

STAR OF THE SOUTH OFFSHORE WIND FARM

Marine Protected Areas

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REPORT

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This report is based on the scope, conditions and limitations, as described in the report. The report has been prepared for Star of the South Pty Ltd as trustee of the Star of the South trust for the sole purpose of satisfying the scoping requirements for the environment effects statement and the EIS guidelines for the environmental impact statement for the Star of the South project. RPS accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

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Prepared by:

RPS

Level 3, 500 Hay Street
Subiaco, WA 6008

T +61 8 9211 1111

Prepared for:

Star of the South Pty Ltd

Level 19, 477 Collins Street
Melbourne VIC 3000

T +61 3 9108 4000

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EXECUTIVE SUMMARY

Overview

Star of the South is Australia's most advanced offshore wind project. Located off the central Gippsland coast, the project comprises an offshore wind farm and supporting transmission infrastructure to transfer energy to the existing electricity network. A delegate for the Commonwealth Minister for the Environment determined that the proposed action (project) has the potential to have significant impact on the environment (as set out in notice dated 2 June 2020) and is required to be assessed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). The action has potential to have a significant impact on the following matters of national environmental significance (MNES) protected under Part 3 of the EPBC Act, all of which are relevant to marine protected areas:

- The ecological character of declared Ramsar wetlands
- Listed threatened species and communities
- Listed migratory species
- The environment in Commonwealth marine areas.

It was determined that the proposed action will be assessed through the preparation of an Environmental Impact Statement (EIS).

The Victorian Minister for Planning has determined that an Environment Effects Statement (EES) is required (as set out in notice dated 11 May 2020) under the *Environment Effects Act 1978* (Vic) (EE Act).

This report has been prepared to address the requirements of the EIS and EES. Future management plans will link EPBC and EE Act assessments through to delivering requirements under the *Offshore Energy Infrastructure Act 2021* (OEI Act).

Existing environment

There are several marine protected areas within this region that are relevant to assess impacts and risks from project activities. These include the Corner Inlet Ramsar site, Beagle Australian Marine Park, several Victorian marine protected areas and the Tasmanian Kent Group Marine Nature Reserve.

Corner Inlet was recognised as a Ramsar site in 1982 due to its near natural condition, biological diversity, and significance to a large number of migratory shorebirds (DELWP, 2022) and the site is rated IUCN protected area category II (National Park). Recognised critical and supporting components, processes and services/benefits for the Corner Inlet Ramsar Site include wetland mega-habitats, waterbird breeding, nationally threatened fauna species and recreational and tourism values.

The Beagle AMP lies within the South-East Marine Park Network, encompassing the waters surrounding offshore islands groups and structures. The major conservation values of the AMP are the ecosystems, habitats and communities associated with the Southeast Shelf transition area including various seafloor features. The area is an important migration and resting areas for the southern right whale and an important foraging area for the Australian fur seal, killer whale, numerous protected birds, and the white shark.

Victorian marine parks and reserves that are relevant for the impact and risk assessment of the project are the Corner Inlet Marine National Park, Corner Inlet Marine and Coastal Park, McLoughlins Beach Seaspray Reserve, Ninety Mile Marine National Park, Nooramunga Marine and Coastal Park, Wilsons Promontory Marine National Park, Wilsons Promontory Marine Reserve and Wilsons Promontory Marine Park. These marine parks and reserves are valued for a range of features from coastal inlets and dunes, permanent shallow waters, intertidal and subtidal habitats, protected species, shipwrecks and tourism and recreational activities.

The Kent Group Marine Nature Reserve is a Tasmanian managed marine protected area with relevant values that include marine mammals, threatened shorebirds and seabirds, fur seals, tourism and recreation.

Impact assessment findings

An assessment of potential impacts associated with the project was completed, considering the values of marine protected areas in the vicinity of the project and associated construction, operation and decommissioning activities.

There will be no offshore construction in marine protected areas. Vessels associated with construction, operations and decommissioning may transit through the Corner Inlet Ramsar Site and Beagle AMP and transit adjacent to the Corner Inlet Marine National Park, Corner Inlet Marine and Coastal Park and Nooramunga Marine and Coastal Park.

The impacts for assessment considered relevant to the values of marine protected areas included:

- Vessel presence (within the OPA and transiting vessels) e.g. light, underwater noise, physical disturbance
- Changes to coastal processes.

Not all impacts were relevant to all the marine protected areas. For instance, vessel presence only applies to those marine protected areas that vessels may transit through. Similarly, changes to coastal processes applies only to those marine protected areas along Victoria's coastline.

The risks for assessment considered relevant to the values of marine protected areas included:

- Introduction and establishment of IMS
- Accidental hydrocarbon spill from vessels or offshore substation (OSS) during all phases of the project
- Contaminated surface water from shore crossing construction site flowing into Corner Inlet
- Bird collision with turbines
- Vessel strike (with marine mammals).

Not all risks were relevant to all the marine protected areas. For instance, vessel strike only applies to those marine protected areas that vessels may transit through and the risk of impacts from a hydrocarbon spill from vessels or during operations is dependent on the volume released, weather conditions at the time of the spill and distance from the spill.

The impact and risk assessments found that identified impacts ranged from minor to negligible and risks from low to very low. With the mitigation and monitoring measures applied during the construction, operations and decommissioning of the Star of the South offshore windfarm, the impacts and risks are considered acceptable.

Cumulative impact assessment

Five projects were identified that have the potential to cause cumulative impacts on marine protected areas. These included one offshore wind farm (Great Eastern Offshore Wind), site investigations for two further offshore wind farms (Gippsland Offshore Wind Farm and Gippsland Skies Offshore Wind Farm), one onshore wind farm (Gelliondale onshore wind farm), and installation of an undersea electrical transmission cable (Marinus Link). Standard mitigations and controls are likely to be applied to reduce the potential for cumulative impacts to receptors. Cumulative impacts are expected to be negligible to minor, except for the risk of seabird collision with turbines, as the potential cumulative impact is unknown. In order to assess the latter, site-specific data and design information for the Great Eastern Offshore Wind project is needed to accurately assess the likely impacts from the combined projects. This will not be available until the Great Eastern Offshore Wind EIS is published. While cumulative impacts are possible, it is likely that collisions from the two projects combined would be orders of magnitude less than natural losses and deaths from other sources.

Mitigation measures

Potential impacts to the values of marine protected areas due to the project will be avoided, minimised or managed to required standards through the recommended mitigation measures.

As part of the project design process, a number of initial mitigations (designed-in measures) have been proposed to reduce the potential for impacts of the project. These include

- committing to trenchless installation methods at the Reeves Beach shore crossing during the construction phase to minimise impacts to beach and dune habitat
- committing to a minimum airgap (lowest blade tip clearance) of 35 metres above lowest astronomical tide for wind turbine generators to minimise bird collision risk

Further mitigation measures proposed to avoid, mitigate or manage these and other impacts and risks associated with the project include (but not limited to):

- Developing, implementing and maintaining a vessel operations framework
- Establishing a Marine Coordination Centre to manage movements of project vessels to and within the offshore project area
- Producing a Vessel Passage Plan for relevant vessels entering corner inlet, in consultation with the Gippsland ports harbour master
- Developing, implementing and maintaining a Spill Response Plan for accidental hydrocarbon release from project activities within the marine environment
- Appropriately managing vessel ballast water and biofouling
- Implementing 'no approach' and 'caution' zones for vessels around whales, dolphins and seals
- Compliance with national light pollution guidelines for wildlife
- Implementing the best available noise abatement systems to minimise underwater noise.

Monitoring is planned to address residual uncertainty in the assessment and support effective adaptive management to ensure that project environmental outcomes are achieved. This includes monitoring of seabirds and fish.

