direct and indirect impacts associated with proposed project activities within the referral area. The high-level assessment of potential impacts was then used to inform a preliminary assessment of the project against the relevant ecological referral criteria within the Ministerial Guidelines under the EE Act (DTP 2023a). These criteria assist in identifying the significance of the project's potential effects in a regional or state context (DTP, 2023a). Other, non-ecological, criteria are addressed in the EES referral form and in Attachments 6 – 9 to the referral.

3.3 Limitations

- This report is based solely on desktop analysis, with no field surveys conducted. The desktop review and preliminary impact assessment draw on data from a range of sources identified in Section 3.2.1. The reliability of information from these databases depends on the standards and procedures applied by external parties. It is important to note that the accuracy of historical records cannot be assured, and the absence of a species in database listings or observational studies does not confirm that the species is not present within the Referral Area. A lack of database records may reflect limited historical sampling efforts in the area rather than the true absence of a species. The likelihood of species occurrence described in this report may be revised following the completion of detailed site surveys.
- The information regarding the extent, type, and condition of native vegetation within the Referral Area, as presented in this report, is based on modelling undertaken by DEECA. To confirm this data, an on-site assessment by a qualified and accredited ecologist is required.
- The assessment of impacts in this report are based on the standalone HSW project and does not consider cumulative impacts of other projects occurring in the region.
- Impacts to FFG threatened species are based on where project activities are occurring. Where there are threatened fauna species that are migratory or forage within the offshore marine environment in Commonwealth waters, potential impacts associated with construction, operation and decommissioning of the project in this location is considered as part of the EPBC Act referrals. The majority of FFG threatened species that have the potential to interact with the offshore wind farm in commonwealth waters are EPBC listed, however if they are not EPBC listed, impacts and risks to these species will be considered as part of the Commonwealth marine area assessment.

4 REFERRAL AREA DESCRIPTION

4.1 Landscape context

The onshore TIA is situated on the coastal plain between Ninety-mile Beach and the South Gippsland Highway. The area is rural and predominantly used for agriculture, particularly livestock grazing, with some cropping and timber plantations. Rural residences are dispersed within the area.

In Victorian coastal waters, the nearshore TIA is within the Marine Planning Area 7 under the Marine Spatial Planning Framework. It comprises areas of subtidal and intertidal environments within in the Twofold Shelf National IMCRA Bioregion and the Southeast Shelf Transition local province.

Table 4-1 provides an overview of the landscape context of the referral area.

Table 4-1 Landscape context of the referral area

Aspect	Description
Onshore bioregion	Gippsland Plain (GipP) bioregion, which generally sits below 200 metres above sea level (asl) and has a temperate climate, averaging between 200 to 1,100 millimetres of rainfall per year.
Marine bioregion	The nearshore TIA is located within the Twofold Shelf National (IMCRA) Bioregion. The Victorian Biounits include Gippsland Lakes (Gippsland Lakes Region) and Ninety Mile Beach (Twofold Shelf Region), both of which fall in the Southeast Shelf Transition local province.
Local government area (LGA)	Wellington Shire LGA
Catchment management authority (CMA)	West Gippsland CMA
Nearest townships	Woodside is located approximately 3.4 kilometres inland of the referral area. Seaspray is located approximately 8.3 kilometres northeast of the referral area.
Registered Aboriginal Party	Gunaikurnai Land and Waters Aboriginal Corporation
Registered Native Title Body Corporate	The Gunaikurnai Land and Waters Aboriginal Corporation is the Registered Native Title Body Corporate acting as trustee for the native title rights and interests held by the Gunai/Kurnai People for parts of Gippsland and Victorian alpine region (VCD2010/001). This includes coastal Crown land and nearshore marine area in the investigation area.
Onshore land use	The onshore study area sits within a highly modified landscape that has been extensively cleared for agriculture and forestry uses. Within the wider study area larger patches of remnant native vegetation is present primarily in reserves and along roadsides. Most of these areas sit outside of the onshore TIA.
Nearshore marine use	Recreational fishing, boating and tourism, as well as marine ecology, cultural heritage, environmental protection. The shoreline, including the shore crossing location, is part of the McLoughlins Beach – Seaspray Coastal Reserve, which covers part of the nearshore marine area, as well as the beach and primary dunes.
Coastal reserves	The Reeves, Woodside, Jack Smith Lake and McGaurans beaches lie inshore of the site (listed in the direction of south to north along the coast adjacent to the project), and the Jack Smith Lake Wildlife Reserve (hunting) and McLoughlins Beach - Seaspray coastal reserves are similarly adjacent to the project area.
Waterways	Coastal plains are drained by several unnamed minor waters in the project area, which converge towards the coast, where ephemeral estuarine wetland is present behind coastal dunes and beach. The waterways do not currently have a direct outlet to the ocean.
Zoning	The following zoning makes up the onshore investigation area: • Farming Zone 1 – to protect and promote agricultural use of land while supporting sustainable land management. • Transport Zone 3 – Significant Municipal Road – to provide for an integrated and sustainable transport system. • Public Conservation and Resource Zone – to protect and conserve the natural environment and natural processes for their historic, scientific, landscape, habitat or cultural values.

Aspect	Description
	- Public Use Zone 1 – Service and Utility – to recognise public land use for public utility and community services and facilities. Crown land tenure includes: - Nature conservation reserve – located in the coastal and nearshore marine area - Multiple use public forest – areas used for plantation timber productions - Pastoral lease – some unused road reserves.
Recreational areas	The following reserves occur near, but (at least 500 metres) outside the onshore TIA: - Giffard (Rifle Range) Flora Reserve - Jack Smith Lake State Game Reserve (Hunting) - Giffard H31 Bushland Reserve - Lake Denison Wildlife Reserve (Hunting) - Warrigal Creek Streamside Reserve. Recreational fishing occurs within the nearshore area.
Nearby infrastructure	- Gippsland Water Saline Wastewater Outfall Pipeline easement runs northwest-southeast through the onshore investigation area. The ocean outfall is located within the nearshore investigation area off McGaurans Beach. - APA holds easements for the high voltage Basslink Interconnector, connecting from Victoria to Tasmania. The Basslink cable makes landfall immediately southwest of the proposed shore crossing location and bisects the onshore investigation area. - Roads including sealed and unsealed local roads (nearest being South Gippsland Highway) between Seaspray and Longford. - Agricultural infrastructure for livestock grazing, some cropping and timber plantations.
Surrounding development	Rural area with surrounding development associated with agriculture, particularly livestock grazing, some cropping and timber plantations.

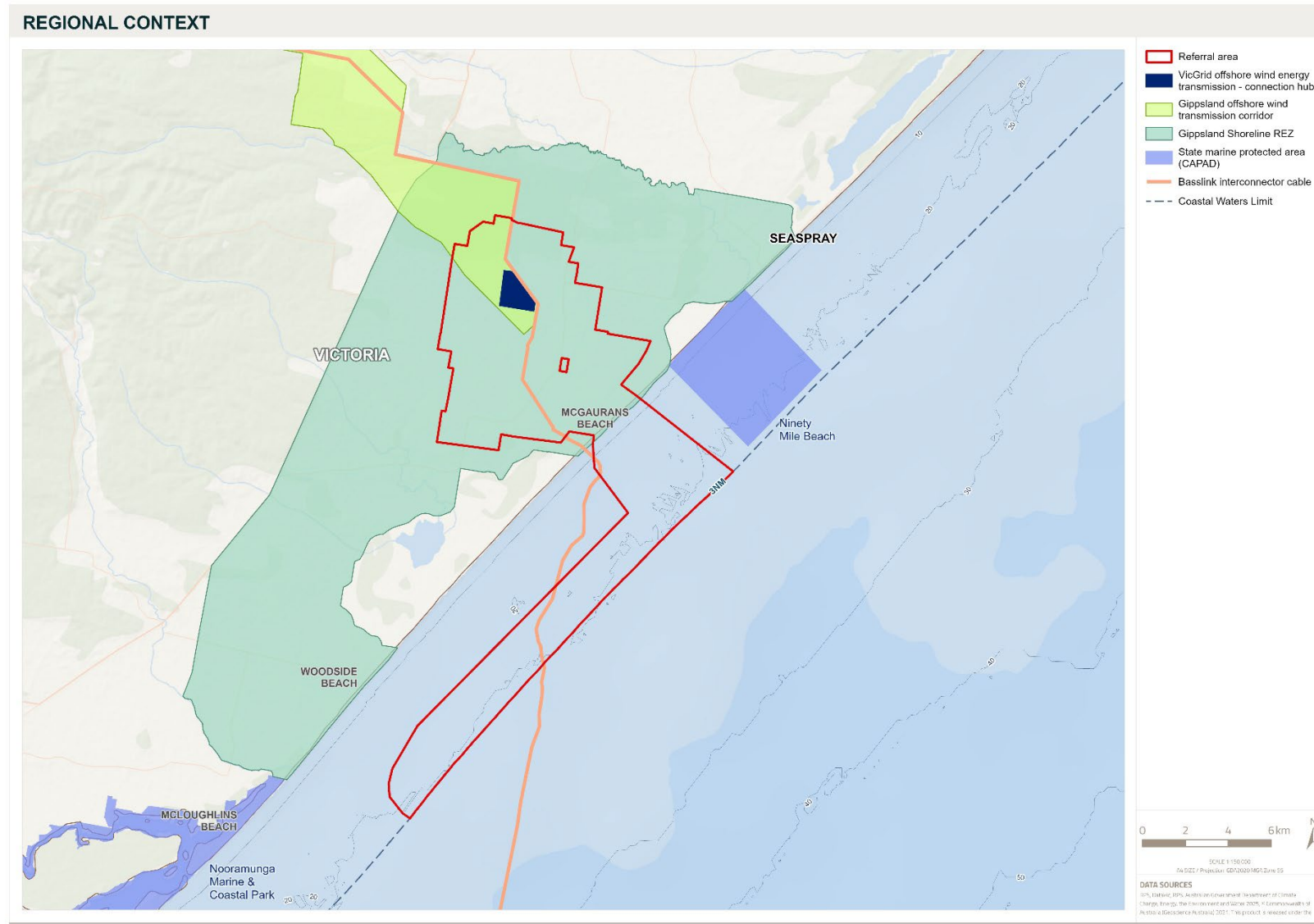


Figure 4-1 Landscape context of the referral area

4.2 Physical environment

A summary of the key physical environment features of the referral area and surrounds is provided in Table 4-2.

Table 4-2 Summary of the physical environment of the referral area

Aspect	Description
Climate	The Gippsland plain (GpiP) has a temperate climate, averaging 500 to 1,100 millimetres rainfall per year (DEECA 2025).
Onshore	
Topography and geology	The GipP bioregion includes flat low lying coastal and alluvial plains with a gently undulating terrain, banded by coastal barrier dunes and low lying floodplains and swampy flats (DEECA, 2024).
Soil type	Gippsland soils are generally highly diverse, ranging from fertile alluvial soils to acidic sandy loams, supporting agriculture, pasture, and environmental restoration. Most of the Onshore TIA is expected to have disturbed soil, associated with agricultural use.
Nearshore	
Bathymetry	Water depths within the nearshore TIA range from approximately 0 to 20 m. The shallowest waters are located inshore at the coastal crossing adjacent to McGaurans beach, and the deepest are found offshore, closest to the Victorian coastal waters boundary. The seabed exhibits a gentle gradient, generally deepening seaward, towards the state border. The site is relatively flat, with a consistent gradient and no obvious features.
Seabed morphology	The nearshore TIA is located on the continental shelf of Bass Strait. The morphology of the seabed is interpreted as a largely flat and gently sloping shelf, with no major geomorphic features observed in the nearshore TIA.
Seabed geology	Soft sediments, sublittoral sand and muddy sand, are the dominant seabed habitats present, with non-reef sediment epibenthos, and patches of rocky reef in both intertidal and subtidal zones.
Coastal morphology	The project area is on the southeast facing coast of the Wellington Shire LGA and is located between Corner Inlet (northeast) and 90 Mile Beach National Park (southwest). Six beaches are located inshore from the project area: Lake Denison, McCaurans, Jack Smith Lake, Woodside, Reeves and McLaughlins. There are three major river entrances along the shore: Bruthen Creek, which is continuously open with an entrance width of 30 m; Jack Smith Lake, intermittently open with an entrance width of 0-80 m; and Lake Dennison, intermittently open with an entrance width of 0-10 m. Three geological sites are found adjacent to the project site. Woodside Beach Barrier and Lagoons is a geoform that has a narrow, stationary foredune beach barrier in front of a coastal lagoon. Jack Smith Lake is a large coastal lagoon, and McGaurans Beach features lagoon sediments that indicate barrier formation and retreat. The adjacent beaches are considered low tide terrace, which are flat areas of beach adjacent to the low-water line. These areas occur in shallow areas of the sea floor, so waves often create sand bars while rip currents move seaward, and temporary shallow pools form as a result. These pools trap marine life and therefore are considered significant features in beach ecology and sediment dynamics.
Currents	Bass Strait has strong tidal currents in many locations due to its relatively shallow average water depth (60 metres) and the narrow space and rapid changes in depth between islands (Bass Strait currents, n.d.).
Tides	Bass Strait has two tidal cycles a day, with the flood tide generally flowing from both sides of the Strait towards the middle (Bass Strait currents, n.d.). Maximum spring tides are approximately 2.4 metres at Jack Smith Lake, Woodside, Reeves and McLaughlins beaches (measured at Port Welshpool tide station). Neap tides are 0.6 metres at each of the beaches measured at Port Welshpool, and 0.1 metres when measured at Lakes Entrance.
Waves	The high energy environment of Bass Strait results in significant wave heights and oceanic wind speeds. The predominate wave direction is south-easterly, with an average significant wave height of approximately 1-2 metres and average peak wave height of 3-4 metres (BOM, 2026). The mean wave period in the nearshore TIA is 10 seconds.

Aspect	Description
Coastal Acid Sulfate Soils	The majority of the onshore TIA has low to very low potential for acid sulfate soils (CSIRO, 2026). There is a high probability of acid sulfate soils to be present within the coastal estuarine wetland of Lake Denson, which covers a small portion of the onshore TIA.

4.3 Protected and conservation areas

Protected and conservation areas within 10 kilometres of the referral area are provided in Table 4-3 and shown on Figure 4-2. Other reserves are listed in Table 4-1 above.

Table 4-3 Protected areas within 10 kilometres of the referral area

Protected areas	Distance from referral area	Description
McLoughlin's Beach - Seaspray Coastal Reserve	Within the referral area.	The shoreline, including the shore crossing location, is part of the McLoughlins Beach – Seaspray Coastal Reserve, which covers nearshore marine area, as well as the beach and primary dunes.
Darriman H29 B.R Natural Features Reserve	Not included in the referral area, marked as an area to be avoided.	The Darriman H29 Bushland Reserve is situated within, but excluded from, the investigation area.
Ninety Mile Beach Marine National Park	The park is located at least 1.2 kilometres east of the referral area.	Ninety Mile Beach Marine National Park features vast plains of sand. This is a linear landscape with a combination of sandy beaches, low dunes, peninsulas and wetlands. It is set against the seas of Bass Strait. 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 the hooded plover and double-banded plover.
Nooramunga Marine and Coastal Park	Around 5 kilometres west of the nearshore TIA	Nooramunga Marine and Coastal Park consists of a network of waterways and islands that are sheltered from the Bass Strait by sand barrier islands and Wilsons. There is a significant Ramsar wetland included in the park that protects 67,186 ha of diverse habitats such as mangrove communities, Broadleaf Seagrass forests and saltmarsh (Corner Inlet and Nooramunga Marine and Coastal Parks, n.d.).
Jack Smith Lakes	Located approximately 7 kilometres south west of the referral area.	Jack Smith Lakes is a nearby Nationally important wetland that provides important seasonal habitat for a number of migratory shorebirds. Features extensive coastal lagoons, salt marshes and native grasslands, and provides valuable feeding and nesting habitat for a range of waterbirds.