ABBREVIATIONS

Abbreviation	Definition
AC	Alternating current
AMP	Australian Marine Parks
BBMT	Barry Beach Marine Terminal
BIA	Biologically important areas
CPS	Components, processes and services (Ramsar Sites)
Cth	Commonwealth
DAWE	Department of Agriculture, Water and the Environment (Commonwealth) (now DCCEEW)
DBBC	Double big bubble curtain, a method for mitigating underwater noise
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DEECA	Department of Energy, Environment and Climate Action (Victoria)
DELWP	Department of Environment, Land, Water and Planning (Victoria)
DISER	Department of Industry, Science, Energy and Resources (Commonwealth)
DoE	Department of the Environment (Commonwealth)
DTP	Department of Transport and Planning (Victoria)
ECD	Ecological character description
EE Act	<i>Victorian Environment Effects Act 1978</i>
EES	Environment effects statement
EEZ	Exclusive economic zone
EIA	Environmental impact assessment
EIS	Environmental impact statement
EMF	Environmental management framework
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EVC	Ecological vegetation class
HDD	Horizontal directional drilling
IUCN	International Union for Conservation of Nature
LAC	Limits of acceptable change
MARPOL	The International Convention for the Prevention of Pollution from Ships
MDS	Maximum design scenario
MNES	Matter/s of national environmental significance
MNP	Marine national park
MPA	Marine protected area
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OECA	Offshore Export Cable Area
OEI Act	<i>Offshore Electricity Infrastructure Act 2021</i>
OPA	Offshore Project Area
OPGGS(E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023
OSS	Offshore substation
OWFA	Offshore Wind Farm Area
PDE	Project design envelope
PMST	Protected matters search tool
VBA	Victorian Biodiversity Atlas
WTG	Wind turbine generator
GED	General environmental duty

REPORT

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Victoria

GLOSSARY

Term	Definition
Acceptable level	Specified amount of environmental impact and risk that an activity may have which is tolerable, is consistent with relevant principles, and does not compromise the management/conservation/protection objectives of the environment
Accident	An event that would only occur under unexpected circumstances
Activity	Any operations or works carried out in relation to the project that may have an environmental impact e.g. piling of foundations and operating turbines.
Adaptability	Ability to shift (e.g., in behaviour, biology) in response to change that supports survival and resilience; responses that decrease the negative effects of change and capitalise on opportunities (SoE, 2021).
Adaptive management	an iterative management process that seeks to reduce scientific uncertainty and improve management through rigorous monitoring and periodic review of management decisions in response to growing knowledge gained from monitoring data. (Le L Lièvre a)
Assessment criteria	Defines the environmental performance outcomes that must be achieved
Commonwealth Waters	Any waters of the sea beyond three nautical miles (State waters) to the boundary of the exclusive economic zone (EEZ). Jurisdiction over the water column and the subjacent seabed is vested to the Commonwealth.
Consequence	Outcome of an event affecting a receptor and is based on the assessment of magnitude of impact and sensitivity of the receptor.
Cumulative impact	The resultant impact of the project, in combination with one or more other existing or proposed projects in the area, on the same environmental asset. The total impact from the contributing projects is the cumulative impact
Direct impact	Where an effect is a direct result of the project.
Effect	Term used to express the consequence of an impact; that is a change to the environment (including socio-economic changes) resulting from the project that may be positive or negative. The significance for the effect is determined by correlating the magnitude of the impact and the sensitivity of the receptor.
Event	Occurrence or change of a particular set of circumstances in accordance with AS/NZS ISO 31000 Guidelines
Final mitigation measures	Initial mitigation measures plus any additional mitigation measures adopted to address the findings of impact assessments to further reduce impacts to acceptable levels.
Impact	A positive or negative change to an environmental asset (including physical, ecological and socio-economic assets) that is caused by a project activity. For example, seabed clearing for cable construction (activity) which results in habitat loss (impact).
Indirect impact	Indirect environmental impacts are typically separated in time and space from direct impacts and include downstream impacts such as on wetlands due to pollution discharged or upstream impacts such as extraction of raw materials which are used to deliver the project. They may also relate to an impact on an asset via a secondary mechanism, such as the effects on birds due to impacts upon their prey species.
Initial mitigation measures	The standard suite of mitigation measures that will be implemented by the project as part of the initial assessment. These may include measures required under legislation, national or international standards and standard measures implemented on similar projects.
Inter-related impact	Multiple impacts on the same receptor arising from the project. This occurs where a number of separate impacts, such as noise and habitat loss, affect a single receptor (for example marine mammals) at the same time.
Likelihood	The change of an event occurring resulting in the identified outcome (the consequence).
Magnitude	A combination of geographical extent, duration, and severity of an impact. <ul style="list-style-type: none"> • Geographic extent – spatial extent of the impact e.g. local, regional, widespread • Duration – timescale of the effect e.g. short, medium or long term • Severity – scale or degree of change from the baseline condition as a result of the impact.
Management measure	Management measures are implemented during construction or operation of the project to control the level of impact, such as implementing marine mammal observers to detect whales prior to piling.

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Term	Definition
Maximum design scenario	Design parameters that represent the greatest potential impact to a defined sensitive receptor group (referred to as the 'maximum design scenario' in this assessment)
Mitigation measures	Actions, commitments, or measures that are implemented to avoid, minimise or manage potential impacts. These include boundaries around project design parameters (including construction), as well as the implementation of actions, systems, and procedures to avoid, minimise and manage impacts (including monitoring)
Monitoring	Methods used to review the environmental performance and effectiveness of mitigation measures and to determine if project activities are within defined acceptable levels of impact.
Offshore export cable area	A 232 square kilometre area extending from the offshore wind farm area to the shore crossing. Includes offshore export cables to connect the wind farm to land. This area traverses Commonwealth waters and Victorian coastal waters.
Offshore project area	The maximum offshore geographical extent that would be used for the development of the project, encompassing both the Offshore Export Cable Area and the Offshore Wind Farm Area
Offshore wind farm area	A 586 square kilometre area extending approximately 10 to 40 kilometres offshore from the shore crossing. Includes offshore wind turbines installed on foundations, offshore substations and offshore transmission cables. This area is in Commonwealth waters.
the Project	Star of the South offshore wind farm
Project design envelope	A description of the range of possible design parameters that make up the proposed project design options under consideration when the exact engineering parameters are not yet known. The range is representative of the smallest and largest project that could be built.
Ramsar site	Wetlands of international importance, designated under the Ramsar Convention.
Receptor	The physical or biological resource or user group that could be impacted by the project.
Recoverability	Re-establishment of the pre-disturbance population/processes following disturbance (e.g., mortality of the original individuals, through recruitment or colonisation).
Residual impact	The predicted remaining impacts following the implementation of committed mitigation measures, taking into account the expected effectiveness of these measures
Residual risk	The predicted remaining risk following the implementation of committed mitigation measures, taking into account the expected effectiveness of these measures.
Risk	The potential impacts as a result of an accident occurring. Risk is expressed in terms of a combination of the likelihood of an accident occurring and the potential consequences should the accident occur.
Sensitivity	The sensitivity of a receptor is determined by its vulnerability (potential for harm), resilience to change, recoverability and status (level of protection, uniqueness).
Significant impact	Under the EPBC Act Significant Impact Guidelines 1.1, a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.
State waters	Inland waters between the shoreline and three nautical miles seaward. Jurisdiction over the water column and the subjacent seabed is vested in the adjacent State or Territory.
Terms of reference	The terms of reference for the project are defined as the Commonwealth Guidelines for the Content of an Environmental Impact Statement for Star of the South Offshore Wind Farm Project and Victorian Scoping Requirements for Star of the South Offshore Wind Farm Environment Effects Statement.
Tolerance	Whether a receptor can absorb disturbance or stress without changing character
Zone of influence	The temporal and spatial area in which a receptor is impacted. For the cumulative impact assessment, the zone of influence is the area in which impacts to a receptor caused by another project overlap spatially and temporal with those caused by the Star of the South project

1 INTRODUCTION

The Star of the South Offshore Wind Farm (the project) is Australia's most advanced offshore wind farm. The project is located in Commonwealth waters off the coast of Gippsland, and will connect to the electricity network via the proposed VicGrid connection hub in Giffard.

The project represents a significant opportunity to diversify Australia's energy resources. As Australia's ageing coal fleet retires, new sources of power are needed to address the anticipated gap in electricity generation. The project will address this gap, by harnessing Bass Strait's strong, consistent winds and delivering significant amounts of clean, reliable power to the grid starting in 2032. With a capacity of up to 2.2 gigawatts (GW), the project can meet approximately 20 per cent of Victoria's current electricity demand, enough to power around 1.2 million homes annually.

The project is located within both Commonwealth and Victorian jurisdictions and is subject to planning and environmental assessment and approval under Commonwealth and Victorian legislation.

A delegate of the Commonwealth Minister for the Environment and Water has determined the project is a controlled action (as set out in a notice dated 2 June 2020) and must be assessed and approved under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) through an Environmental Impact Statement (EIS). The Victorian Minister for Planning has determined the project requires an Environment Effects Statement (EES) (as set out in a notice dated 11 May 2020) under the *Environment Effects Act 1978* (Vic) (EE Act).

1.1 Purpose of this report

The purpose of this report is to assess the potential impacts and risks associated with the project to marine protected areas (MPAs) and inform the preparation of the EIS and EES required for the project.

Marine protected areas include Ramsar wetlands, Australian Marine Parks, Victorian Marine Parks and Reserves, Victorian Marine and Coastal Parks and Tasmanian Marine Nature Reserves.

This Technical Report:

- Presents the designated environmental values and characteristics of marine protected areas.
- Identifies the criteria adopted to assess the projects potential impacts and risks.
- Presents the potential project impacts and risks to MPAs arising from the project (for construction, operation and decommissioning).
- Identifies any assumptions and limitations encountered in compiling the environmental information.
- Recommends any necessary mitigation measures which could avoid, minimise, manage, or offset the possible environmental effects identified in the environmental impact assessment (EIA) process and monitoring to verify environmental outcomes.

The assessment presented for MPAs considered within this report focusses on those values of each MPA where potential impact and/or risk pathways have been identified in the relevant technical reports. This means that where a technical report for a receptor group, (e.g. Benthic Ecology, Fish and Invertebrates, Marine Mammals and Turtles, Offshore Ornithology and Bats), identifies a potential impact / risk for receptor that is also a conservation value of importance for an MPA, then that impact / risk pathway has been assessed in this report.

For example, potential impacts and risks associated with the presence of vessel operations within the OPA or transiting between ports and the OPA are considered relevant to the MPA assessment. Conversely, activities resulting in increased sedimentation from installation of the array cables and export cables (e.g. trenching) and drilling (if required) during foundation installation are not considered relevant impact pathways within this technical report, as their effects do not extend to the MPAs. Underwater noise emissions from the installation of foundations (piling and drilling) is also not considered a relevant impact pathway as this activity will be managed such that marine fauna impact thresholds are not exceeded beyond applied precautionary zones, including application of noise abatement systems (NAS) and monitoring (refer to EIS Attachment III - Construction underwater noise management framework). Given the absence of this impact pathway for marine protected areas, the assessment for underwater noise focusses on the two credible impact pathways of vessel noise emissions via transiting vessels and/or vessel activities with the offshore project area (OPA).

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Detailed baseline information contained in other technical reports relevant to the impact and risk assessment of MPA (e.g. shorebirds, fish) are not repeated herein but are referenced in this report and outcomes applied where relevant. Aboriginal cultural significance values are scoped out of this assessment as these are addressed separately in Technical Report K – Aboriginal Cultural Heritage and Technical Report Z - Submerged Aboriginal Cultural Heritage.

2 PROJECT DESCRIPTION

Section 2 provides a high-level overview of the project in its entirety. Detailed descriptions of project components and construction processes are provided in in Chapter 4 – Project description of the EIS for the whole of project assessment across the Commonwealth jurisdiction, and in Chapter 4 – Victorian works project description of the EES for the Victorian jurisdiction.

2.1 Project overview

The offshore wind farm will be installed within a 586-square-kilometre offshore wind farm area, located approximately 10 to 40 kilometres off the coast of Gippsland, as shown in Figure 2-1.

The project comprises an offshore wind farm and supporting transmission infrastructure to generate and transfer power to the grid. The offshore infrastructure extends from the shore crossing at Reeves Beach, to the offshore wind farm area.

The onshore infrastructure primarily comprises of an underground cable system that will connect the project to the proposed VicGrid connection hub in Giffard (also referred to as 'proposed Giffard terminal station area'). The onshore transmission infrastructure is located in Central Gippsland, extending approximately 30 kilometres from Reeves Beach to the proposed VicGrid connection hub.

This technical report focusses on construction, operation and decommissioning of the offshore wind farm and transmission components, within offshore project area, as shown in Figure 2-3.

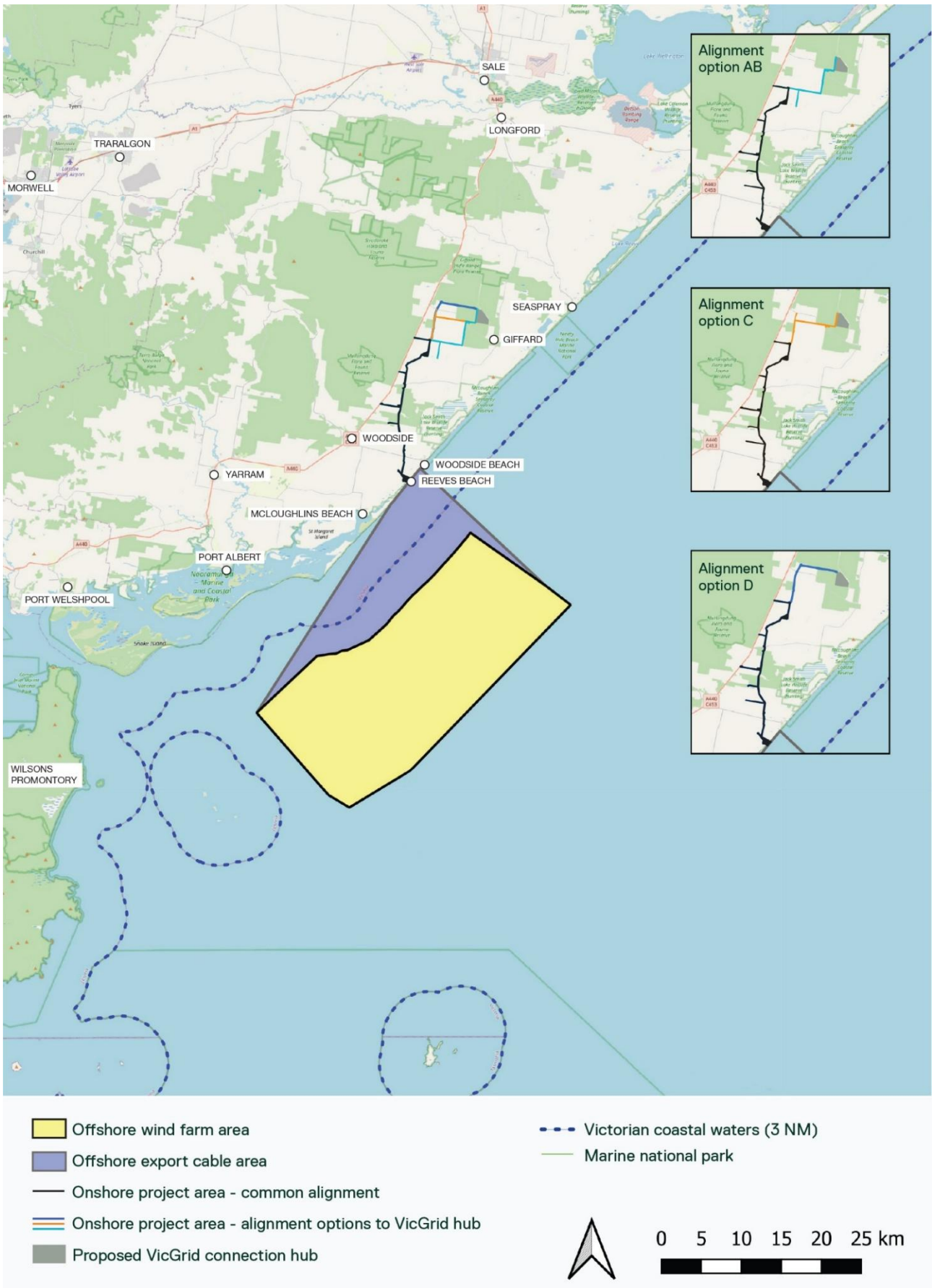


Figure 2-1 Project location

2.2 Project development

Over several years of project development, opportunities to avoid and minimise environmental impacts have been realised in accordance with the mitigation hierarchy shown in Figure 2-2. The assessment framework has also enabled the identification and adoption of further avoidance and minimisation measures as part of the planning and environmental approvals process.