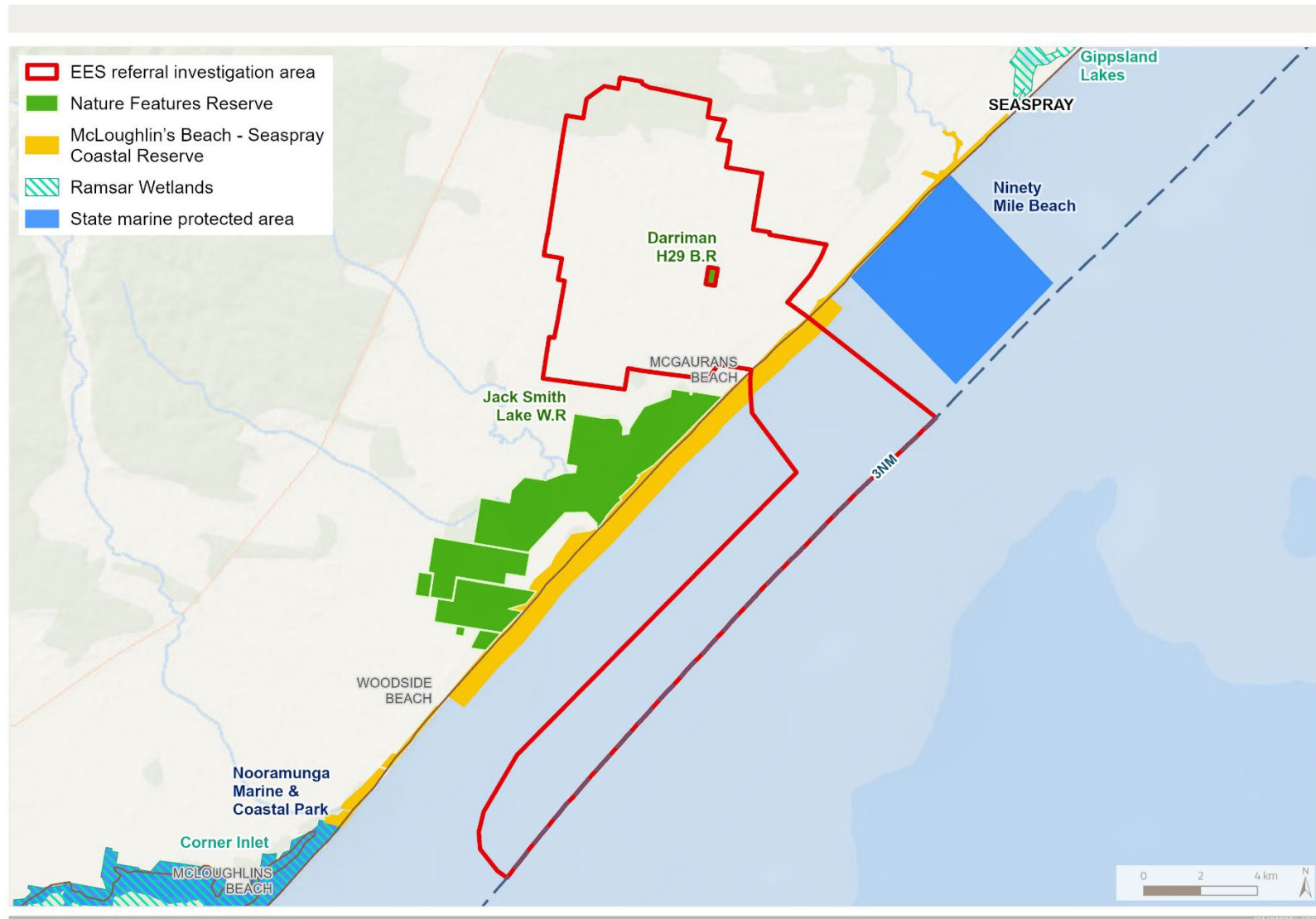


Figure 4-2 Protected areas in proximity to referral area

4.4 Native vegetation

4.4.1 Ecological Vegetation Classes (EVCs)

The onshore TIA is approximately 7,322 ha of predominately cleared coastal and agricultural land, with some areas preserved as bushland and coastal reserves. The DEECA Native Vegetation model (2005 EVC dataset) indicates approximately 6,734.5 ha (92 %) of the onshore TIA contains no modelled native vegetation as shown in Figure 4-3. Within the areas that contain no native vegetation, historical aerial imagery indicates that the referral area has been subjected to historical clearing, predominantly used for agricultural purposes.

Eight per cent of the onshore TIA is modelled as containing remnant native vegetation, existing predominately along road reserves, such as Giffard West Road and Giffard Road and in isolated patches. A review of aerial imagery suggests the extent of native vegetation may be much less than indicated by modelled data, with clear indications of agricultural use (see Figure 4-4 for an example).

The 587.59 ha of modelled native vegetation within the onshore TIA is comprised of eight EVCs as shown in Table 4-4. The majority being Lowland Forest/Heathy Woodland Mosaic (EVC 698, 67%), followed by Lowland Forest (EVC 16, 18%) and Estuarine wetland (EVC 10, 8%) (refer Figure 4-3).

Within the wider study area larger patches of remnant native vegetation are present primarily in reserves and along roadsides. Most of these areas sit outside of the onshore TIA and are likely to provide habitat for threatened flora and fauna species and threatened ecological communities. Closest to the shoreline, the onshore TIA is boarded by McGaurans Beach Road to the south west, and Ninety Mile Beach to the north east.

The Darriman H29 Bushland Reserve at Giffard has been identified as an area to be avoided and is not included in the referral area.

Within the onshore TIA, a much smaller project site will be chosen that avoid or minimises environmental sensitivities, including native vegetation. The project area will be defined following a detailed site assessment, including targeted flora and fauna surveys.

Table 4-4 Modelled EVCs within the referral area

Ecological Vegetation Class	Description	Bioregional conservation status (BCS)	FFG community	Modelled area in onshore IA (ha)	Percentage cover of the onshore IA (%)
Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01)	Coastal Dune Scrub - Closed scrub to 5 metres tall with occasional emergents occurring on secondary dunes along ocean and bay beaches and lake shores. Occupies siliceous and calcareous sands that are subject to high levels of salt spray and continuous disturbance from onshore winds. Coastal Dune Grassland - Consists of grasses and halophytes (salt-tolerant species) that colonise the foredunes of ocean beaches. Soils are siliceous sands that have a very low humus content.	Depleted	Coastal Moonah Woodland (associated with the Coastal Dune Scrub EVC)	6.61	0.09
Estuarine Wetland (EVC 10)	Grows on anaerobic peat-rich muds on the edges of estuarine waterbodies such as creeks, rivers and lagoons with intermediate salinity conditions. Vegetation is determined by fluctuating salinity, which varies in time from occasionally fresh to brackish or occasionally saline according to river flood and marine tide events. Dominated by graminoids and halophytic herbs and often fringed by a tall scrub layer of swamp paperbark <i>Melaleuca ericifolia</i> at the landward edge.	Least Concern	N/A	47.72	0.65
Lowland Forest (EVC 16)	Eucalypt forest to 20 metres tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. Characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs.	Vulnerable	N/A	105.10	1.44
Heathy Woodlands (EVC 48)	Spans a variety of geologies but is generally associated with nutrient-poor soils including deep uniform sands (aeolian or outwash) and Tertiary sand/clay which has been altered to form quartzite gravel. Eucalypt-dominated low woodland to 10 metres tall lacking a secondary tree layer and generally supporting a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken. Geophytes and annuals can be quite common but the ground cover is normally fairly sparse.	Heathy Woodlands	N/A	1.15	0.02
Swamp Scrub (EVC 53)	Closed scrub to 8 metres tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by swamp paperbark <i>Melaleuca ericifolia</i> (or sometimes woolly tea-tree <i>Leptospermum lanigerum</i>) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer.	Endangered	N/A	2.03	0.03

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Ecological Vegetation Class	Description	Bioregional conservation status (BCS)	FFG community	Modelled area in onshore IA (ha)	Percentage cover of the onshore IA (%)
Riparian Scrub (EVC 191)	A dense shrubland to 6 metres tall with occasional eucalypt emergents growing on waterlogged substrates often with a peaty surface horizon. Emergent eucalypts may be occasionally present. The understorey is often species-poor and consists typically of sedges tolerant of seasonal waterlogging. Occurs along creeks and minor stream tributaries of the lowland plains.	Vulnerable	N/A	29.49	0.40
Lowland Forest/Heathy Woodland Mosaic (EVC 698)	Lowland Forest – Eucalypt forest to 20 metres tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. Characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs. Heathy Woodland - Spans a variety of geologies but is generally associated with nutrient-poor soils including deep uniform sands (aeolian or outwash) and Tertiary sand/clay which has been altered to form quartzite gravel. Eucalypt-dominated low woodland to 10 metres tall lacking a secondary tree layer and generally supporting a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken. Geophytes and annuals can be quite common, but the ground cover is normal sparse.	Vulnerable	N/A	393.27	5.37
Water Body – Fresh (EVC 992)	N/A	N/A	N/A	2.21	0.03
Total of modelled native vegetation				587.59	8.03%
No modelled native vegetation				6,734.48	91.97%
Total area of onshore TIA				7,322.07	100%

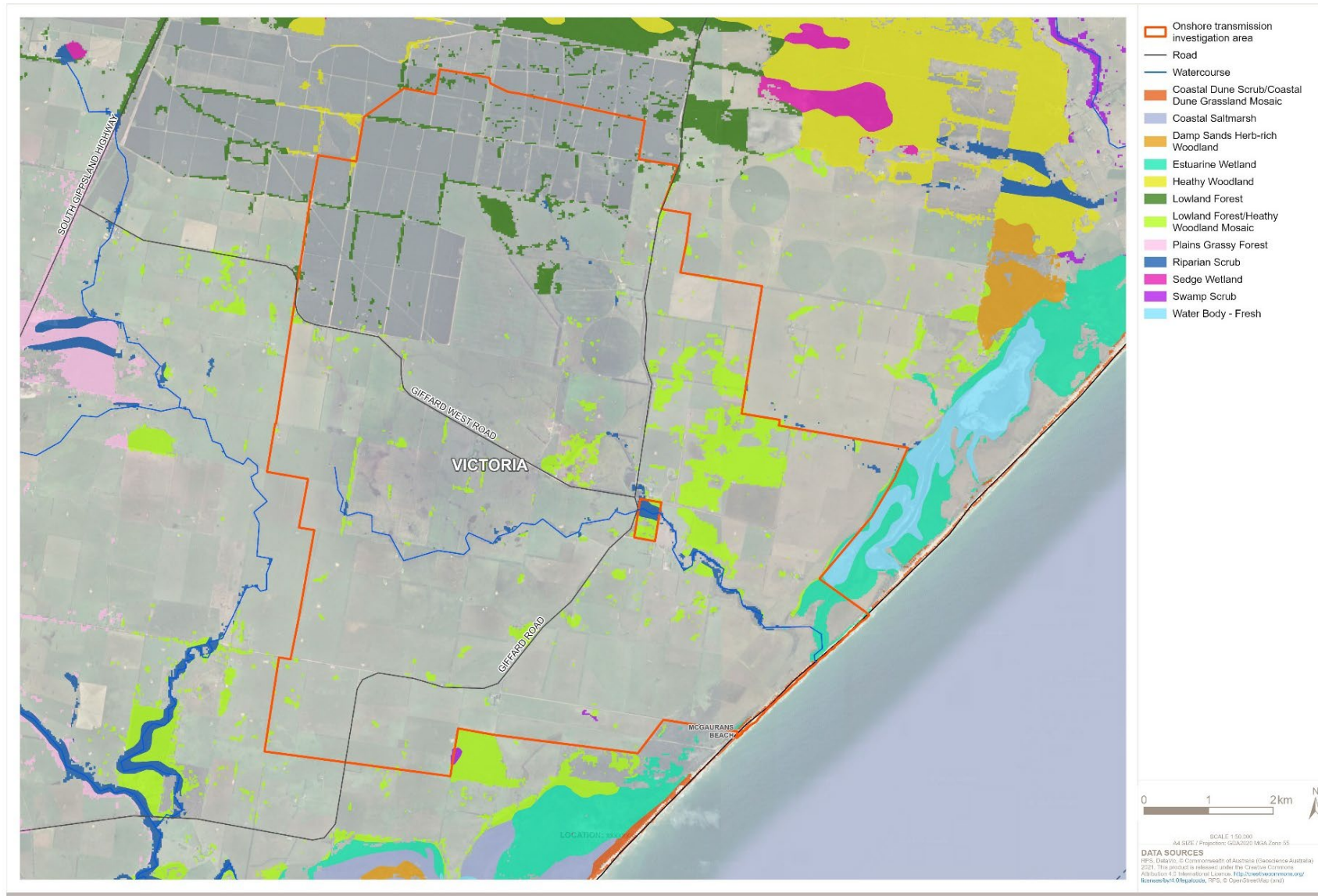


Figure 4-3 Modelled EVCs in the onshore TIA



Figure 4-4 2005 Modelled EVC 53 – Swamp scrub patch (yellow) in the onshore TIA compared to more recent aerial imagery

4.4.2 Threatened ecological communities

A review of DECCA's 2005 FFG threatened community mapping extent (VNV2005_FFG_COMM) identified the presence of one FFG Act listed TEC community, Coastal Moonah (*Melaleuca lanceolata* subsp. *Lanceolata*) as modelled to occur within the onshore TIA. This TEC is modelled to occur within the southern portion of the onshore TIA, along the coastal dune system adjacent to McGaurans beach as shown in Figure 4-5.