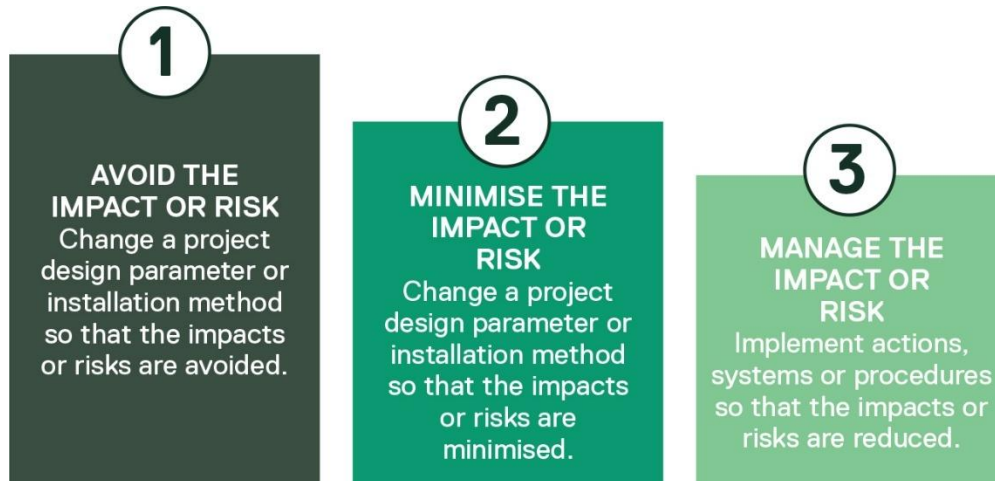


Figure 2-2 Mitigation hierarchy

Avoidance and minimisation of social and environmental impacts is central to the project's decision making and as such, the project will continue to be refined in response to technical requirements and potential environmental and social impacts identified during the development phase.

This was considered in the preparation of a project description which is found in Chapter 4 – Project description of the EIS for the whole of project assessment across the Commonwealth jurisdiction and Chapter 4 – Victorian works project description of the EES for the Victorian jurisdiction. Examples of this include the decision to design the shore crossings without directly impacting coastal areas, utilising existing roads for construction site access wherever possible and adopting construction techniques which avoid impacts on sensitive receptors such as waterways.

Once avoidance and minimisation measures are exhausted, residual impacts and risks are managed. In the case of risks, mitigation measures can be applied both before and after an event occurs. Residual impacts and risks are then evaluated against the assessment criteria to ensure they are at an acceptable level.

2.3 Project area

The project area, shown in Figure 2-3 has been broken down into three main sections - offshore, shore crossing, and onshore areas.

1. Offshore project area, comprising:

- **Offshore wind farm area:** A 586 square kilometre area extending approximately 10 to 40 kilometres offshore from the shore crossing. Includes offshore wind turbines installed on foundations, offshore substations and offshore transmission cables. This area is in Commonwealth waters.
- **Offshore export cable area:** A 232 square kilometre area extending from the offshore wind farm area to the shore crossing. Includes offshore export cables to connect the wind farm to land. This area traverses Commonwealth waters and Victorian coastal waters.

2. Shore crossing:

Located at Reeves Beach, this is where the offshore export cables will transition to land and connect to the underground cable system onshore.

- 3. Onshore project area:** An approximately 30 kilometre corridor extending from the shore crossing to the proposed VicGrid connection hub. Includes an underground cable system within a (common) alignment to Giffard West, at which point there are three alignment options (AB, C and D) to reach the proposed VicGrid hub in Giffard.

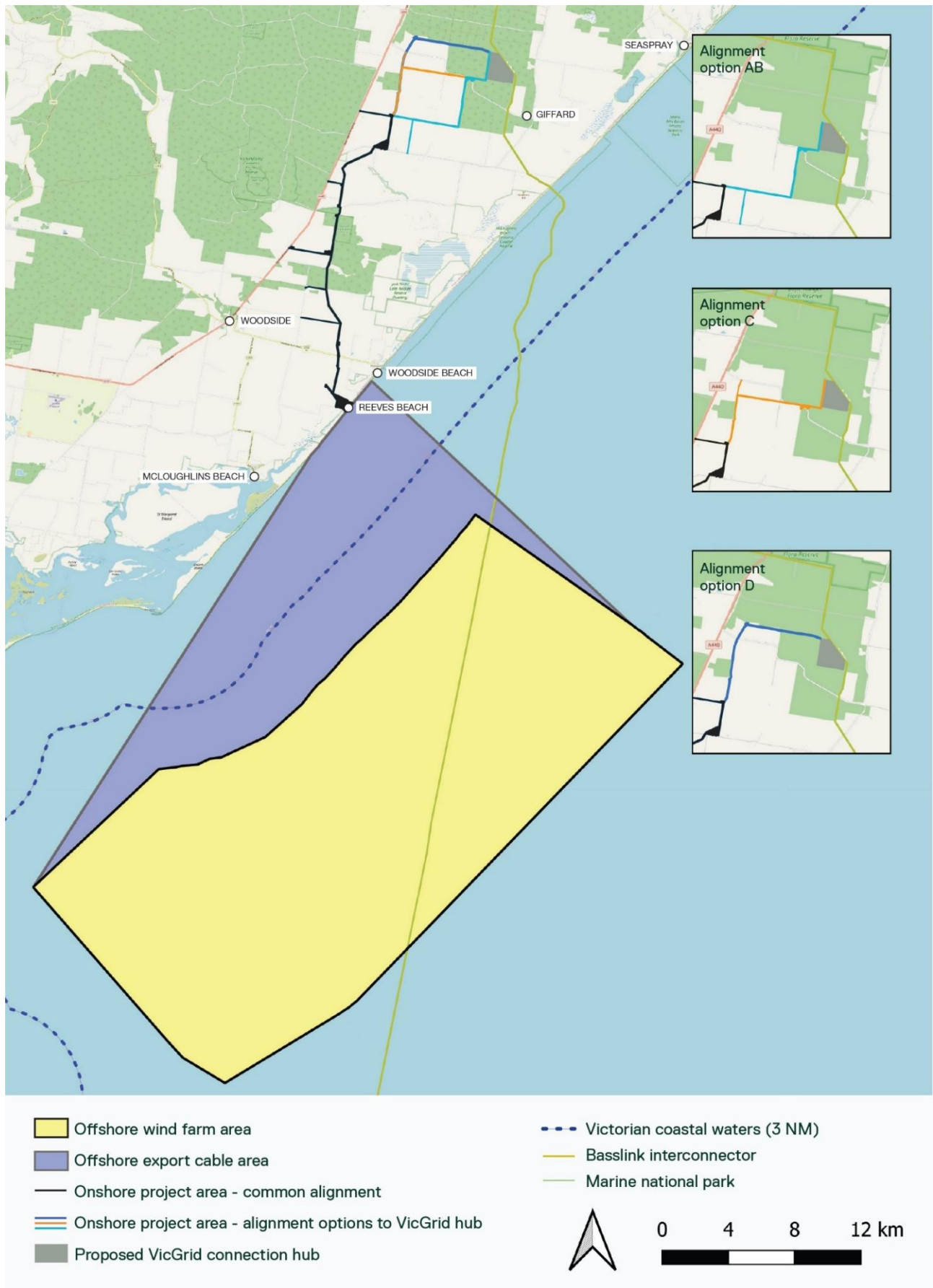


Figure 2-3 Project overview

2.4 Key project components

The key components that make up the project are the offshore wind farm and transmission infrastructure (inter-array cables, offshore substations and offshore export cables), the shore crossing infrastructure and onshore transmission infrastructure.

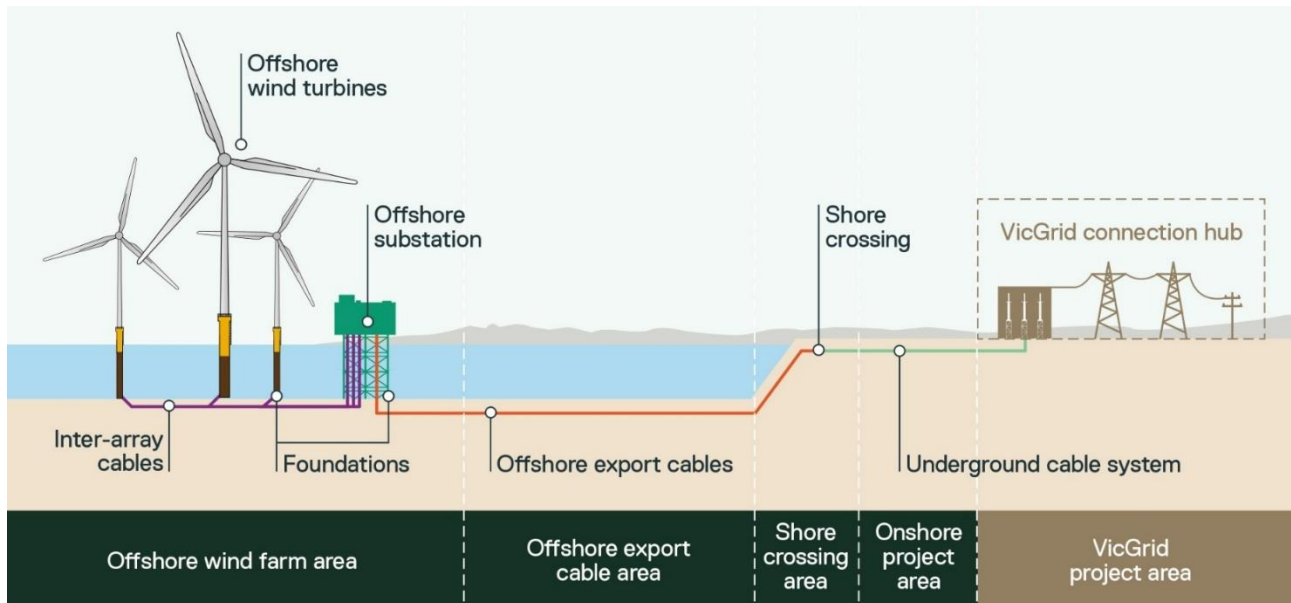


Figure 2-4 Project components

Key components are shown in Figure 2-4 and include:

- Offshore wind farm and transmission infrastructure:
 - Up to 147 offshore wind turbines installed on foundations with connecting inter-array cables
 - Up to five offshore substations and three interlink cables
 - Up to eight offshore export cables.
- Shore crossing infrastructure:
 - Up to eight trenchless crossings containing the offshore export cables.
- Onshore transmission infrastructure, which consists of:
 - An underground cable system connecting to the proposed VicGrid connection hub

2.5 Construction approach

The offshore components of the project are likely to be constructed according to the general sequence below:

- Site preparation activities
- Offshore export cable installation
- Foundation installation
- Offshore substation topside installation
- Inter-array and interlink cable installation
- Offshore wind turbine installation.

Construction of the shore crossing involves 2 main activities and phases:

- Drilling and duct installation
- Cable pulling

2.6 Project timeline

The project has been under development for approximately seven years. If approvals are obtained in the next few years, construction could start around 2030 and electricity generation from 2032. The operational life of the project is approximately 30 years, with the possibility of repowering to extend its life, if deemed appropriate by Star of the South and regulators closer to the time.



Figure 2-5 Project timeline

2.7 Construction schedule

The project is expected to take up to seven years to construct, if built to its full capacity in a single stage. The project could also be built in two stages, depending on energy market and government requirements and timing. Figure 2-6 shows the order and maximum duration of construction for key components.

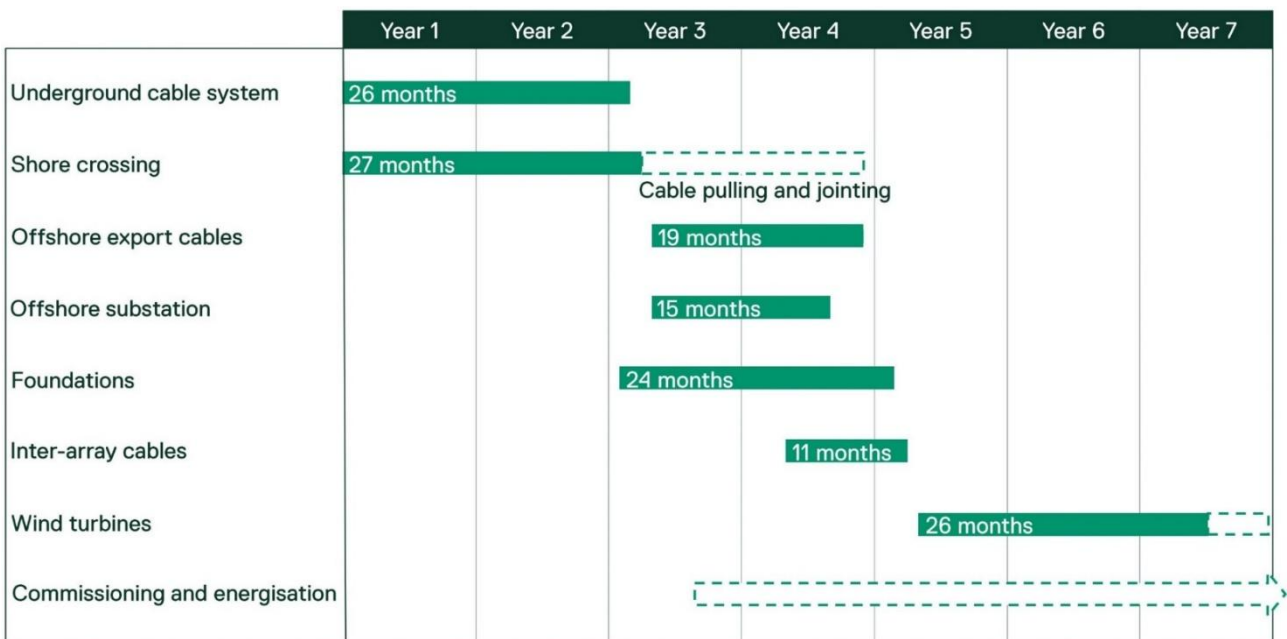


Figure 2-6 Indicative construction schedule

2.8 Operation

The project is expected to have an operational life of approximately 30 years. The offshore wind turbines will be available to operate continuously during the operations phase. Infrastructure will be monitored and operated remotely from a local O&M facility located at either Barry Beach Marine Terminal or Port Anthony, supported by a service operation vessel (SOV) and/or crew transfer vessel (CTV) logistics strategy.

O&M activities will be both preventative (planned) and corrective (unplanned). Preventative activities are carried out as part of regular scheduled services, such as removing marine growth. Corrective maintenance covers unexpected repairs, component replacement and breakdowns.

2.9 Decommissioning

Key principles that will apply to decommissioning offshore include:

- Planning and budgeting for decommissioning, as required under the Offshore Electricity Infrastructure Act 2021 (Cth)
- Considering environmental conditions and stakeholder interests when developing decommissioning plans
- Returning the seabed to baseline conditions as far as reasonably practicable.

Decommissioning is expected to involve similar types and numbers of vessels and equipment as the construction phase. Requirements at the time will determine the scope of decommissioning activities and impacts. The anticipated duration is up to three years. Indicative activities include:

- Removing offshore substation topsides and foundations to just below the seabed
- Removing offshore wind turbines, transition pieces and monopiles to just below the seabed
- Removing scour protection where reasonably practicable and appropriate to do so
- Retaining offshore cables in situ.

3 EVALUATION FRAMEWORK

The identification, assessment and evaluation of potential impacts from the project to marine protected areas and the required management and mitigation measures to control those impacts and risks to acceptable levels, is guided by relevant legislation, policy, guidelines, recovery plans, published conservation advice and action plans as well as other social context such as stakeholder feedback.