Table 4-5 TECs modelled to occur within the onshore TIA

FFG Community	Conservation status	Description	Relevant / associated EVC modelled occurring within the onshore TIA	Source
Coastal Moonah (<i>Melaleuca lanceolata</i> subsp. <i>lanceolata</i>) Woodland Community	Threatened	The Coastal Moonah Woodland Community is an open grassy woodland dominated by <i>Melaleuca lanceolata</i> subsp. <i>lanceolata</i> (Moonah). This TEC tends to occur on high-level coastal dunes on strongly alkaline and developed on moderately organic aeolian sands or on dune calcarenite. This community is distributed along the Victorian coastline (DECCA n.d)	Coastal Dune Scrub/Coastal Dune Grassland Mosaic (EVC 01)	NV2005_FFG_COMM NV2005_EVC

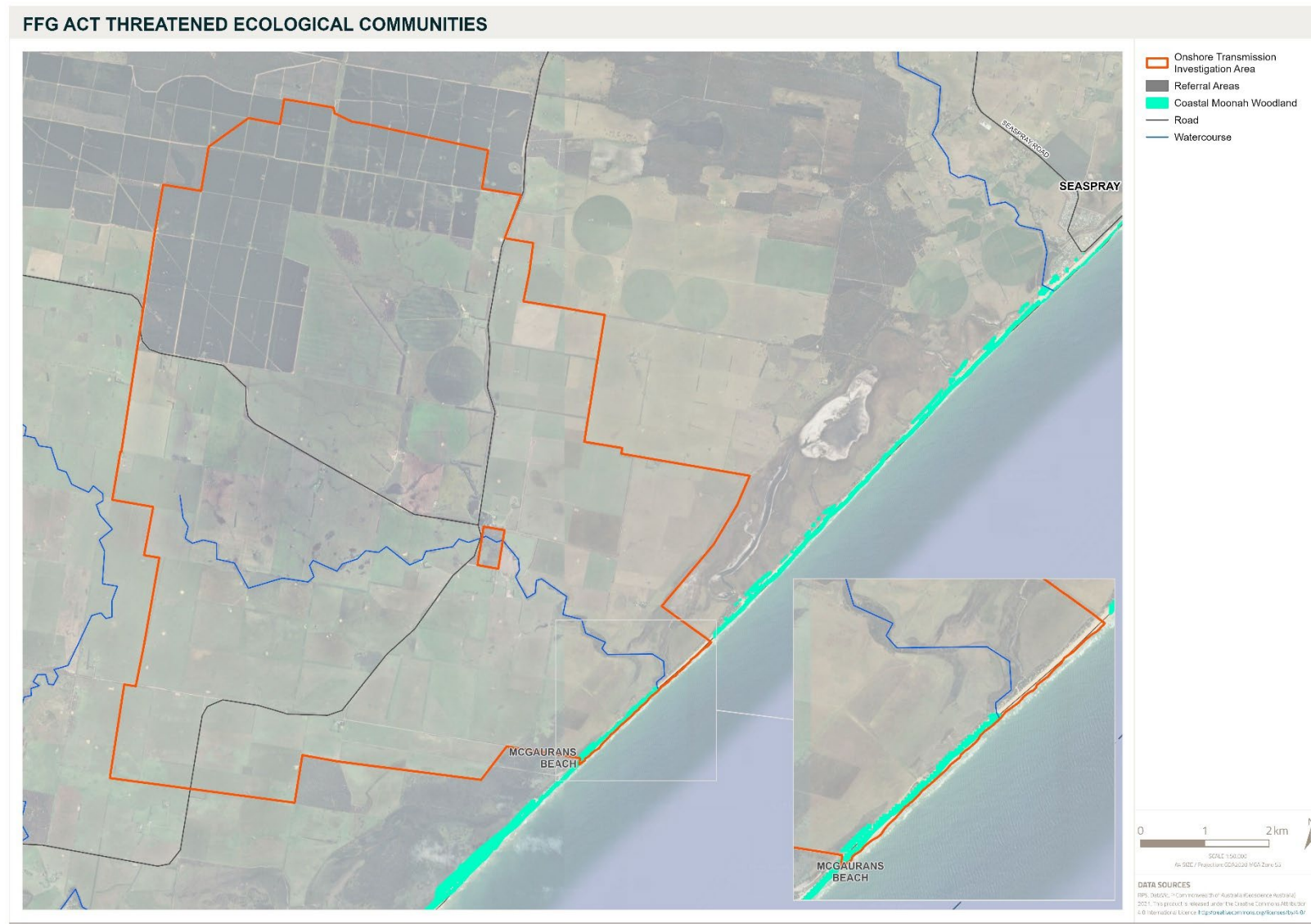


Figure 4-5 Threatened ecological communities modelled to occur within the onshore TIA

4.5 Flora

4.5.1 Terrestrial flora

The desktop assessment described in Section 3.2.1 identified 38 threatened terrestrial flora species that have the potential to occur within the study area (a 10 kilometre buffer of the referral area). Of the 38 threatened flora species considered, 32 are assessed as 'possible' to occur within the referral area as shown in Table 4-6. This assessment is based on the species either being recorded in the VBA or habitat for the species is modelled or known to be present within the referral area. Species that have been screened out have either not been recently recorded in the study area or habitat is not present or unlikely to occur within the referral area.

Species records within the study area are shown in Figure 4-6. No records exist within the referral area and therefore all species in Table 4-6 are assessed as 'possible' to occur.

A preliminary evaluation of the likelihood of occurrence for all threatened flora species identified through the desktop assessment is provided in Appendix A.

Table 4-6 Threatened flora species known or predicted to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Acacia howittii</i>	Sticky wattle	Vulnerable	3	27/06/2023	Possible
<i>Althenia marina</i>	Sea water-mat	Critically Endangered	2	30/11/1990	Possible
<i>Austrostipa rudis subsp. australis</i>	Veined spear-grass	Endangered	1	28/10/1983	Possible
<i>Caladenia aurantiaca</i>	Orange-tip finger-orchid	Endangered	7	26/08/2003	Possible
<i>Caladenia tessellata</i>	Thick-lipped spider-orchid, daddy long-legs	Vulnerable	0		Possible
<i>Calochilus imberbis</i>	Naked beard-orchid	Critically Endangered	1	1/11/2000	Possible
<i>Commersonia prostrata</i>	Dwarf kerrawang	Endangered	29	10/11/2010	Possible
<i>Corybas aconitiflorus</i>	Spurred helmet-orchid	Endangered	1	31/05/1966	Possible
<i>Corybas fimbriatus</i>	Fringed helmet-orchid	Endangered	1	27/06/2023	Possible
<i>Dianella amoena</i>	Matted flax-lily	Critically Endangered	2	30/06/2006	Possible
<i>Diuris punctata</i>	Purple diuris	Endangered	2	1/09/2003	Possible
<i>Eucalyptus arenicola</i>	Gippsland Lakes peppermint	Endangered	5	9/11/2000	Possible
<i>Eucalyptus bosistoana</i>	Coast grey-box	Endangered	144	27/07/2023	Possible
<i>Eucalyptus fulgens</i>	Green scentbark	Endangered	2	10/04/2003	Possible
<i>Grevillea chrysophaea</i>	Golden grevillea	Vulnerable	3	1/11/2000	Possible
<i>Lachnagrostis robusta</i>	Salt blown-grass	Endangered	1	17/12/1998	Possible

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Lachnagrostis semibarbata</i> var. <i>semibarbata</i>	Purple blown-grass	Endangered	5	8/09/2000	Possible
<i>Leptorhynchus elongatus</i>	Lanky buttons	Endangered	1	26/11/1994	Possible
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant honey-myrtle	Endangered	1	20/09/2010	Possible
<i>Oxalis rubens</i>	Dune wood-sorrel	Endangered	2	16/04/2003	Possible
<i>Poa billardiarei</i>	Coast fescue	Endangered	1	19/09/1979	Possible
<i>Pomaderris discolor</i>	Eastern pomaderris	Endangered	1	1/11/2000	Possible
<i>Pomaderris pilifera</i> subsp. <i>pilifera</i>	Striped pomaderris	Endangered	1	1/11/2000	Possible
<i>Posidonia australis</i>	Fibre-ball weed	Endangered	2	18/07/1960	Possible
<i>Prasophyllum spicatum</i>	Dense leek-orchid	Critically Endangered	0		Possible
<i>Pseudanthus ovalifolius</i>	Oval-leaf pseudanthus	Vulnerable	1	1/11/2000	Possible
<i>Pterostylis chlorogramma</i>	Green-striped greenhood	Endangered	126	28/07/2023	Possible
<i>Pterostylis grandiflora</i>	Cobra greenhood	Endangered	451	28/07/2023	Possible
<i>Senecio microbasis</i>	Slender fireweed	Vulnerable	2	14/11/2019	Possible
<i>Thelymitra epipactoides</i>	Metallic sun-orchid	Endangered	0		Possible
<i>Xanthosia leiophylla</i>	Parsley xanthosia	Endangered	1	18/12/1978	Possible
<i>Zieria veronicea</i> subsp. <i>veronicea</i>	Pink zieria	Endangered	1	25/09/1975	Possible

Large parts of the onshore TIA are devoid of native vegetation, having been disturbed by agriculture, with most threatened flora species unlikely to occur across the majority of the onshore TIA. The greatest opportunity for threatened flora species to exist is within bushland and coastal reserves, wetlands and along road reserves. These areas are shown in Figure 4-6.

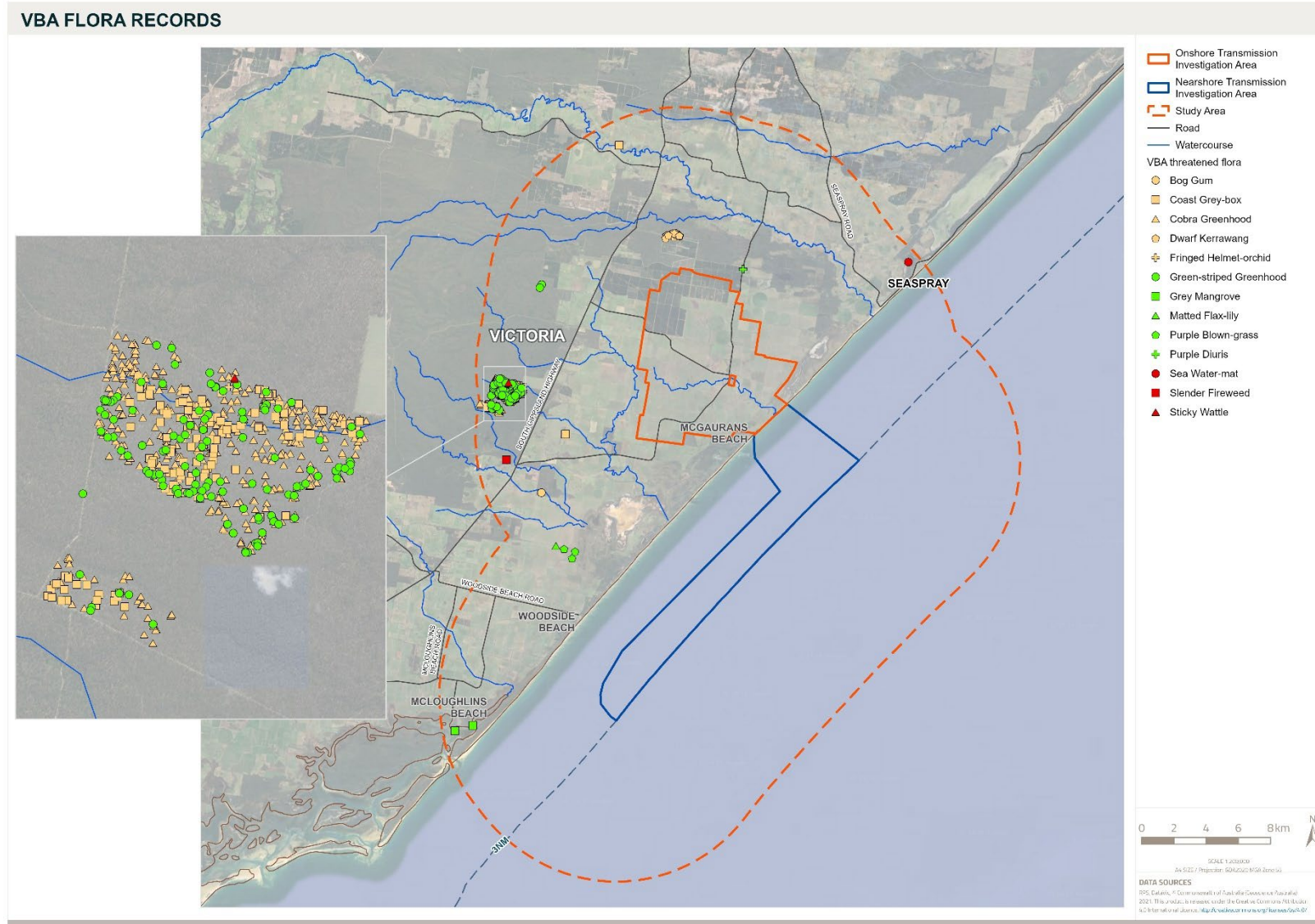
Habitats and locations in which the threatened flora species considered possible or known to occur within the onshore TIA may occupy include:

- Road reserves – road reserves contain some of the few intact areas of remnant vegetation within the onshore TIA. These areas, such as Giffard Road and Giffard West Road provide potential habitat for species such as the sticky wattle and veined speargrass
- Wetlands – including freshwater and estuarine wetlands (sea water-mat)
- Waterways - such as the presence of ephemeral waterways and estuarine systems.

4.5.2 Marine flora

There are no marine threatened flora identified as known or possible to occur within the nearshore TIA as shown in Figure 4-6. The sea water-mat (*Althenia marina*) is discussed in the terrestrial flora section (Section

4.5.1) as suitable habitat may occur within the onshore TIA, associated with permanent saline waters and within the estuarine wetland (EVC 10).



4.6 Terrestrial fauna

4.6.1 Terrestrial fauna habitat

Aerial imagery and the DEECA landcover layer (DEECA, 2026d; Geoscience Australia, 2026), shows that the majority of the referral area has been cleared or modified for agriculture (including grazing and cropping) and agroforestry use. Approximately 92 % of the referral area is modelled to be devoid of native vegetation as discussed in Section 4.4 and shown in Figure 4-3. Areas where native vegetation has been cleared are now covered by non-native perennial pasture and crops which provide low value habitat for fauna and are unlikely to support threatened fauna species.

Where pockets of native vegetation do exist within the referral area, for example along road reserves, wetlands and waterways and coastal reserves, these areas are likely to provide habitat for threatened fauna species. During detailed design for onshore transmission, these areas will be avoided where possible as described in Section 2.

There are no areas determined to be critical habitat under the FFG Act present within the referral area.

The key faunal habitats likely to occur within the onshore TIA are described in Table 4-7 below.

Table 4-7 Fauna habitats likely to occur within the onshore TIA

Habitat type	Description	Fauna habitat value and species
Woodland	Majority of patches of forest/woodland habitat within the terrestrial referral area are of relatively small extent and fragmented, occurring mostly within road reserves or as isolated patches surrounded by cleared or modified areas.	Forest/woodland habitats are expected to provide suitable habitat for a range of terrestrial birds including threatened species such as the swift parrot and powerful owl. These habitats would also support various ground-dwelling and arboreal mammal and reptile species such as the new holland mouse and the lace monitor.
Grassland	Large portions of the terrestrial referral area have been cleared for agricultural purposes and are now dominated by native pasture grasses or crops. Some agricultural land may contain pockets of native grassland. Most areas of grassland within paddocks appear to be frequently grazed by cattle or sheep, however, some areas contain less disturbed, native grasslands.	Common and adaptable fauna species use this habitat, including native and non-native birds. Mammals are also expected to use this habitat regularly. Threatened fauna species with smaller, discrete home ranges are unlikely to regularly use grassland habitat within the onshore referral area, unless there are associated ecological features such as wetlands or surrounding waterways.
Coastal dunes and vegetation	The coastal habitats at McLoughlins Beach and Seaspray Coastal Reserve comprise a mixture of wide, sandy beaches, grading into coastal grassy, scrub or woodland habitats and areas of coastal saltmarsh.	The coastal habitats at Ninety Mile Beach are likely to provide habitat for those that prefer sandy beach habitats. These include the hooded plover and the double-banded plover. 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 the glossy grass skink and the swamp skink.
Wetlands and waterways	There are a number of wetlands and waterways in the onshore TIA, most of which are small, unnamed tributaries or farm dams within agricultural land. Riparian swamp/scrub is expected to be confined to relatively narrow riparian corridors along waterways or other low-lying depressions within the onshore TIA.	Coastal wetlands and waterway habitats are likely to be of high value to a range of shorebirds and other wetland birds, including threatened and/or migratory species. Jack Smith Lake, located approximately 7 kilometres from the onshore referral area, is a wetland of regional significance that provides important habitat for a number of migratory shorebirds including the sharp-tailed sandpiper. Freshwater wetlands and waterways within the onshore TIA, 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 the growling grass frog.

Habitat type	Description	Fauna habitat value and species
		Riparian swamp/scrubs may provide habitat for a number of ground-dwelling mammals, small birds, reptiles and frogs, and may support threatened species such as the swamp skink and the glossy grass skink.

4.6.2 Threatened fauna species

The desktop assessment outlined in Section 3 identified 65 threatened terrestrial fauna species that have the potential to occur within the study area (a 10 kilometre buffer of the referral area). Of the 65 threatened terrestrial fauna species considered, 51 are assessed as 'known' or 'possible' to occur within the referral area. This assessment is based on the species either being recorded in the VBA or habitat for the species is modelled or known to be present within the referral area. Species that have been screened out have either not been recently recorded in the study area or habitat is not present or unlikely to occur within the referral area.