The evaluation framework describes the way that the project was assessed to determine the impacts on assets, values and uses. The key components of the evaluation framework are:

- Terms of reference
- Legislation, policy, and standards
- Assessment criteria.

The terms of reference set by the Victorian Minister for Planning (the EES scoping requirements) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) (the EIS guidelines) are outlined in Section 3.1. All relevant international conventions, Commonwealth and state legislation, policy, guidelines and standards that are broadly relevant to the project and management and mitigation of potential impacts are included in Section 3.2. The legislation, guidelines and standards that are relevant to determining specific 'assessment criteria' that have been adopted for the project in relation to the assessment of impacts to marine protected areas are included in Section 3.2.

3.1 Terms of reference

3.1.1 EIS guidelines

The Guidelines for the Content of an Environmental Impact Statement for Star of the South Offshore Wind Farm Project ('the guidelines') set out the requirements to allow the Commonwealth Minister for the Environment to make an informed decision on the approval of the project under the EPBC Act.

The aspects of the guidelines relevant to the marine protected areas assessment are shown in Table 3-1 as well as where these items have been addressed in this report.

Table 3-1 EIS requirements addressed within this report

Requirement	Section addressed
<p>A description of the ecological character of the Corner Inlet Ramsar Wetlands including the following details:</p> <ul style="list-style-type: none"> • Ramsar values (identified in the listing criteria in the Ramsar Information Sheet 2020), critical components, processes and services of the Corner Inlet Ramsar Wetlands (identified in the Draft Ecological Character Description (ECD) or final ECD if available). This includes: <ol style="list-style-type: none"> a) extent and types of wetland habitats at the proposed development site and in areas that may be impacted by the development including, but not limited to, intertidal and subtidal habitats and areas; b) threatened ecological community locations; c) threatened and migratory species numbers, distribution and site fidelity at the Ramsar sites and in areas that may be impacted by the development, known habitat utilisation or requirements, and the predicted temporal and spatial variability in occurrence at the site; d) locations of feeding and roosting habitats of threatened and migratory species at the Ramsar sites, the behavioural ecology which links these habitats, their site fidelity, temporal variability in occurrence at the site and their usage of the area in regional context, including their migratory pathways; e) coastal morphology and hydrology, including the tidal regime of Corner Inlet; f) physico-chemical status of the wetland (levels of turbidity and suspended sediment) g) water quality; h) soils and marine sediments, including acid sulphate soils (ASS) and potential acid sulphate soils (PASS); and i) Current status and condition of the Corner Inlet Ramsar Wetlands, including the past and projected trends and existing threats. 	Section 4.1

Requirement	Section addressed
Discuss all the relevant impacts of the action to the ecological character of wetlands of international importance	Section 4.2
Predictions (including modelling) of any changes to the physico-chemical status of Corner Inlet Ramsar site (including turbidity and suspended sediment changes) during the construction, operation and decommissioning stages of the action	Section 4.2
Characterise potential changes to the quality of waters, sediments and biota at the Corner Inlet Ramsar site	Section 4.2
Predictions of the extent, severity and persistence of impacts of the action on existing marine benthic habitats and communities and the biota they support (e.g. mammals, reptiles, marine plants, fish and invertebrates), and evaluating how these impacts affect marine ecological integrity and functioning, for the Commonwealth Marine Area as well as any marine protected areas that may be affected.	Section 4.2
Consideration of the potential for cumulative impacts on the ecological character of the Corner Inlet Ramsar site	Section 8
Characterise impacts to the qualities and characteristics of Commonwealth Marine Parks	Section 5.1
Proposed avoidance, management and mitigation measures relevant to Commonwealth Marine Parks and Ramsar Sites.	Section 10
Demonstrate how a net benefit will be achieved for the Corner Inlet Ramsar Site...through the implementation of avoidance, mitigation and offset measures in a timely, transparent and scientifically robust manner.	Section 4.2

The whole of the environment within the Commonwealth Marine Area is considered an MNES as such an integrated assessment of the marine ecosystem and its components is required. The interaction of different receptors and potential combined impacts on the ecosystem as a whole are contained in EIS Chapter 24 - summary and conclusions.

3.1.2 EES evaluation objectives and scoping requirements

The Scoping Requirements for Star of the South Offshore Wind Farm Environment Effects Statement (‘scoping requirements’) released by the Minister for Planning, set out the specific environmental matters the project must address in order to satisfy the Victorian assessment and approval requirements.

The scoping requirements include a set of evaluation objectives. These objectives identify the desired outcomes to be achieved in managing the potential impacts of constructing, operating, and decommissioning the project in accordance with the Ministerial guidelines for assessment of environmental effects under the EE Act.

The following evaluation objective is relevant to the assessment of impacts on the natural values of Victorian marine protected areas:

- To avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas].
- To minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].

The aspects from the scoping requirements relevant to the evaluation objective are shown in Table 3-2, as well as where these items have been addressed in this report.

Table 3-2 Scoping requirements relevant to the evaluation objective Marine Protected Areas

Aspect	Scoping requirement	Section addressed
Key issues	Potential impacts on habitats within protected areas, such as national parks, state parks or other conservation reserves [in the Victorian marine area].	Section 6
	Potential impacts on the ecological character and associated biodiversity values of Ramsar Wetlands.	Section 4.2
	The potential for adverse effects on the functions, values, and beneficial uses of surface water environments, such as interception or diversion of	Section 6

Aspect	Scoping requirement	Section addressed
	flows or changed water quality or flow regimes [in Victorian marine protected areas]	
	Potential effects to values through spills of fuels or chemicals or the introduction of invasive species [in Victorian marine protected areas]	Section 6
Priorities for characterising the existing environment	Characterise the type, distribution, and condition of biodiversity values within a suitable [Victorian marine protected areas] study area, comprising the project site and its environs, including marine native vegetation, marine habitat and marine habitat corridors or linkages.	Section 6
	Describe the biodiversity values of [Victorian marine protected areas] that could be directly or indirectly affected by the project	Section 6
	Describe any existing threats to biodiversity values [within Victorian marine protected areas], including but not limited to: <ul style="list-style-type: none"> • historic or ongoing disturbance or alteration of habitat conditions (e.g. habitat fragmentation, • severance of wildlife corridors or habitat linkages, changes to water quantity or quality and fire hazards); • potentially threatening process listed under the FFG Act; and • the presence of any declared marine pests within and in the vicinity of the project area. 	Section 6
	Describe marine, estuarine, intertidal and freshwater waters and their beneficial uses that could be affected by the project, such as from changed water quality, or water movement.	Section 6
Design and mitigation measures	Identify and evaluate aspects of project works and operations, and proposed design refinement options or measures, that could avoid or minimise significant effects on groundwater, waterway, wetland, estuarine, intertidal, and marine waters [in Victorian marine protected areas].	Section 6
	Describe further potential and proposed design options and measures that could avoid or minimise significant effects on groundwater, waterway, wetland, estuarine, intertidal, and marine waters during the project's construction and operation, including response measures for environmental incidents [in Victorian marine protected areas].	Section 6
Assessment of likely effects	Identify and evaluate effects of the project on groundwater, waterway, wetland, estuarine, intertidal, and marine waters [in Victorian marine protected areas] potentially affected by project works, including with appropriate consideration of climate change scenarios and possible cumulative effects.	Section 6
	Ensure a systems-based assessment where necessary, with marine water quality, hydrodynamics and marine ecology studies undertaken together.	Section 6
Approach to manage performance	Describe and evaluate the approach to monitoring and the proposed contingency measures to be implemented in the event of adverse residual effects on groundwater, waterway, wetland, estuarine, intertidal, and marine waters requiring further management [in Victorian marine protected areas].	Section 6
	Describe contingency measures for responding to unexpected but foreseeable impacts.	Section 6

3.2 Legislation and international conventions/agreements

The Commonwealth and Victorian State legislation and international agreements relevant to this assessment are summarised in Table 3-3.