A preliminary evaluation of the likelihood of occurrence for all threatened fauna species identified through the desktop assessment is provided in Appendix A.

Of the 51 species predicted as 'possible' or 'known' to occur, these species occupy a range of habitats including woodlands, grasslands, coastal dunes and vegetation and wetlands and waterways and are discussed further in the following categories:

- Terrestrial birds
- Shorebirds
- Waterbirds
- Mammals
- Reptiles
- Fish
- Frogs.

VBA species records within the study area are shown in Figure 4-7.

The PMST report is provided in Appendix B.

A summary of species identified through the PMST and VBA search and a summary of the likelihood of occurrence assessment is outlined in Appendix A.

4.6.2.1 Terrestrial birds

For the purpose of this report, 'terrestrial birds' refers to bird species that are adapted to live and feed, almost exclusively, in terrestrial habitats. Includes species that undertake regular broadscale or regional, seasonal or annual movements/migrations over ocean habitat and/or feed aerially on insects that may be carried offshore. Includes, for example, songbirds, parrots, cuckoos and swifts.

There are 11 terrestrial bird species assessed as known or possible to occur within the referral area and are shown in Table 4-8.

Table 4-8 Terrestrial bird species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence
<i>Accipiter novaehollandiae</i>	Grey goshawk	Endangered	2	1/09/1980	Possible
<i>Calamanthus pyrrhopygius</i>	Chestnut-rumped heathwren	Vulnerable	13	1/02/1999	Possible

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence
<i>Hieraaetus morphnoides</i>	Little eagle	Vulnerable	12	23/06/2005	Possible
<i>Hirundapus caudacutus</i>	White-throated needletail	Vulnerable	17	9/02/2019	Possible
<i>Lathamus discolor</i>	Swift parrot	Critically Endangered	2	16/04/2017	Possible
<i>Neophema chrysogaster</i>	Orange-bellied parrot	Critically Endangered	16	11/07/2020	Possible
<i>Neophema chrysostoma</i>	Blue-winged parrot	Vulnerable	23	23/04/2019	Possible
<i>Ninox connivens</i>	Barking owl	Critically Endangered	1	24/07/1980	Possible
<i>Ninox strenua</i>	Powerful owl	Vulnerable	10	29/04/2008	Possible
<i>Stagonopleura guttata</i>	Diamond firetail	Vulnerable	0		Possible
<i>Tringa stagnatilis</i>	Marsh sandpiper	Endangered	10	24/03/2019	Possible

4.6.2.2 Shorebirds

For the purpose of this report, the group 'shorebirds' refers to a bird species in the suborder Charadrii that feeds by wading in intertidal areas or on the fringes of wetlands. These include plovers, oystercatchers, sandpipers and allies. Typically long-legged in relation to body size and without webbing between the toes.

A total of 17 threatened shorebird species were identified as known or possible to occur within the referral area as shown in Table 4-9. Although many of the shorebirds listed in Table 4-9 have recent records within the study area, most of these records are outside of the referral area within coastal wetlands such as Jack Smith Lakes and therefore the likelihood of occurrence is 'possible'.

The beaches along Ninety Mile Beach provide habitat for shorebirds, as well as the wetlands and coastal dune systems, such as Jack Smith Lake. During daily activities, most shorebirds generally remain within a single area of habitat, where foraging and roosting areas are in close proximity to each other. Resident and migratory shorebirds largely forage in or around the margins of shallow water. Depending on the species, shorebirds may use bodies of freshwater, estuaries, beaches and/or the intertidal zone. Year-round resident species such as the hooded plover may be largely confined to localised areas of suitable habitat, although some individuals may undertake broader movements.

Some shorebird species may undertake long migrations, which typically follow the East Asian-Australasian Flyway (DCCEEW, 2025a). Migratory shorebirds are a significant ecological component of Victoria's coastal and wetland environment. These shorebirds breed in the tundra regions of Northern Asia during the northern hemisphere summer and migrate to Australasia, including Victoria, during the Southern Hemisphere summer to feed. Migratory shorebirds rely on Victoria's coastal and inland wetlands as critical feeding and resting sites during their annual migration. These habitats provide rich mudflats with invertebrates, essential for the birds to build reserves for their migration journeys.

Table 4-9 Shorebird species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within the referral area
<i>Actitis hypoleucos</i>	Common sandpiper	Vulnerable	4	25/01/2019	Possible
<i>Arenaria interpres</i>	Ruddy turnstone	Vulnerable	14	17/09/2017	Possible
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Vulnerable	34	16/03/2021	Possible

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within the referral area
<i>Calidris canutus</i>	Red knot	Vulnerable	11	18/12/2023	Possible
<i>Calidris ferruginea</i>	Curlew sandpiper	Critically Endangered	28	12/12/2020	Possible
<i>Calidris tenuirostris</i>	Great knot	Vulnerable	1	4/11/1998	Possible
<i>Gallinago hardwickii</i>	Latham's snipe	Vulnerable	12	13/09/2007	Possible
<i>Limosa lapponica baueri</i>	Nunivak bar-tailed godwit	Endangered	0		Possible
<i>Limosa limosa</i>	Black-tailed godwit	Endangered	4	1/09/1980	Possible
<i>Numenius madagascariensis</i>	Eastern curlew	Critically Endangered	23	1/03/2024	Possible
<i>Numenius phaeopus</i>	Whimbrel	Endangered	3	1/03/2024	Possible
<i>Pluvialis fulva</i>	Pacific golden plover	Vulnerable	14	5/10/2018	Possible
<i>Pluvialis squatarola</i>	Grey plover	Vulnerable	2	12/02/1981	Possible
<i>Thinornis cucullatus</i>	Hooded plover	Vulnerable	43	21/01/2025	Possible
<i>Tringa brevipes</i>	Grey-tailed tattler	Critically Endangered	1	29/11/1977	Possible
<i>Tringa nebularia</i>	Common greenshank	Endangered	28	5/07/2019	Possible
<i>Xenus cinereus</i>	Terek sandpiper	Vulnerable	1	29/11/1977	Possible

4.6.2.3 Waterbirds

For the purpose of this report, the group 'waterbirds' refers to a bird species that habitually lives on or around water with legs that are adapted to swimming, diving or wading. Includes, for example, ducks, egrets and herons.

A total of eight threatened waterbird species were identified that are known or possible to occur within referral area as shown in Table 4-10.

Key habitat for waterbirds within the onshore study area occurs at Lake Denison and Jack Smith Lake and their associated estuarine or coastal wetland habitats. Some waterbirds may also use freshwater wetlands/waterways that occur in the onshore study area.

Table 4-10 Waterbird species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Anseranas semipalmata</i>	Magpie goose	Vulnerable	1	1/07/1999	Possible
<i>Ardea alba modesta</i>	Eastern great egret	Vulnerable	64	7/07/2020	Possible
<i>Ardea intermedia plumifera</i>	Plumed egret	Critically Endangered	3	31/12/1980	Possible
<i>Biziura lobata</i>	Musk duck	Vulnerable	30	15/02/2017	Possible

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Botaurus poiciloptilus</i>	Australasian bittern	Critically Endangered	2	19/06/1979	Possible
<i>Oxyura australis</i>	Blue-billed duck	Vulnerable	8	8/03/1989	Possible
<i>Spatula rhynchotis</i>	Australasian shoveler	Vulnerable	60	19/09/2020	Known to occur
<i>Stictonetta naevosa</i>	Freckled duck	Endangered	4	7/07/2017	Known to occur

4.6.2.4 Mammals

A total of six threatened terrestrial mammal species were identified that are known or possible to occur within the referral area, as shown in Table 4-11. Habitat for most of these species within the onshore study area occurs in areas of forest/woodland habitat, scrub habitat and within coastal vegetation.

Table 4-11 Terrestrial mammal species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Isodon obesulus obesulus</i>	Southern brown bandicoot	Endangered	0	N/A	Possible
<i>Petauroides volans</i>	Southern greater glider	Endangered	51	21/07/2022	Known to occur
<i>Phascogale tapoatafa</i>	Brush-tailed phascogale	Vulnerable	1	30/04/1962	Possible
<i>Pseudomys novaehollandiae</i>	New holland mouse, Pookila	Vulnerable	3	1/02/1978	Possible
<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	Vulnerable	0	N/A	Possible
<i>Synoicus chinensis</i>	King quail	Endangered	1	1/08/1975	Possible

4.6.2.5 Reptiles

Three threatened terrestrial reptile species were identified that are known or possible to occur within the referral area, as shown in Table 4-12. Habitat for most of these species (including the lace monitor) within the onshore study area occurs in areas of forest/woodland habitat, scrub habitat and within coastal vegetation. Other species such as the glossy grass skink and swamp skink are more likely to reside within freshwater wetlands/waterways and their associated riparian habitats.

Table 4-12 Terrestrial reptile species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Lissolepis coventryi</i>	Swamp skink	Endangered	2	9/12/1997	Possible
<i>Pseudemoia rawlinsoni</i>	Glossy grass skink	Endangered	9	3/12/2024	Possible
<i>Varanus varius</i>	Lace monitor	Endangered	15	30/10/2017	Known to occur

4.6.2.6 Fish

The desktop assessment identified three terrestrial fish as having the potential to occur within the study area, however, one species, the Macquarie perch was assessed as being unlikely to occur in the referral area and is therefore screened out of this assessment (refer Table 4-13 and Appendix A).

The migratory Australian grayling would pass through estuarine and marine areas during spawning migrations, this species along with southern pygmy perch require permanent freshwater habitat. Both dwarf galaxias and Macquarie 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.

Table 4-13 Terrestrial fish species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Galaxiella pusilla</i>	Eastern dwarf galaxias, dwarf galaxias	Endangered	0	N/A	Possible
<i>Prototroctes maraena</i>	Australian grayling	Vulnerable	2	23/02/1976	Possible

4.6.2.7 Frogs

Three threatened terrestrial frog species were identified that are known or possible to occur within the referral area, as shown in Table 4-14.

The growling grass frog, classified as vulnerable under the FFG Act, is likely to be associated with freshwater wetlands/waterways and their associated riparian habitats. Their habitat 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. The southern toadlet is generally found at lower elevations in damp areas (Swiff, 2026). It is recorded from forests, woodlands, heaths and grasslands but not necessarily always near permanent water. Martin's toadlet is mainly confined to the Gippsland Coast in Victoria and resides in medium-sized permanent or semi-permanent swaps and ponds surrounded by woodland or coastal heath.

Table 4-14 Terrestrial frog species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Litoria raniformis</i>	Growling grass frog	Vulnerable	10	19/04/1977	Possible
<i>Pseudophryne semimarmorata</i>	Southern toadlet	Endangered	45	16/04/2021	Possible
<i>Uperoleia martini</i>	Martin's toadlet	Endangered	1	23/09/1998	Possible

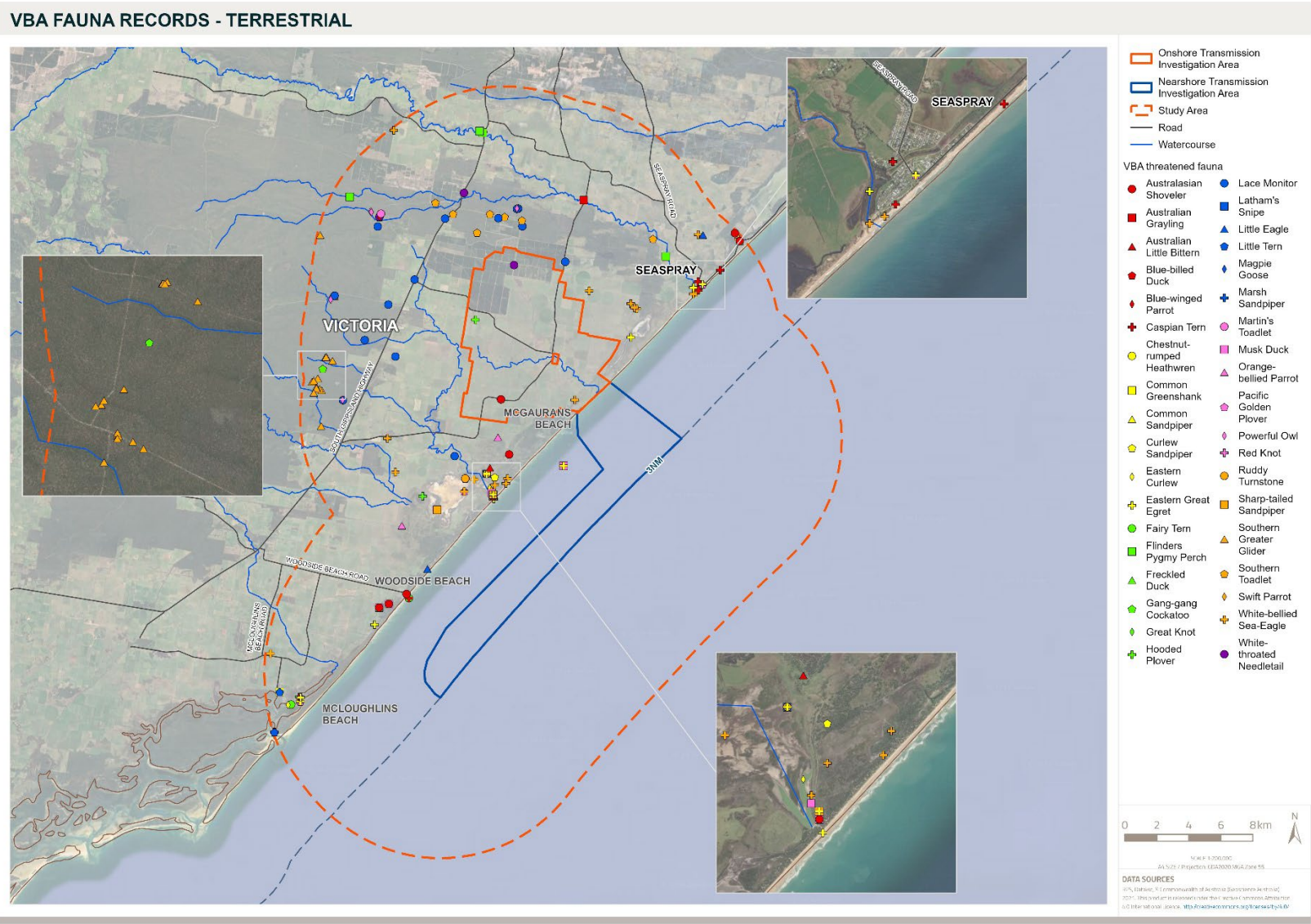


Figure 4-7 VBA terrestrial fauna records within the study area

4.7 Marine fauna

4.7.1 Marine fauna habitat

The South-East Marine Region supports a wide array of species, ranging from commercially important fish to threatened marine mammals, birds, reptiles and invertebrates. The nearshore TIA is characterised by a high energy wave environment and strong tidal currents. The seabed is predominantly fine to medium grain sand/rubble interspersed with patches of rocky reef. There are three key marine ecological features (KEFs) identified as potentially occurring within the nearshore TIA (Table 4-15).

In Victoria, biotopes are classified in a hierarchical catalogue termed the Combined Biotope Classification Scheme (CBiCS) (Edmunds, Glynn, & Ferns, 2021). CoastKit (Victoria's marine and coastal mapping portal) identified five CBiCS level three biotopes in the nearshore TIA: "littoral sand", "high energy littoral rock", "high energy infralittoral rock", "sublittoral sand and muddy sand", and "non-reef sediment epibenthos". The most represented biotope in the nearshore TIA is the 'sublittoral sand and muddy sand' as shown in Figure 4-8.

Key habitats within the nearshore TIA are described in Table 4-15, including the species they support.

Table 4-15 Summary of habitats within the nearshore TIA, derived from CoastKit biotopes.

Habitat	Description and Species
Intertidal beaches	The intertidal region of the referral area is represented by sandy beaches consisting of fine sediments and silt, classified as 'littoral sand'. The beaches along the Gippsland coast are notable areas of shorebird habitat, including for threatened species such as the hooded plover, great knot and curlew sandpiper (refer Section 4.6.2). The proposed shore crossing location at McGaurans beach is however frequently disturbed by vehicles driving on the beach and does not feature a significant beach width that allows for the establishment of breeding nests.
Sediment	The seabed of the nearshore TIA comprises predominately sublittoral sand and muddy sand and occasional areas of hard substrate (Figure 4-8). Victorian Biotope Atlas records confirm the presence of a range of habitats and habitat complexes, including 'Sublittoral mixed sediments', 'Sublittoral sand and muddy sand', 'Infralittoral fine sand', 'High energy infralittoral rock', 'Non-reef sediment epibenthos', 'Rippled fine sand' and 'Littoral sand'. These habitats may support a wide range of infauna and epibiota including polychaetes, bivalves, echinoderms, anemones, hydroids and Bryozoa.
Infralittoral rock	Patchy areas of high energy infralittoral rock are mapped as occurring predominately parallel to the coastline, within the wave zone. Patches of infralittoral rock further offshore of the beach within the nearshore TIA, are likely to support low profile reef. These areas are likely to support fauna including infaunal polychaetes, cumacean crustacea and venerid bivalves.
Key marine ecological features	There are three marine KEFs mapped as potentially occurring within the nearshore TIA. The investigation area includes part of two benthic habitats identified as 'significant' under the Victorian Marine Key Ecological Features Framework (DEECA 2025): • Woodside Patch Reefs (k.vic.523) - Low profile patch reefs offshore from Ninety Mile Beach, characterised by sessile invertebrate and filter feeding assemblages. • Woodside Offshore Sediment Bed (k.vic.524) - High diversity infauna in offshore sediments, typical of wider shelf environments. • Woodside Ocean Beaches (k.vic.521) – Shorebird habitat along Ninety Mile Beach.

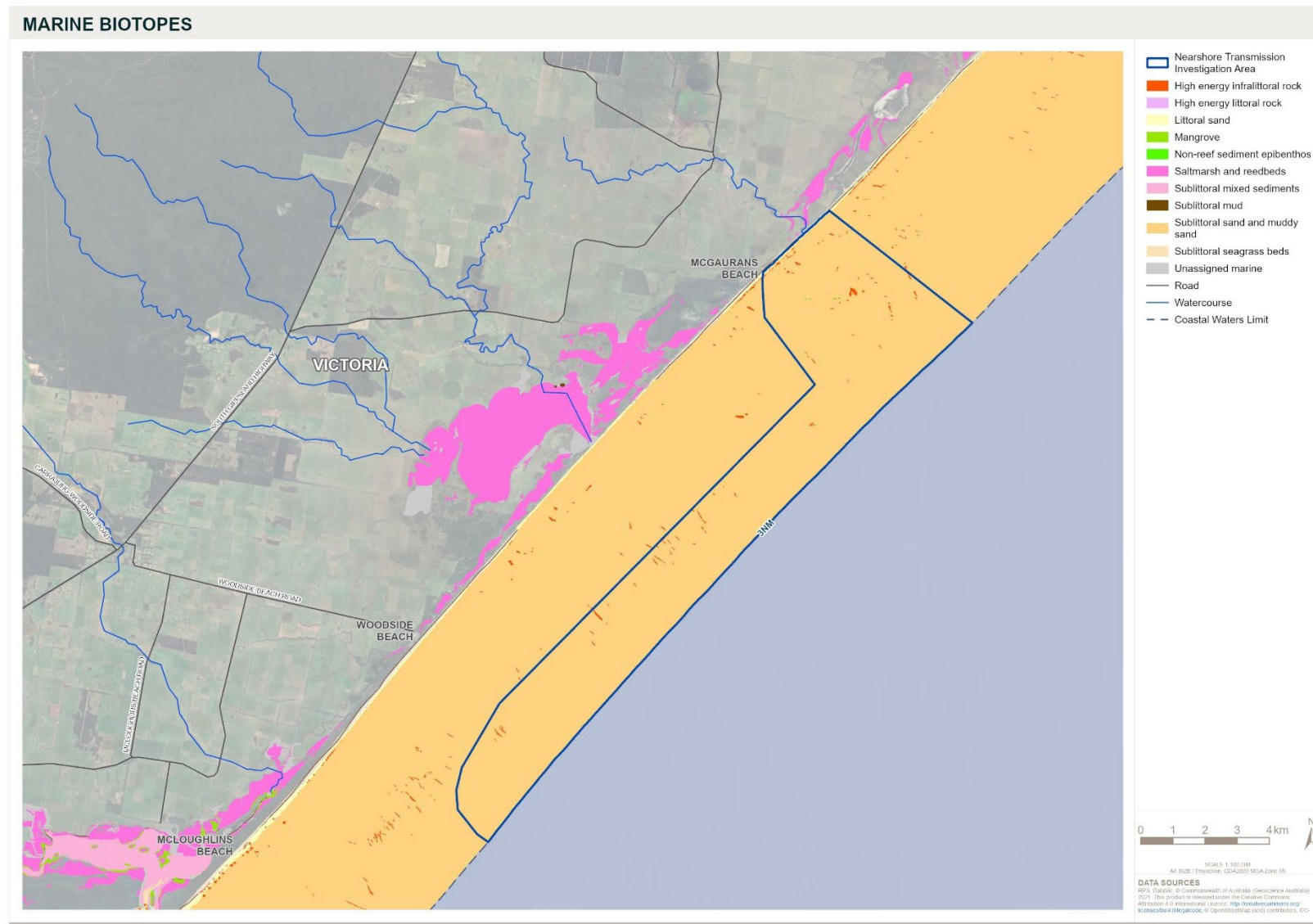


Figure 4-8 Biotopes within the nearshore TIA

4.7.2 Threatened species

The desktop assessment outlined in Section 3.2 identified 21 threatened marine fauna species (as listed under the FFG Act) that have the potential to occur within the study area (a 10 kilometre buffer of the referral area). Of the 21 threatened marine fauna species considered, 14 are assessed as 'known' or 'possible' to occur within the referral area as shown in Section 4.7.2.1 to Section 4.7.2.5 below. This assessment is based on the species either being recorded in the VBA or habitat for the species is modelled or known to be present within the nearshore TIA.

A preliminary evaluation of the likelihood of occurrence for all threatened fauna species identified through the desktop assessment is provided in Appendix A.

The following sections describe marine fauna groups assessed as known or possible to occur within the nearshore TIA.

4.7.2.1 Benthic invertebrates

There are no FFG listed benthic invertebrates identified within the study area from desktop searches.

4.7.2.2 Fish and sharks

No FFG listed marine fish species have been recorded within the nearshore TIA as per the VBA search. The PMST search (Appendix B) identified six FFG listed species (grey nurse shark (*Carcharias taurus*), white shark (*Carcharodon carcharias*), school shark (*Galeorhinus galeus*), porbeagle shark (*Lamna nasus*), whale shark (*Rhincodon typus*) and blue warehou (*Seriola lalandi*), however four of these species have been screened out as unlikely to occur within the referral area (refer Appendix A). The porbeagle shark is known to be extinct in Victoria and the whale shark has no historical records or known habitat within the region.

Although no records are shown on the VBA, the white shark and the blue warehou are known to occur or possible to occur within the referral area, as shown in Table 4-16.

A Biologically Important Area (BIA) for the white shark for breeding is mapped as occurring across the referral area, and tagging studies support the nearshore and inshore region (Corner Inlet) as being a nursery area (Bruce et al. 2018). White sharks are widely distributed in temperate and subtropical waters, ranging from inshore reefs and bays to the outer continental shelf. In Australia, they are mostly found along the southern and eastern coasts, with seasonal movements northward in autumn and winter, and a return south by summer. The white shark is known to migrate along the east coast of Australia with temporary residency in key areas.

The blue warehou is listed as 'Conservation Dependent' under the FFG Act. The species may occur along the coast from Brisbane to Esperance, throughout the Bass Strait and around Tasmanian coasts.

Based on the likelihood of occurrence assessment, the white shark was assessed as known to occur within the referral area, and the blue warehou assessed as possible to occur within the referral area.

Table 4-16 Marine fish and shark species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Carcharodon carcharias</i>	White shark	Endangered	0	N/A	Known to occur
<i>Seriola lalandi</i>	Blue warehou	Conservation Dependent	0	N/A	Possible

4.7.2.3 Marine mammals

One FFG listed marine mammal is known to occur within the nearshore referral area, the southern right whale (*Eubalaena australis*), as shown in Table 4-17. All other species are considered unlikely to occur as detailed in Appendix A.

Table 4-17 Marine mammal species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Eubalaena australis</i>	Southern right whale	Endangered	14	22/07/2023	Known to occur

The southern right whale (*Eubaleana australis*) is listed as Endangered under the FFG Act. There are two subpopulations of southern right whale in Australia – the ‘eastern’ subpopulation, found along the south-eastern coast, and the ‘western’ subpopulation, found predominantly between Cape Leeuwin in Western Australia and Ceduna in South Australia (DCCEEW, 2024). Southern right whales favour shallow waters near the coastline (less than 10 metres deep), and habitat use varies with breeding status and environmental factors.

Southern right whales migrate annually from southern feeding grounds in the subantarctic to northern coastal aggregation grounds to breed, calve and rest during the Austral winter, typically found along the Australian coast from May to October. Key aggregation and calving sites in the South-east Marine Region include Warrnambool, Port Fairy, Port Campbell, and Portland in Victoria, as well as Encounter Bay in South Australia.

14 VBA records of the species were identified within the study area (refer Appendix A and Figure 4-10). The offshore referral area and adjacent coastal waters do not represent a recognised aggregation area for southern right whales; however, the area overlaps with BIAs for ‘migration’ and ‘reproduction’ (refer Figure 4-9). The reproduction BIA is also identified as a habitat critical to survival (HCTS) for the southern right whale. The reproduction BIA and HCTS encompasses the entire southern Australian coastline from Bundaberg in Queensland to north of Bunbury in Western Australia, including the Gippsland coast, and extending out to three kilometres from the coastline.

The National Recovery Plan for the Southern Right Whale (DCCEEW, 2024) identifies climate variability and change as the highest threat to the eastern southern right whale population. Entanglement in fishing/aquaculture equipment and habitat degradation due to the development of coastal and offshore infrastructure are also rated very high risk.

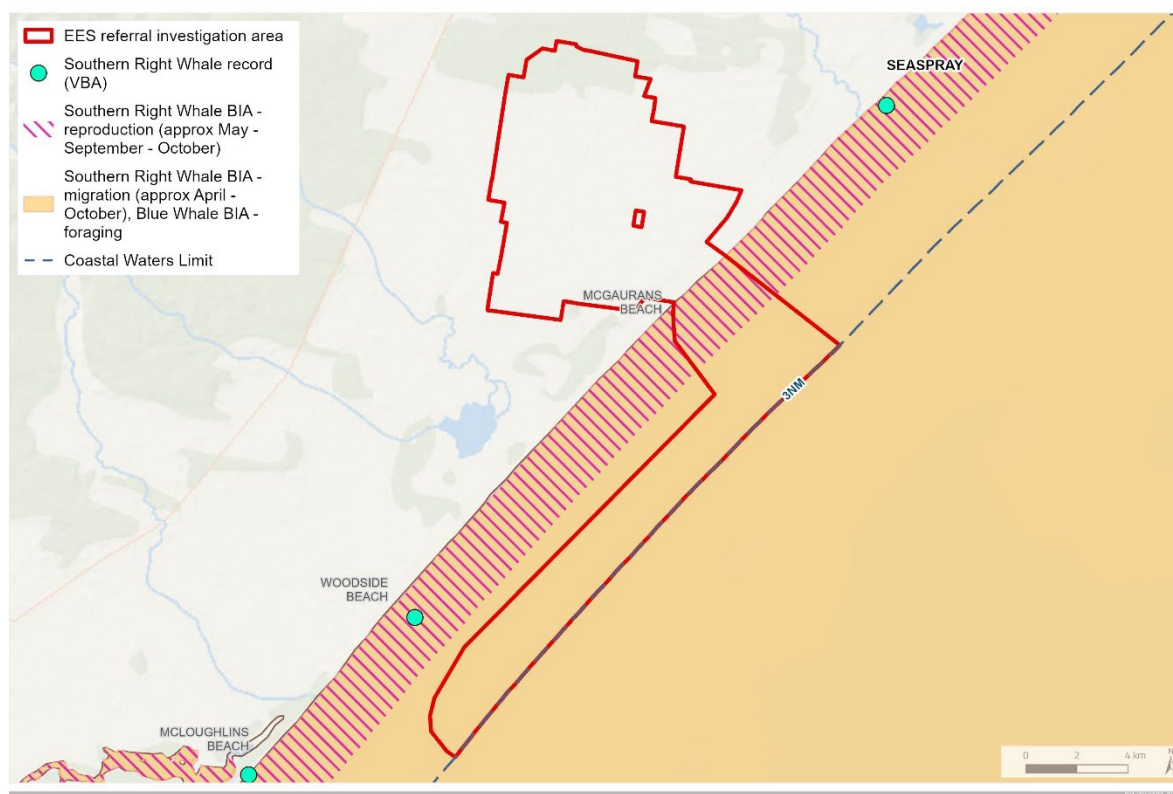


Figure 4-9 Southern right whale BIA and species records (VBA)

4.7.2.4 Marine turtles

One FFG Act listed marine turtle was assessed as possible to occur, the leatherback turtle (*Dermochelys coriacea*), as shown in Table 4-18. No records exist for the species in the VBA within the study area, however, there has been records of carcasses occurring on Gippsland shorelines (ALA 2026, VBA 2026).

Leatherback turtles are distributed throughout tropical, sub-tropical and temperate waters around the world (Limpus, 2009). In Australia, leatherbacks feed in coastal waters around central eastern Australia, south-east Australia and south-western Australia.

No major leatherback turtle rookeries have been recorded in Australia. It is thought that leatherback turtles inhabit and breed in warmer waters in Indonesia, Papua New Guinea and the Solomon Islands between spring and autumn before travelling to forage in the southerly latitudes of south-east Australian waters during summer (November to February) (Bailey et al., 2012). The Bass Strait is reportedly a foraging hot spot for leatherback turtles, with individuals concentrating in areas where productivity is higher (Benson et al., 2011).

Table 4-18 Marine turtle species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Dermochelys coriacea</i>	Leatherback turtle	Critically Endangered	0	N/A	Possible

4.7.2.5 Seabirds

For the purpose of this report, the group 'seabirds' refers to a bird species that lives most of its life at sea, gets its food resources from it and with adaptations to survive in the marine environment (e.g. salt glands, webbed feet). Typical breeding habitat comprises continental or offshore islands, although coastal species may breed on mainland habitats. Includes, for example, albatross, gannets, penguins, petrels and shearwaters. For the purposes of this assessment, terns, gulls, osprey and sea-eagle are categorised as seabirds, despite some species also exploiting terrestrial habitats and/or food sources.

Many seabird species spend relatively little time on land and forage at sea for extended periods. Some species undertake long migrations, however, unlike migratory shorebirds, they do not typically follow the East Asian-Australasian Flyway. A total of 10 threatened seabird species were assessed as known or possible to occur within the referral area as shown in Table 4-19. However, none of the seabird species listed below are known to breed within the referral area. For example, the Indian yellow-nosed albatross, a small sized, dynamic soaring albatross species, breeds on several islands throughout the Southern Indian Ocean, and there are no Australian breeding populations. In Australia, the species forage mostly in Western Australian waters, between March and May. The shy albatross, endemic to Australia, breeds on three islands off the Tasmanian coast, not within or near the referral area.