Table 3-3 Legislation, policy, guidelines and standards relevant to the assessment

Document title	Summary	Relevance to project
International conventions/guidance		
<i>IMO Guidelines for the reduction of underwater noise from commercial</i>	Describes the strategy to reduce underwater noise from shipping (not including naval or military vessels, and	Underwater noise will be created by project vessels during all stages of the project.

Document title	Summary	Relevance to project
<i>shipping to address adverse impacts on marine life (MEPC, 2014)</i>	not including seismic or other similar activities) to reduce the impact to marine wildlife, including describing practical efforts to evaluate the success of any measures taken.	
International Convention for the Prevention of Pollution from Ships 1973 (MARPOL)	Aimed at preventing both accidental pollution and pollution from routine vessel operations	Australia is a signatory to this Convention, meaning projects within the Australian jurisdiction will need to be conducted in line with it. MARPOL is applied as an initial mitigation measure for safety of navigation to reduce potential impacts to birds associated with the risk of vessel collision. This convention applies to international, Commonwealth and State waters.
International conventions/agreements on migratory species	Australia is a signatory to the following: <ul style="list-style-type: none"> • Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animal • Japan-Australia Migratory Bird Agreement (JAMBA) • China-Australia Migratory Bird Agreement (CAMBA) • Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) 	Australia is a signatory to these agreements, therefore projects undertaken within the Australian jurisdiction will need to be conducted in line with them. Migratory species covered by these agreements are listed as such under the EPBC Act.
Ramsar Convention on Wetlands	Australia is a contracting party to the Ramsar Convention, which encourages the designation of sites containing representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity.	Australia is a contracting party to the Ramsar Convention. The EPBC Act is the mechanism by which Australia ensures obligations are met, and provides for the listing of, and assessment of impacts to, Ramsar wetlands within the Australian jurisdiction. Birds that utilise or have the potential to pass through the OPA are known to utilise Ramsar sites in proximity to the project, including Corner Inlet, Jack Smith Lakes and Western Port. Local ports (BBMT and Port Anthony) proposed to be used by the project, are also located within Corner Inlet.
Commonwealth government		
<i>Biosecurity Act 2015 (Cth)</i>	Provides the framework for management of diseases and pests that may cause harm to human, animal or plant health or the environment.	Ballast water and biofouling are a potential source of non-indigenous marine species (NIMS). This Act implements the Ballast Water Convention and regulates the ballast water and sediment of certain vessels. Manages vessel biofouling. Mandatory biofouling management requirements for international vessels will commence on 15 June 2022, with vessel biofouling management information to be reported through the DAFF Maritime Arrivals Reporting System)

Document title	Summary	Relevance to project
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)	Assessment, protection and management of potential impacts on Matters of National Environmental Significance including Commonwealth marine areas.	Determined that the project is a 'controlled action' requiring assessment through an EIS, and approval from the Commonwealth Minister for the Environment., partly due to potential for impacts on Ramsar wetlands and the Commonwealth marine area.
Environment Protection and Biodiversity Conservation Regulations 2000	Sets regulations, management objectives and principles for MNES	Provides regulations, management principles and assessment criteria relevant to the project
<i>Offshore Electricity Infrastructure Act 2021</i> (Cth)	<p>The OEI Act regulates offshore infrastructure used to generate electricity including wind farms, and infrastructure used for transmitting or storing electricity or energy offshore in Commonwealth waters.</p> <p>The Act provides a framework for the construction, operation, maintenance and decommissioning of offshore electricity projects.</p> <p>The Act allows the Minister to declare areas and issue licences suitable for offshore energy infrastructure and can require conditions to be met under those licences. Three main licensing approaches are:</p> <ul style="list-style-type: none"> • Commercial use (with a feasibility licence being a pre-requisite for scoping activities) • Research/demonstration • Transmission and infrastructure. 	<p>In May 2024, the Commonwealth government issued the Star of the South with an exclusive feasibility license, enabling exploration to investigate and plan an offshore wind farm in Commonwealth waters. This licence was valid for five years with the potential to extend for another two years.</p> <p>The exploration licence does not provide an automatic right to build or operate an offshore wind farm. The following will also be required prior to commencing installation:</p> <ul style="list-style-type: none"> • Demonstration of financial security • An approved management plan for the Licences • Have all other relevant State and Commonwealth approvals in place • The project will have to comply with the requirements of this Act for all applicable activities and infrastructure in Commonwealth waters.
<i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> (Cth)	The Act implements international maritime law (MARPOL) to which Australia is signatory and addresses requirements for addressing emissions and discharges from vessels.	Sets pollution prevention and discharge management requirements for vessels used in the project.
<i>Underwater Cultural Heritage Act 2018</i> (Cth)	<p>Provides clarity to the jurisdictional arrangements for the protection and management of Australia's underwater heritage in line with the 2010 Australian Underwater Cultural Heritage Intergovernmental Agreement.</p> <p>The Act replaces the <i>Historic Shipwrecks Acts 1976</i>, broadening protections from shipwrecks to also include sunken aircraft and cultural heritage (including Australian Aboriginal and Torres Strait Islander heritage) in Commonwealth waters.</p>	Requires protection of known and unrecorded shipwrecks, sunken aircraft and cultural heritage in the offshore wind farm area and along the OECA.
<i>Protection of the Sea (Harmful Antifouling Systems) Act 2006</i>	The Act implements Australia's obligations under the International Convention on the Control of Harmful Anti-Fouling Systems on Ships.	Sets antifouling requirements for vessels used in the project, prohibiting the use of harmful antifouling systems, and requiring vessels to carry antifouling certificates and declarations.

Victorian Government

Document title	Summary	Relevance to project
<i>Catchment and Land Protection Act 1994</i>	The main legislation covering noxious weed and pest animal management in Victoria and provides the power to declare species of plants and animals as noxious. One of the main objectives is to protect primary production, Crown land, the environment and community health from the threats posed by noxious weeds and pest animals (including introduced marine species).	Protection of the environment, including the marine protected areas discussed in this report, from land and introduced marine species is described in Sections 8 to 13 of this report.
<i>Crown Land (Reserves) Act 1978</i>	This Act allows for land to be set aside as Crown Land in Victorian and stipulates who and how the land is managed.	Sets the management and management actions of areas reserved as Crown Land in Victoria, including some Victorian reserves.
<i>Environment Effects Act 1978 (VIC)</i>	Empowers the Minister for Planning to require proponents to prepare environment effects statements (EESs) for projects before any statutory approvals for the project are granted. EESs must be undertaken in accordance with the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978.	An EES is required to be prepared for the project.
<i>Environment Protection Act 2017 (VIC)</i>	The primary waste management and pollution control legislation in Victoria, which imposes a number of statutory duties on people who carry out activities in the State, including the general environmental duty (GED). The GED requires any person engaging in an activity in Victoria to minimise the risk of harm to human health and the environment from pollution and waste, so far as reasonably practicable. The Act and its subordinate legislation is administered by the Victorian Environment Protection Authority (EPA).	Construction and operation of the project, including any management plans for works in Victoria, will need to comply with the statutory duties. No permissions are required for the project under this Act.
<i>Flora and Fauna Guarantee Act 1988 (FFG Act)</i>	This Act establishes a legal and administrative structure to enable and promote the conservation of Victoria's native flora and fauna.	The objectives of the Act include a guarantee that taxa of Victoria's flora and fauna can persist and improve in the wild, to prevent such taxa from becoming threatened, and to protect, conserve, restore and enhance biodiversity. The administration of this Act also adopts the Common Assessment Method, a consistent national approach to the assessment and listing of threatened species.
<i>Marine and Coastal Act 2018 (VIC)</i>	Protection and enhancement of the Victorian marine and coastal environment between the outer limit of Victorian coastal waters (3NM) and 200 metres inland of the high-water mark of the sea.	Establishes the following principles that are relevant to the project: <ul style="list-style-type: none"> • That planning and management incorporate an ecosystem-based approach including avoidance of cumulative impacts • That development be consistent with the principles of ecological sustainability • That planning and management decisions be based on the best