Table 4-19 Seabird species known or possible to occur within the referral area

Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Ardenna grisea</i>	Sooty shearwater	Vulnerable	2	14/12/1955	Possible
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	Endangered	51	17/05/2019	Known to occur
<i>Hydroprogne caspia</i>	Caspian tern	Vulnerable	63	16/11/2024	Known to occur
<i>Macronectes giganteus</i>	Southern giant-petrel, southern giant petrel	Endangered	0		Possible
<i>Macronectes halli</i>	Northern giant petrel	Endangered	0		Possible

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Scientific name	Common name	FFG Act threatened status	Number of records within the study area	Last recorded	Likelihood of occurrence within referral area
<i>Sternula albifrons</i>	Little tern	Critically Endangered	20	21/01/2025	Possible
<i>Sternula nereis</i>	Fairy tern/ Australian fairy tern	Critically Endangered	8	18/12/2023	Known to occur
<i>Thalassarche bulleri</i>	Buller's albatross	Endangered	0		Possible
<i>Thalassarche carteri</i>	Indian yellow-nosed albatross	Endangered	0		Possible
<i>Thalassarche cauta</i>	Shy albatross	Endangered	2	10/04/1977	Possible

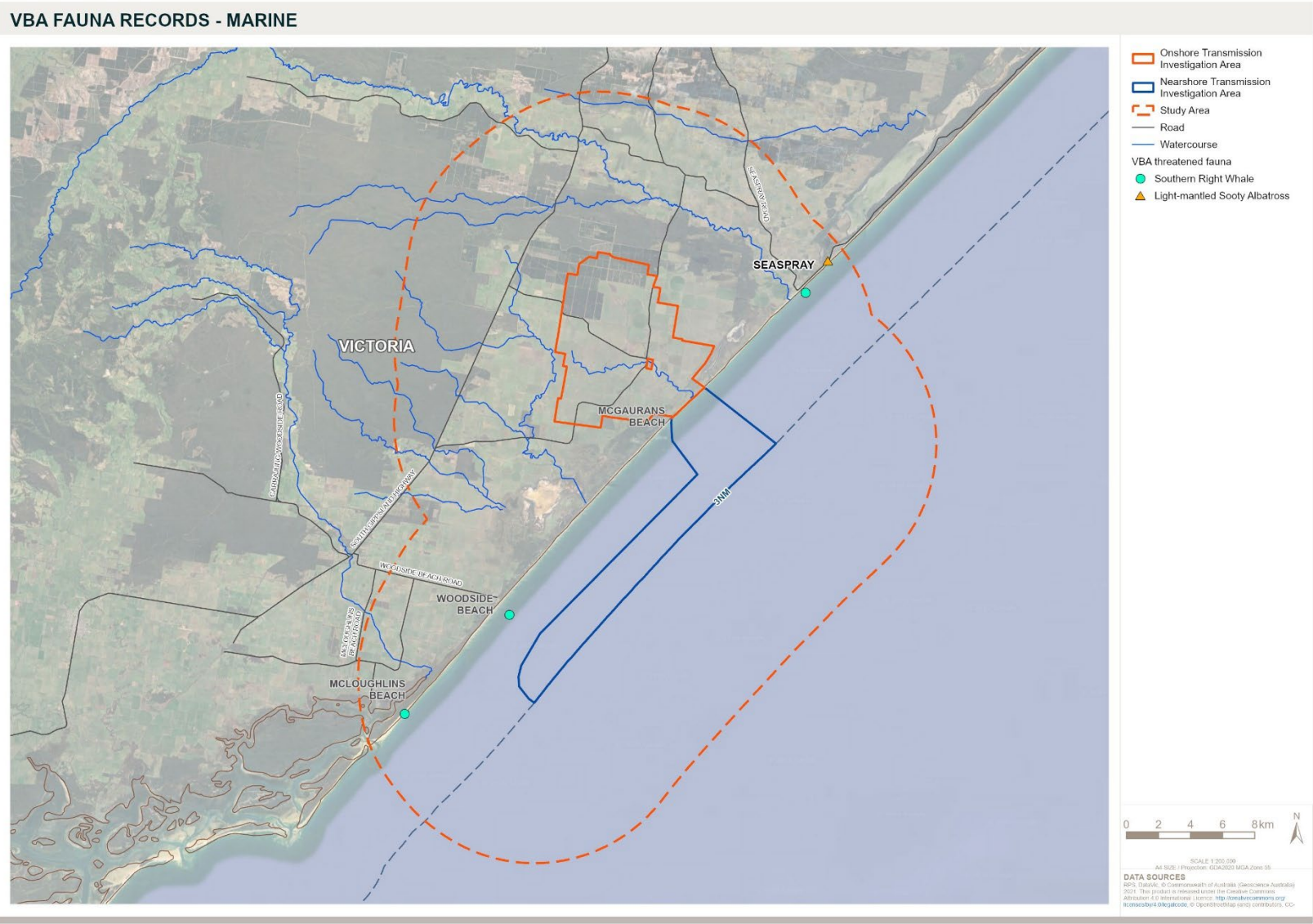


Figure 4-10 VBA marine fauna records within the study area

4.8 Wetlands and hydrology

4.8.1 Ramsar wetlands

Ramsar wetlands are wetlands of international importance designated under the Ramsar Convention. Ramsar wetlands are protected for their important habitat for international migratory shorebirds.

Two wetlands listed under the Ramsar Convention or in a Directory of Important Wetlands in Australia are present in the Gippsland region (refer Figure 4-2):

- The Gippsland Lakes Ramsar Site is more than eight kilometres from the investigation area at its closest point
- The Corner Inlet Ramsar Site is about five kilometres from the offshore investigation area at its closest point, and more than 17 kilometres from the onshore investigation area.

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 Ninety Mile Beach (DCCEEW, 2025). This site consists of a range of wetland habitat types including coastal lagoons, subtidal seagrass, algal beds and a range of saline, brackish and freshwater marsh environments.

Corner Inlet is a large tide-dominated embayment located adjacent to the southernmost tip of the Australian mainland. It consists of a submerged plain covered by sand or mud flats with well-developed seagrass beds, and large sand islands (DCCEEW, 2026). The inlet supports internationally significant populations of a number of coastal, aquatic and semi-aquatic species.

Given the geographic separation between the investigation area and these Ramsar sites, as well as the scale and nature of proposed project activities, these wetlands would not be impacted by the project.

4.8.2 Nationally important wetlands

Nationally important wetlands are wetlands recognised for their ecological, hydrological, cultural or social significance, meeting specific criteria outlined in the Directory of Important Wetlands in Australia (DIWA). The Directory identifies nationally important wetlands and provides a substantial knowledge base of what defines wetlands, their variety, and the flora and fauna species that depend on them (DCCEEW, 2026a).

There are no Nationally important wetlands within the referral area. Jack Smith Lake State Game Reserve, located approximately 7 kilometres south-west of the referral area, is listed as a Nationally important wetland. The Reserve is of high value for flora and fauna and contains extensive areas of coastal saltmarsh, which have been known to support species including the orange-bellied parrot.

4.8.3 State wetlands

Estuarine wetland is present on the eastern margin of the onshore TIA, where it abuts a continuation of Lake Denison. This ephemeral wetland may intermittently provide habitat for migratory wading birds.

The Victorian Wetland Inventory is a comprehensive dataset that includes wetlands in Victoria. According to the *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA, 2025), all mapped wetlands are considered as a remnant patch of native vegetation. A review of modelled wetlands through DEECA's Current Wetlands Map, identified seven mapped wetlands within the referral area, as shown in Figure 4-11. These include:

- Wetland ID 91767 – aquatic system comprising palustrine or lacustrine, periodically inundated
- Wetland ID 90965 – aquatic system being estuarine; Lake Denison
- Wetland ID 91160 - being palustrine, periodically inundated
- Wetland ID 91142 – being palustrine, periodically inundated
- Wetland ID 91203 – being palustrine or lacustrine, periodically inundated
- Wetland ID 91136 - being palustrine, periodically inundated
- Wetland ID 91781 - being palustrine or lacustrine, periodically inundated.

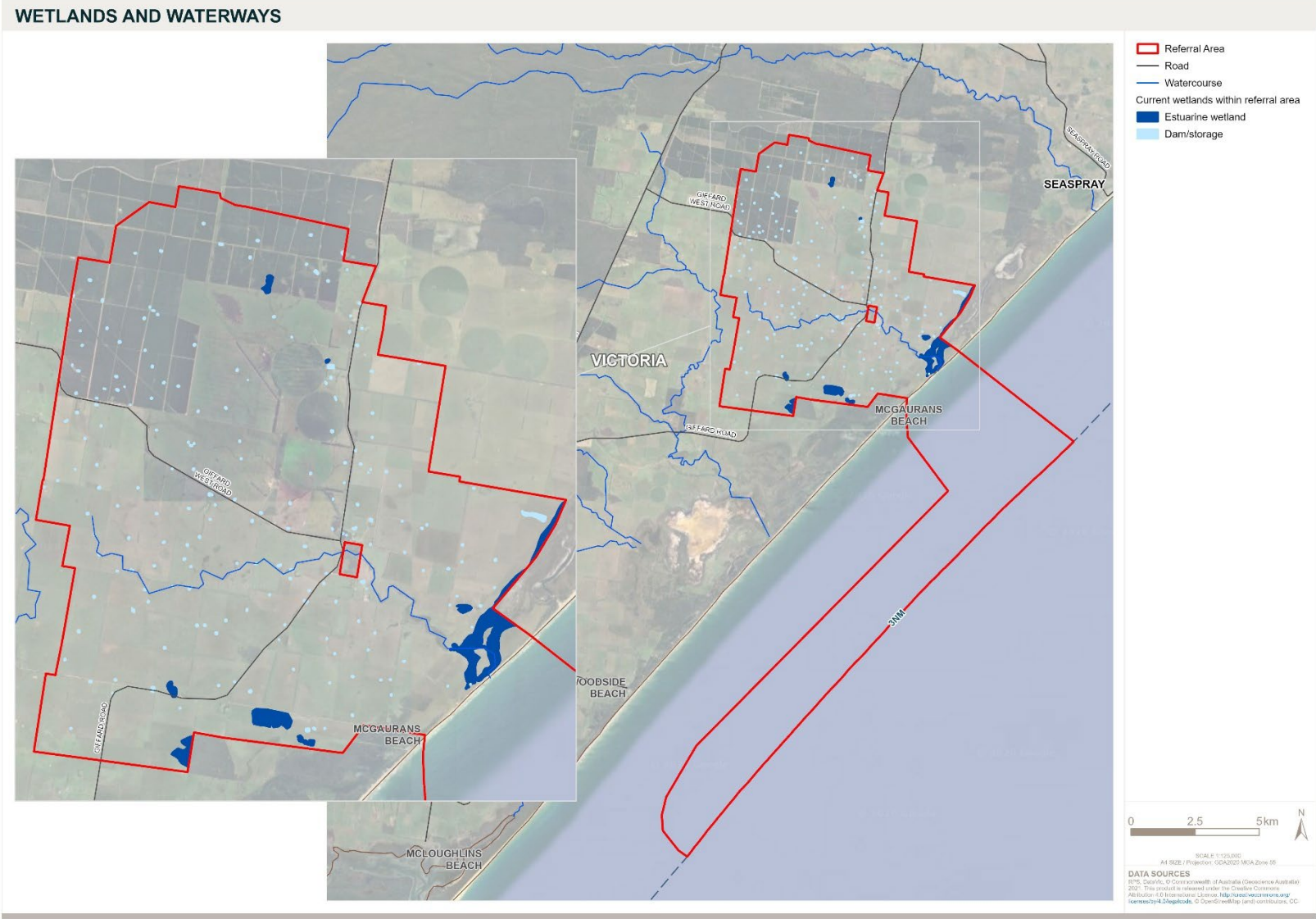
4.8.4 Waterways – rivers and creeks

The coastal plains within the project area are drained by several unnamed minor waters. These converge towards the coast where estuarine wetland, an ephemeral extension of Lake Denison, is present behind coastal dunes and beach. Small temporary swamps, wetlands and claypans are located in low lying areas of agricultural land. The waterways do not currently have a direct outlet to the ocean.

Coastal dune vegetation and estuarine wetland are present adjacent to the shoreline. Some Riparian scrub remains along waterways, and Coastal Dune Scrub/ Coastal Dune Grassland Mosaic and Estuarine Wetland are present immediately inland of the beach.

The shore crossing is located across a section of Ninety Mile Beach (McGaurans beach). This is a linear landscape with a combination of sandy beaches, low dunes, coastal lakes and wetlands adjacent to the seas of Bass Strait.

The onshore cable installation would cross at least one minor waterway as shown in Figure 4-11. There are also several isolated farm dams present on some water ways that flow through the area.



4.9 Summary of environmental values

The referral area is an investigation area extending from the boundary of Victorian coastal waters (three nautical miles from the high-water mark), between Reeves Beach and Seaspray, to 11 kilometres inland. Table 4-20 provides a summary description of environmental values within the referral area.

4.9.1 Nearshore

The water depth in the nearshore referral area ranges from approximately 20 metres at the coastal waters' boundary, to the shore. Soft sediments, sublittoral sand and muddy sand, are the dominant seabed habitats present, with non-reef sediment epibenthos, and patches of rocky reef in both intertidal and subtidal zones.

4.9.2 Onshore

Onshore, the investigation area is located on the coastal plain between Ninety-mile Beach and the South Gippsland Highway. The area is rural and predominantly used for agriculture, particularly livestock grazing, with some cropping and timber plantations.

The coastal plains are drained by several unnamed minor waters in the project area, which converge towards the coast, where ephemeral estuarine wetland is present behind coastal dunes and beach. The waterways do not currently have a direct outlet to the ocean.

Vegetation in the onshore investigation area is predominantly pasture. Modelled native vegetation cover indicates approximately eight per cent of the investigation area comprises native vegetation, although a review of aerial imagery suggests the extent of native vegetation may be much less than indicated by the modelling.

Table 4-20 Summary of environmental values within the referral area

Environmental value	Summary description
Native vegetation	587.59 ha of native vegetation is modelled to occur within the onshore investigation area, comprising eight EVCs, the majority being: • Lowland Forest/Heathy Woodland Mosaic (67%) • Lowland Forest (18%) • Estuarine Wetland (8%). Some riparian scrub is present around waterways. Coastal dune vegetation and estuarine wetland present adjacent to the shoreline.
Threatened ecological communities	DECCA's FFG threatened community mapping extent identified the presence of one FFG Act listed TEC community as modelled to occur within the onshore TIA; the Coastal Moonah (<i>Melaleuca lanceolata</i> subsp. <i>Lanceolata</i>). This TEC is modelled within the southern portion of the onshore TIA.
Threatened species	32 threatened terrestrial flora species identified under the FFG Act are known or possible to occur within the referral area. Habitats in which threatened flora species occur include road reserves, wetlands and waterways. Included in this number, one marine threatened flora is identified as possible to occur within the nearshore TIA; the sea water-mat (<i>Althenia marina</i>). 51 threatened terrestrial fauna species identified under the FFG Act are known or possible to occur within the referral area, including terrestrial birds, shorebirds, waterbirds, mammals, reptiles, fish and frogs. Habitat for these species comprises woodlands, grasslands, coastal dunes and vegetation and wetlands and waterways. 14 threatened marine species identified under the FFG Act are known or possible to occur within the nearshore investigation area, including fish and sharks, marine mammals, marine turtles, and seabirds.
Wetlands and waterways	Two Ramsar wetlands are present within the region, although not within the referral area: • Gippsland Lakes Ramsar site (approximately 8 kilometres from the investigation area) • Corner Inlet Ramsar Site (approximately 5 kilometres from the investigation area). There are no Nationally important wetlands within the referral area. There are a number of State wetlands within the onshore referral area as identified under the DELWP mapped wetlands database.

Environmental value	Summary description
	There are a number of unnamed minor watercourses which converge towards the coast where estuarine wetlands are present behind coastal dunes and beach. Small temporary swamps, wetlands and claypans are located in low lying areas of agricultural land within the region.

5 PRELIMINARY IMPACT ASSESSMENT

This section presents the results of a preliminary impact assessment of the potential effects of the project on state ecological values, and identifies key mitigation measures that will be adopted by the project. The assessment against the environmental effects criteria as defined by the Ministerial Guidelines, focuses on threatened flora and fauna species, threatened ecological communities and native vegetation.

5.1 Identification of potential effects and mitigation

There is the potential for project specific effects to occur to environmental values assessed as known or possible to occur within the referral area.

Table 5-1 and Table 5-2 identifies the following:

- project activities during construction, operation and decommissioning of the project that have potential to result in environmental effects
- key environmental effects that may arise from these project activities, and the key receptor groups that may be impacted
- mitigation measures to avoid and minimise the magnitude of potential effects across each impact pathway.

Proposed measures to avoid or mitigate the main potential adverse environmental effects are described further in Section 6.2. It is assumed that standard mitigation measures required by legislation would be implemented by the project and therefore are not provided in Table 5-1 and Table 5-2. Refer to EES Attachment 10 – Inherent mitigations for a list of all mitigation measures that will be adopted by the project.

5.1.1 Activities onshore

The assessment provided in Table 5-1 is based on the proposed project activities occurring onshore, within the onshore TIA, as described in Section 2 of this report, which are limited to the following:

- construction and installation of the export cable, including the shore crossing within the onshore cable envelope
- operation and maintenance activities relevant to onshore export cables
- decommissioning activities relevant to onshore export cables.

Assessment of impacts and effects are to ecological receptors only.

Table 5-1 Potential impacts, effects and mitigation measures for activities in the onshore TIA

Activity	Impact pathway	Potential effects	Mitigation measures
Construction			
Onshore construction – site establishment	Vegetation removal and clearing	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 (refer Section 4) • Loss, degradation and/or fragmentation of habitat for fauna species listed as threatened or migratory under the FFG Act • Loss, degradation, barrier effects and /or fragmentation or intertidal, wetland, freshwater or terrestrial habitat Indirect loss of vegetation and fauna habitat: • Injury, mortality or displacement of fauna during construction or operation • Physical and toxicity effects to fauna populations. Direct loss of fauna as a result of vegetation removal and clearing.	The project will ensure that any required clearing of native vegetation is less than 10 ha. An onshore investigation area has been identified for investigation of suitability to construct transmission infrastructure. Further assessment (including targeted surveys) would be undertaken through the environmental approvals process to understand the presence of threatened ecological vegetation classes (EVCs) or threatened flora. Where these are present, the project would first aim to avoid and then minimise impacts on these values. Where avoidance is not possible, vegetation clearance would be managed in accordance with the <i>Guidelines for the removal, destruction or lopping of native vegetation</i> (DECCA 2025), including: • Detailed site assessment by a certified native vegetation assessor • Offset unavoidable vegetation removal for listed EVCs.
Operation of construction plant and equipment	Generation of noise and dust	Indirect impacts on terrestrial flora and fauna including reduced viability of habitat due to machinery noise and dust impacts. Potential for sensitivity to the area and avoidance of habitats by terrestrial fauna.	All onshore construction activities will be carried out in accordance with industry best practice standards and guidelines, including for dust suppression and noise. Refer EES Attachment 10 – Inherent mitigations.

Activity	Impact pathway	Potential effects	Mitigation measures
	Introduction and spread of weeds and pathogens	Potential to cause indirect loss of vegetation and fauna habitat. Transport of weeds or pathogens to adjacent vegetation. Displacement of terrestrial fauna if habitat is impacted by weeds and pathogens.	- Inspection of plant and equipment for any organic materials would be undertaken - Washdowns would be implemented as required - Topsoil movement would be minimised where possible
Onshore transmission construction – cable trenching	Fauna injury/mortality during construction and trenching	Direct impacts to terrestrial flora and fauna including vehicle strike, vegetation removal.	- Pre-clearance fauna inspections of fauna habitat, and fauna relocation would be undertaken, if required - Fauna ramps or egress points in excavations if any critical habitat would be intersected due to the construction of project infrastructure - Trench inspections and fauna relocation if required.
	Ground disturbance causing impact to waterways: modifying natural flow regimes, altered runoff patterns, and changes to water quality (e.g. from erosion and sedimentation),	Several waterways and waterbodies including freshwater and estuarine reaches, and wetlands, are present in the onshore referral area that may be impacted directly or indirectly by construction. Impacts to waterways could result in changes to key habitats. Potential impacts including modifying natural flow regimes, alter runoff patterns, impacts to water quality (e.g. erosion and sedimentation), that could result in an impact on the health of biodiversity (flora and fauna).	- Locate infrastructure outside of key habitat for migratory shorebird and waterbird species where possible - Situate project infrastructure away from any waterways that flow into the Ramsar sites where possible - Minimise impacts associated with any waterway crossings using measures such as trenchless construction where practicable and erosion and sediment control to manage indirect impacts to waterways.
	Soil disturbance / inversion during trenching and cable laying	Potential for erosion and scour caused by soil disturbance during onshore earthworks. Indirect impact to terrestrial flora and fauna due to soil disturbance (e.g. habitat removal or changes, loss of flora due to soil changes or disturbance during cable laying). Trampling of threatened flora during soil disturbance for onshore construction.	Soil stockpiling controls would be implemented, including soil layer separation.
	Acid sulfate soil or contamination disturbance from trenching	Potential for toxicity effects to terrestrial flora and fauna due to acid sulfate soil or contamination disturbance. Direct injury or mortality to fauna if contamination arises as a result of construction.	Requirements under the relevant legislation would be adhered to during onshore construction to reduce potential impacts to contamination or disturbance.
	Dewatering from trenching including surface runoff and groundwater	Dewatering can effect terrestrial flora and fauna through the disruption of ecosystems and altering water quality and availability. Impacts include water pollution	Requirements under the relevant legislation would be adhered to during onshore construction to reduce potential impacts to dewatering from trenching.

Activity	Impact pathway	Potential effects	Mitigation measures
Onshore transmission construction – waterway crossings		- ecosystem disruption - reduced availability of water for terrestrial fauna.	
	Temporary flow disruption at waterway crossings during cable laying	Temporary flow disruption at waterway crossings can effect terrestrial flora and fauna through: - physical barriers by the waterway crossings (contribute to obstruction of movement, ability to access key areas) - biodiversity loss – can lead to loss of biodiversity, including direct mortality of fish species and prevent them from migrating.	- Construction would aim to target low flow periods - Plan construction to minimise period of disruption - Flow bypass if necessary. - Consideration of trenchless crossing such as horizontal directional drilling to avoid impacts to waterways.
	Disturbance (excavation) of bed and bank at waterway crossings during cable laying	Disturbance of bed and bank at waterway crossings can impact terrestrial flora and fauna through: - riparian vegetation removal (habitat loss), which is crucial for the survival of many species - bed and bank erosion can lead to loss of critical habitats for some fish and other fauna - long term disturbance, which can lead to population fragmentation and reduced genetic diversity - pollution – disturbance to bed and banks at waterway crossings can lead to erosion and sedimentation which can contribute to pollution in the waterway. This could impact aquatic species, waterbirds, etc.	- Reinstatement of bed and bank material and profile - Rock armour would be utilised where required for stability.
Shore crossing construction	Mud loss to environment during horizontal directional drilling	Mud loss to the environment during horizontal directional drilling can result in: - Pollution of surrounding land and/or water environments, which could result in direct and indirect impacts to a range of terrestrial flora and fauna - Smothering of aquatic habitat and disturbance to fauna if drilling fluids enter waterways - Impacts to water quality from sedimentation or contamination - Potential temporary habitat degradation if releases are not promptly contained.	- Drill fluid selection would aim to use non-toxic fluids - Returns monitoring would be implemented - Response preparedness and clean up.
	Waste concrete, crushed rock, cuttings and mud	Waste produced during shore crossing construction can lead to:	Requirements under the relevant legislation would be adhered to during onshore construction to reduce potential impacts to waste concrete, crushed rock, cuttings and mud.

Activity	Impact pathway	Potential effects	Mitigation measures
Onshore construction – reinstatement of ground disturbance		- Habitat destruction including loss of natural habitats, and reducing living space available for terrestrial flora and fauna - Pollution - Invasive species – improper waste management can introduce non-native species that could outcompete local flora and fauna	
	Waste production during reinstatement	Waste generated during reinstatement may result in: - Improper disposal of construction materials - Pollution of surrounding land and waterways, which could directly impact terrestrial fish and waterbird species - Increased risk of habitat disturbance if waste is not managed appropriately.	Requirements under the relevant legislation would be adhered to during onshore construction to reduce potential impacts to waste production during reinstatement.
	Erosion and sedimentation following reinstatement	Erosion and sediment runoff following reinstatement may lead to: - Sediment entering waterways or drainage lines - Smothering of vegetation and habitat, which could reduce potential habitat for a number of terrestrial species - Reduced soil stability and land degradation.	Permanent erosion and sediment controls would be implemented as per standard legislative requirements.
	Weed growth following reseeded and rehabilitation	Weed growth may result in the following impacts to terrestrial flora and fauna: - Competition with native vegetation - Reduced success of rehabilitation and revegetation, if required - Potential spread of invasive species into surrounding areas.	- Weed management would be implemented, in discussion with landowners - Cover seeding if required.
Operations			
Export cable operation	Electromagnetic field exposure	EMF are generated by the flow of current passing through power cables from both electric fields. Certain fauna species can detect EMF using specialised sensory systems, which enable them to detect weak electric or magnetic fields for navigation, foraging and communication. Onshore EMF have potential to cause:	Appropriate cable burial depth to be identified during detailed design to minimise EMF

Activity	Impact pathway	Potential effects	Mitigation measures
		Local variations of the geomagnetic field caused by power cable EMI Sensitivity to EMF cables which could affect navigation, foraging and communication with other fauna.	

5.1.2 Activities in Victorian coastal waters

The assessment of potential environmental impacts provided in Table 5-2 is based on the proposed project activities nearshore within Victorian state waters, as described in Section 2 of this report, which are limited to the following:

- construction and installation of the export cable, including the shore crossing within the nearshore cable envelope
- vessel activities within Victorian coastal waters
- operation and maintenance activities relevant to offshore export cables in Victorian coastal waters
- decommissioning activities relevant to offshore export cables in Victorian coastal waters.

Table 5-2 Potential impacts, effects and mitigation measures for activities in the nearshore TIA

Activity	Impact pathway	Potential effects	Mitigation measures
Construction and decommissioning			
Export cable construction, maintenance and decommissioning (including seabed preparation for nearshore construction and installation of cable protection)	Seabed disturbance	Potential to cause: • direct disturbance/loss of benthic habitat within the footprint of export cable construction • suspended sediments and sediment deposition resulting in reduced water quality • disturbance to intertidal habitats/subtidal habitats.	Pre-construction geophysical, geotechnical and benthic surveys would inform micro-siting of cable infrastructure to avoid sensitive habitats (including high profile reef and seagrass beds) where possible.
Physical presence of artificial structures in the marine environment (Construction, operation and decommissioning)	Presence of nearshore infrastructure (e.g. cables, cable protection)	The degree to which the physical presence of artificial structures in the marine environment may provide a beneficial or detrimental ecological effect is complex. Potential effects may include: • attraction to infrastructure (leading to increase in species abundance within the area) • barrier effects (disruption to migration and breeding events within the area) • displacement (leading to a decline in abundance and species diversity in the area).	Cables will be buried below the seabed where possible. Where cables cannot be buried, cable protection will be installed.
Nearshore export cable and shore crossing construction and construction vessels using dynamic positioning (DP)	Generation of underwater noise and vibration from trenchless crossing drilling and vessel DP (DP)	Elevated underwater noise levels can affect marine fauna through: • behavioural avoidance/displacement and behavioural changes to marine fauna, particularly for low frequency cetaceans • high accumulated sound exposures may result in temporary or permanent hearing impairment to	• No installation activities that require vessels on DP in Victorian waters between 1 May to 31 October of the same year when SRW cow-calf pairs may occur in the coastal reproduction BIA • All bridge watch crew are trained crew, that have demonstrated sound understanding of the requirements of the action and have had experience in and demonstrated

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Activity	Impact pathway	Potential effects	Mitigation measures
Vessels operations during all project phases	Artificial light pollution	some marine fauna (permanent threshold shift (PTS) or temporary threshold shift (TTS)) - masking or interference with biologically important sounds used by marine fauna (e.g. vocal communication, echolocation, signals and sounds produced by predator and prey) - behavioural disturbance, resulting in indirect reduction in prey species.	ability in whale observation, whale identification, distance estimation and reporting. - Implementing national and state guidelines on interacting with cetaceans to maintain distance with all project vessels - Monitoring for marine mammals and 'power down' procedures for vessels using DP
		- Marine fauna have potential to be disrupted within or displaced from important habitat due to light pollution - Potential to impact the ability of marine fauna to undertake critical behaviours such as foraging, reproduction and dispersal - Potential impacts to migration pathways (e.g. seabirds/shorebirds).	Vessel navigation and lighting would be compliant with the relevant guidelines. Aviation obstacle lighting implemented in compliance with the National Airports Safeguarding Framework Guideline D (2012).
	Interaction with marine fauna e.g. vessel strike	Injury or mortality to marine fauna.	- No installation activities that require vessels on DP in Victorian waters between 1 May to 31 October of the same year when SRW cow-calf pairs may occur in the coastal reproduction BIA - Implementing national and state guidelines on interacting with cetaceans to maintain distance with all project vessels - No project vessel travels at a speed greater than 10 knots when operating in Victorian waters between 1 May to 31 October of the same year. - No project vessel travels at a speed greater than 6 knots if a cetacean is within 500 metres of the project vessel. If a cetacean has been observed, the person taking the Action must ensure that no project vessel exceeds 6 knots until all sighted cetaceans are further than 500 metres from the survey vessel
	Pollution from vessels into the marine environment	Marine fauna may be impacted by pollution from vessels into the marine environment (e.g. routine discharges) through: - A decline in water quality in the immediate vicinity of the discharge, including an increase in turbidity of surrounding waters - Introduction of marine pest species leading to a decline in health	Vessels to be used have current management certificates in place as required under Relevant aspects of the AMSA Marine Orders and Acts.

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Activity	Impact pathway	Potential effects	Mitigation measures
		• Temporary toxicity to marine fauna through bilge water discharges • Indirect impacts including changes in prey distribution and abundance.	
	Introduction of invasive marine species	Introduction of invasive marine species could lead to a decline in health to marine fauna and cause indirect impacts including changes in prey distribution and abundance in the area.	Vessels used would apply the requirements of relevant legislation and regulations. Refer Attachment 10 – Inherent mitigation
Operation of export cables – electromagnetic fields	Electromagnetic field impacts to marine fauna	Potential to cause highly localised interference with detection of prey and predators for some species of sharks and rays that are sensitive to electromagnetic fields. Potential for temporary change in swim direction or a longer detour during an animals migration.	Cable burial risk assessment will be undertaken to inform detailed design to determine depth of cable burial requirement for the safety of other marine users, and to minimise exposure of marine fauna to electromagnetic field exposure.
Presence of cable protection - creation of artificial habitat	Creation of artificial habitat for marine fauna in the nearshore area	Potential increase in abundance and diversity of marine fauna and prey species as a result of artificial habitat.	-
Shore crossing construction	Accidental discharge of drilling fluids during trenchless shore crossing construction	Accidental discharge of marine drilling fluids may occur during marine drilling activities such as trenchless installation of the shore crossing. Potential impacts to water quality through contamination, increased turbidity and nutrient levels. Potential to impact marine fauna through: • Direct physical injury • Direct toxicity through ingestion of oil and / contaminated prey • Indirect impacts through effects on prey species e.g. changes in distribution.	The project would utilise the 'Gold/Silver' (CHARM) or 'D/E' (non-CHARM) rated drilling fluids.

5.2 EES referral criteria assessment

This section provides an overview of the assessment of the project against the ecological referral criteria within the Ministerial Guidelines under the EE Act (DTP 2023a) including:

- individual potential environmental effects (Table 5-3)
- combined potential environmental effects (Table 5-4).

These criteria assist in identifying the significance of the project's potential ecological effects in a regional or state context (DTP, 2023a).

The assessment (Table 5-3 and Table 5-4) indicates that the project, with the adoption of mitigation measures described in Section 5.1, is unlikely to exceed any of the individual or combined ecological referral criteria and result in significant effects on the environment.

Other social and heritage referral criteria are addressed in the EES referral form and in Attachments 6 – 9 to the referral.

Table 5-3 EES referral criteria – Individual potential environmental effects

Referral criteria	Likelihood for the criteria to be met	Justification
Potential removal, destruction or lopping of 10 ha or more of native vegetation that consists of, or comprises a combination of: - an 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	Direct effects	
	Unlikely	Approximately 92% of the onshore TIA is modelled to have no native vegetation present, providing the opportunity to site the majority of the cable route and work spaces to avoid native vegetation clearance. Any direct effects to native vegetation are expected to be minor and will not exceed the 10 ha referral threshold. The onshore detailed design will be informed by detailed ecology assessments and avoid and minimise impacts to native vegetation where possible. The project intends to utilise cleared land and/or areas identified as containing low ecological values. The mitigation measures provided in Table 5-1 and Table 5-2 will be implemented to reduce potential effects of the project.
	Indirect effects	
	Unlikely	Indirect effects such as edge effects or temporary disturbance are expected to be localised and managed through project mitigation measures. The project is not anticipated to result in indirect loss or degradation of native vegetation outside the defined project site.
Potential clearing of an area determined as 'critical habitat' under the <i>Flora and Fauna Guarantee Act 1988</i>	Direct effects	
	Unlikely	The onshore referral area does not contain any areas determined as critical habitat under the FFG Act. As such, the project is not expected to directly clear or disturb any critical habitat.
	Indirect effects	
	Unlikely	No critical habitat has been identified within the onshore referral area, and indirect project effects are expected to be localised and managed through standard mitigation measures for the project. The project is not expected to indirectly affect any area determined as critical habitat under the FFG Act.
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.	Direct effects	
	Unlikely	The onshore referral area may contain populations of and/or habitat for threatened flora and fauna species listed under the FFG Act. A detailed site assessment will be undertaken of the potential extent of the onshore referral area to determine which species may occur or utilise the area proposed to be affected. This will inform the detailed design in order to best avoid and minimise impacts. Given the nature of the onshore referral area, potential for loss of a significant proportion of known remaining habitat or population of the threatened species is not likely. One FFG listed marine mammal, the southern right whale, is known to occur within the referral area. Mitigation measures outlined in Table 5-2 will be implemented to reduce potential effects on the species. This includes a commitment to no vessels operating on DP within the southern right whale reproduction BIA between May and September and implementing vessel speed restrictions
	Indirect effects	

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Referral criteria	Likelihood for the criteria to be met	Justification
	Unlikely	It is not likely that there would be indirect impacts as a result of the loss of a significant proportion of known remaining habitat or population of a threatened species within Victoria. Mitigation measures outlined in Table 5-2 will reduce potential indirect effects on known remaining habitat or population of a threatened species.
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'	Direct effects	
	Unlikely	The onshore referral area is located in the region of, but not close to, two Ramsar sites; Gippsland Lakes (more than 8 kilometres from the onshore referral area) and Corner Inlet (approximately 17 kilometres from the onshore referral area, 5 kilometres from the offshore investigation area). Due to the distances between the referral area and Ramsar sites, no impacts from the project area anticipated.
	Indirect effects	
	Unlikely	Indirect effects as a result of the project such as altered surface or groundwater flow, increased sediment runoff, erosion, dust deposition, weed invasion, or contamination could occur. However, the final design of the construction corridor for the onshore cable route will be designed to minimise indirect effects. Furthermore, mitigation measures such as locating infrastructure outside of key habitat for migratory and bird species and situating project infrastructure away from any waterways that flow into the Ramsar sites will be implemented to ensure that any impacts would be below ecological triggers defined by the EES referral criteria. Given the geographic separation from the Ramsar sites, and the design objectives and mitigation measures that will be implemented, indirect effects resulting in long term changes to the ecological character of important wetlands will not occur
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.	Direct effects	
	Unlikely	The onshore referral area contains several waterways and waterbodies including freshwater and estuarine habitats, and wetlands are also present in the area. Excavation or trenching within proximity to waterways has potential to effect water quality and availability. Depending on the final alignment of the onshore cable route, direct effects to the use and environmental values of water resources could include disturbance to riparian vegetation, temporary or permanent alteration of watercourses or drainage lines, and potential disturbance to nearby wetland or important aquatic habitat. Mitigation measures including reinstatement of the waterway bed and back features, and adhering to the requirements under legislation and relevant regulations regarding construction work near waterways will remove the potential for extensive or major effects on the use and environmental values of water resources over the long-term.
	Indirect effects	
	Unlikely	Works associated with the project could temporarily modify natural flow regimes, alter surface runoff patterns or increase erosion and sedimentation, which may result in indirect effects to water quality and the health or biodiversity over the long-term. However, the implementation of mitigation measures will remove the potential for extensive or major effects on the use and environmental values of water resources over the long term.
	Direct effects	

Referral criteria	Likelihood for the criteria to be met	Justification
Potential for extensive or major effects to human health or the environment, or displacement of residents, from pollution or waste emitted to air, land, water or groundwater.	Unlikely	The project is unlikely to result in extensive or major effects to human health or the environment, or displacement of residents, from pollution or waste emissions, provided standard construction and operational mitigation measures are implemented. Any direct pollution or waste effects will be localised and manageable through appropriate spill prevention, waste handling, erosion and sediment controls, and compliance with relevant environmental management measures.
	Indirect effects	
	Unlikely	Indirect effects from pollution or waste emissions are expected to be minor and temporary, and not at a scale that would be extensive or cause major impacts to human health, the environment, or residential displacement. With the implementation of appropriate mitigation measures in place, any off-site or secondary effects are not expected.

Table 5-4 EES referral criteria – combination of environmental effects

Referral criteria	Likelihood for the criteria to be met	Justification
Potential removal, destruction or lopping of 10 ha or more of native vegetation, unless it is authorised for removal under an approved Forest Management Plan or Fire Protection Plan	Direct effects	
	Unlikely	Majority of the onshore referral area comprises previously cleared land used for agriculture. The onshore referral area is modelled to contain 8.03 % of native vegetation, from eight EVCs, majority being: • Lowland Forest/Heathy Woodland Mosaic • Lowland Forest • Estuarine wetland. Given the extent of previously cleared land, opportunity is available to avoid direct effects to native vegetation. Most of the areas of remnant native vegetation within the study area sit outside of the onshore TIA, therefore, potential effects associated with the project will not exceed the 10ha referral threshold.
	Indirect effects	
	Unlikely	Given the extent of previously cleared land, opportunity is available to avoid indirect effects to native vegetation. Most of the areas of remnant native vegetation within the study area sit outside of the onshore CIA.
Matters listed under the <i>Flora and Fauna Guarantee Act 1988</i> :	Direct effects	
• Potential loss of a significant area of a Listed ecological community; or • Potential loss of a genetically important population of an Endangered or	Unlikely	There is one TEC modelled to occur within the onshore TIA; the Coastal Moonah (<i>Melaleuca lanceolata</i> subsp. <i>Lanceolata</i>). However, it is expected to occur only in the coastal dune area where trenchless construction will be used and therefore the TEC would not be directly impacted. 32 threatened terrestrial flora species are known or possible to occur within the referral area. Habitats in which threatened flora species occur include road reserves, wetlands and waterways.

Referral criteria	Likelihood for the criteria to be met	Justification
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.		51 threatened terrestrial fauna species are known or possible to occur within the referral area, including terrestrial birds, shorebirds, waterbirds, mammals, reptiles, fish and frogs. Habitat for these species comprises woodlands, grasslands, coastal dunes and vegetation and wetlands and waterways. 14 threatened marine species are known or possible to occur within the nearshore investigation area, including fish and sharks, marine mammals, marine turtles, and seabirds. Ecological values within the onshore TIA are expected to be mostly located within discrete areas, such as within bushland reserves, coastal reserves, estuaries and waterways, and along roadside, with majority of the onshore TIA comprising disturbed areas used for agriculture and forestry. Siting will be designed to avoid and minimise effects to matters listed under the FFG Act, using the information collected from targeted surveys. Infrastructure will be located outside of key habitat for migratory and other bird species that utilise wetlands in the area. Implementing the mitigation measures listed above will ensure effects on matters listed under the FFG Act are below ecological trigger levels defined by the EES referral criteria.
	Indirect effects	
	Unlikely	Given the extent of previously cleared land within the onshore TIA, the project will aim to avoid indirect effects to any matters listed under the FFG Act. Most of the areas comprising a listed ecological community, TEC or habitat supporting migratory bird species are located outside of the onshore TIA. The onshore infrastructure is not located near waterways that flow into wetlands of national or international importance. The onshore infrastructure will be located to avoid impacts to key wetland habitat for migratory shorebird and waterbird species.
Potential for extensive or major effects to the environment due to changes in land stability, disturbance of acid sulfate soils or project-induced soil erosion over the short or long term	Direct effects	
	Unlikely	The project will not cause extensive or major effects to the environment due to change in land stability. Ground disturbing works will be managed to avoid effects on land stability and minimise soil erosion. Excavations, including trenches, will be backfilled, compacted and topsoil reinstated following cable installation. No effects on highly erodible soils are expected as a result of the project. The majority of the onshore TIA has very low potential for ASS, therefore the project is not likely to disturb ASS. A small area of coastal estuarine wetland has high potential for acid sulfate soils to be present. Any disturbance of soils within this area will be managed to minimise environmental effects. Industry standard management measures include limiting the duration of soil exposure to air as far as practicable, containing runoff, and lime treatment where necessary.
	Indirect effects	
	Unlikely	It is unlikely that there will be potential for extensive or major indirect effects to the environment due to changes in land stability, disturbance of ASS or project-induced soil erosion over short or long term. Any indirect effects would be managed through mitigation measures such as soil stockpiling controls (including soil

Referral criteria	Likelihood for the criteria to be met	Justification
		layer separation), and the implementation of permanent erosion and sediment controls as per standard legislative requirements.

6 CONCLUSION AND RECOMMENDATIONS

6.1 Summary of ecological values

The onshore TIA covers approximately 7,315 hectares (ha) of coastal inland terrain, and the nearshore TIA covers approximately 6,091 ha within Victorian coastal waters. The onshore and nearshore TIA sit within the Gippsland Plain bioregion.

The preliminary ecological assessment identified that most of the land within the onshore TIA is disturbed and mostly used for agriculture and forestry uses. Within the wider study area, larger patches of remnant native vegetation are present, primarily along road reserves. Majority of the areas of native vegetation sit outside of the onshore TIA.

The key ecological values identified for the onshore and nearshore TIA include:

- Native vegetation:
 - Approximately 587.59 ha of native vegetation is modelled to occur within the onshore TIA, comprising eight EVCs, with the majority being Lowland Forest/Heathy Woodland Mosaic (67%), Lowland Forest (18%) and Estuarine Wetland (8%).
- Threatened ecological communities:
 - One FFG Act listed TEC community is modelled to occur within the southern portion of the onshore TIA; the Coastal Moonah (*Melaleuca lanceolata* subsp. *Lanceolata*).
- Threatened species and migratory species:
 - 31 species of threatened terrestrial flora were confirmed known or possible to occur within the referral area during desktop assessment, and one species of marine fauna (the sea water-mat (*Althenia marina*))
 - 51 species of threatened terrestrial fauna were confirmed known or possible to occur within the referral area during desktop assessment, comprising terrestrial birds, shorebirds, waterbirds, mammals, reptiles, fish and frogs
 - 14 species of threatened marine fauna were confirmed known or possible to occur within the referral area during desktop assessment, comprising fish and sharks, marine mammals, marine turtles and seabirds.
- Key areas of habitat for threatened species and/or migratory species within the referral area include:
 - Road reserves (such as Giffard Road and Giffard West Road)
 - Wetlands including freshwater and estuarine wetlands
 - Waterways including the presence of ephemeral waterways and estuarine systems (including riparian swamp/scrub)
 - Woodland, grassland and coastal dunes and vegetation (such as McLoughlins Beach and Seaspray Coastal Reserve).
- Wetlands and waterways:
 - There are seven wetlands mapped under the current wetlands layer within the referral area
 - There are two Wetlands of International Importance (Ramsar sites) relevant to the onshore TIA; Gippsland Lakes Ramsar site (approximately eight kilometres from the investigation area) and Corner Inlet Ramsar site (approximately five kilometres from the investigation area)
 - There are a number of small ephemeral waterways and estuarine systems present within the onshore TIA, however, these are unlikely to support threatened fish species.

6.2 Assessment under the Ministerial Guidelines

Although a range of ecological values were confirmed as known or possible to occur within the referral area, these values are mostly located within discrete areas, such as within bushland reserves, coastal reserves, estuaries and waterways, and along road reserves. Most ecological values are expected to be avoided early

in the project design phase and siting of project infrastructure (e.g. targeted surveys, cable alignment, avoiding sensitive habitats, pre-clearance inspections etc.). Appropriate mitigation measures, such as those detailed in Table 5-1, Table 5-2 and Attachment 6, would be implemented to reduce potential effects of the project on ecological values.

Through avoidance and the application of appropriate mitigation measures, the project is not expected to have significant effects on the Victorian ecological values considered by the referral criteria within the Ministerial Guidelines under the EE Act.

6.3 Recommendations

It is recommended that High Sea Wind integrate the results of the preliminary ecological assessment (this report) along with any additional planned assessments to guide the placement of project infrastructure, inform project design, and determine suitable construction methods (such as horizontal directional drilling (HDD) or direct pipe). This approach aims to avoid and reduce potential impacts on onshore ecological values.

For this project, key areas to avoid and minimise impacts on within referral area 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
- KEFs within Victorian coastal waters.

Once the location of project infrastructure is known (i.e., shore crossing location and a preferred nearshore and onshore cable alignment), undertake more detailed desktop and site assessment for the Project. This may involve the proposed studies listed in Section 6.4.

The outcomes of detailed site assessments and targeted surveys should be used to further refine project design, construction and operations detail, and mitigation measures 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 management and mitigation measures.

Details of management and mitigation measures will 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.

6.4 Proposed baseline studies

Detailed environmental studies will be completed to inform project design development and regulatory assessment. The scope of the study program will be informed by consultation with relevant regulators and stakeholders. The study program is likely to include the specialist studies outlined below in Table 6-1.

Environmental studies will also be undertaken to support other statutory requirements for the project including under the EPBC Act, *Planning and Environment Act 1987* (Vic) and *Environment Protection Act 2017* (Vic).

Table 6-1 Specialist studies proposed for the project

Specialist studies required	Summary description
Onshore specialist studies	• Aboriginal cultural heritage • Flora, fauna and native vegetation • Waterways, hydrology and groundwater • Soil and contamination
Offshore specialist surveys (within state waters)	• Metocean conditions and coastal processes • Marine mammals and sea turtles • Marine archaeology (aided by geophysical survey data)

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Appendix A: Ecological values screening

Appendix B: **Protected Matter Search Tool Report**