Document title	Summary	Relevance to project
		<p>available environmental, social and economic information</p> <ul style="list-style-type: none"> • That management of impacts incorporate the precautionary principle • That risk management and regulatory approaches be proportionate to the risk involved. <p>The project will require a consent for works on coastal Crown land under this Act.</p>
<i>National Parks Act 1975 (VIC)</i>	Establishes the basis for the protection, use and management of National and other Parks within the Victorian State jurisdiction.	Relevant to the protection of National and other parks in the vicinity of the offshore elements of the project. Consideration of such protected areas will be required as part of the EIS/EES and is potentially relevant to subsequent State approvals.
<i>Nature Parks and Reserves Act 2002 (Tas)</i>	Management of parks and reserves based on management objectives of each class of reserve, declaration and management of Marine Protected Areas (marine reserves).	Defines the natural values and management objectives for nature reserves on Tasmanian land. This has been applied to Tasmanian-managed waters as there is no legislative instrument for the management of Tasmanian waters specifically.
<i>Pollution of Waters by Oils and Noxious Substances Act 1986 (VIC)</i>	The purpose of this Act is to make certain provisions for the protection of the sea and certain waters from pollution by oil and other noxious substances and to implement the MARPOL Convention	Sets pollution prevention and discharge management requirements for vessels used in the project, within Victorian waters
<i>Pollution of Waters by Oil and Noxious Substances Regulations 2022 (VIC)</i>	The Regulations prescribe notification and reporting requirements regarding discharges of oil or oily mixtures, including the necessary entries into a ship's oil record book	Prescribes specific discharge management requirements for vessels used in the project, within Victorian waters

3.2.1 General environmental duty

In Victoria, the EP Act came into effect in 2021 and is designed to prevent harm to human health and the environment from pollution and waste. At the centre of the EP Act is the general environmental duty (GED).

The GED requires that any person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.

The GED applies at all times, during construction and operation of the project, for any activities in Victoria posing a risk of harm to human health and the environment from pollution and waste. Meeting regulatory requirements does not necessarily mean that the GED has been met.

The following sections of the EP Act apply to the interpretation of the GED:

- Section 6 of the EP Act states that minimising risks of harm to human health and the environment requires the duty holder to eliminate risks of harm to human health and the environment so far as reasonably practicable and, if it is not reasonably practicable to eliminate those risks, then reduce those risks as far as reasonably practicable.
- Section 6(2) of the EP Act states factors to have regard to when determining what is reasonably practicable in relation to the minimising of risks to harm to human health and the environment. EPA has published guidelines to help apply and interpret these factors, which are addressed in Section 3.2.2 below.

3.2.2 Reasonably practicable

The EP Act sets out the matters that must be considered in determining what is reasonably practicable in relation to the minimisation of risks of harm to human health and the environment. EPA Publication 1856: Reasonably Practicable provides guidance when considering and applying these matters:

- Eliminate first: Can you eliminate the risk?
- Likelihood: What's the chance that harm would occur?
- Degree (consequence): How severe could the harm be on human health or the environment?
- Your knowledge about the risks: What do you know, or what can you find out, about the risks your activities pose?
- Availability and suitability: What technology, processes or equipment are available to control the risk? What controls are suitable for use in your circumstances?
- Cost: How much does the control cost to put in place compared to how effective it would be in reducing the risk?

The items above have been considered when assessing the suitability of mitigation measures for the project.

3.3 Assessment criteria

To assess the acceptability of predicted impacts and risks of the project, refine the design, and identify further mitigation and/or management measures, those predicted impacts and risks are compared against pre-defined 'assessment criteria' that define the environmental performance outcomes that must be achieved. Assessment criteria can be quantitative or qualitative. They vary across the range of technical studies undertaken and have been derived from the following sources:

- Legislation and policy, including the objectives of the EPBC Act and the principles of ecologically sustainable development as defined in the *Ministerial guidelines for assessment of environmental effects* (DTP 2023) and in section 3A of the EPBC Act
- Recovery and conservation management plans for threatened species and environments
- Relevant standards and guidelines
- Stakeholder feedback
- Industry best practice.

The assessment criteria are also aligned with the requirement of the EIS guidelines and EES scoping requirements to develop performance criteria and evaluation objectives.

The specific assessment criteria relevant to this technical report address:

- EPBC Act significant impact guidelines
- Specific targets, key threats and actions outlined in any relevant marine protected areas management plans or strategies and other government guidance material e.g. ecological character descriptions.

The Ecological Character Description (ECD), ECD Addendum, Ramsar Information Sheet and management plan for the Corner Inlet Ramsar site were also reviewed to obtain more specific information about the key values and management objectives for the Ramsar site, in order to assess impacts. The site has specified Limits of Acceptable Change (LAC), which define the limit of variation or change within the wetland over specified timeframes that is considered acceptable. While these LACs provide useful information on the key values of the Ramsar site, it is not appropriate to use the LAC thresholds to assess project impacts in isolation as these have been developed to measure and assess management of the whole Ramsar site, not for assessing specific locations or impacts. The assessment criteria for the project therefore highlight these values to ensure that the impact assessment considers key values for the Corner Inlet Ramsar site.

A summary of the assessment criteria used for this report can be found in Table 3-4.

3.4 Method of assessment

This section presents an overview of the method used to assess the potential impacts and risks from the project on MPAs and their values. This method is summarised under the following key steps:

1. Definition of nature and scale of the project
 - The offshore project area, project components and potentially impacting activities were defined based on the high-level activity description presented in Section 2, and detailed within EIS Chapter 4 – Project description and EES Chapter 4 – Victorian works project description.
2. Identification of relevant MPAs
 - All Commonwealth and Victorian MPAs located within or near the OPA that could be affected by the construction, operation and decommissioning of the project.
 - This included a review of relevant national, state and local legislation and international treaties and conventions.
3. Identification of MPA environmental and other values
 - Environmental (and other values) were defined based on information presented in management plans relevant to the conservation and/or management of an MPA, and for the Corner Inlet Ramsar site, based on the Ecological Character Description (ECD) and Ramsar Information Sheet.
4. Evaluation of potential impact and risk pathways relevant to each MPA value
 - For each environmental (and other) value, the potentially impacting pathways and credible risks associated with the construction, operation and decommissioning of the project were screened using the outcomes of the receptor assessments in the dedicated chapters.
 - Where no plausible impact pathway was identified between the project activities and a value, that value was not carried forward for further assessment.
 - Assessment criteria (defined in Section 3.3) relevant to each MPA were used to evaluate the acceptability of predicted impacts and risks of the project.
 - A cumulative impact assessment (CIA) was undertaken for MPAs and their values, drawing on the CIA outcomes for each of the MPA values of the dedicated receptor assessment chapters.
 - Mitigation, monitoring and adaptive management measures relevant to reduce residual impacts and risks to acceptable levels have been summarised in Section 10.

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Table 3-4 Assessment criteria for marine protected areas

Receptor	Potential impacts and risks	Source of requirements	Specific requirements ¹	Assessment criteria
Ramsar Sites	<p>Impacts</p> <ul style="list-style-type: none"> Underwater noise(transiting vessels) impacting on fauna and socioeconomic values of marine protected areas Construction vessel lighting, or physical disturbance impacting on values of marine protected areas Changes to coastal processes within marine protected areas as a result of a change to local hydrodynamics from offshore infrastructure <p>Risks</p> <ul style="list-style-type: none"> Introduction or establishment of invasive marine species within marine protected areas Accidental hydrocarbon spill from collision of a project vessel impacting on values of marine protected areas Accidental vessel discharges impacting on values of marine protected areas Pollution of surface water from the shore crossing construction impacting values of the marine protected area Vessel strike impacting marine mammal values of marine protected areas Mortality of birds considered values of marine protected areas due to operating turbines 	<ul style="list-style-type: none"> Corner Inlet Ramsar Site Management Plan, within West Gippsland Waterway Strategy 2014-2022 Corner Inlet Ramsar site Ecological Character Description 2011 Corner Inlet Ramsar Site Ecological Character Description Addendum 2017 Corner Inlet Ramsar Information Sheet (2020) Matters of National Environmental Significance – Significant impact guidelines 1.1 <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth of Australia 2013) 	<p>Corner Inlet Ramsar Site Management Plan, within West Gippsland Waterway Strategy 2014-2022:</p> <ul style="list-style-type: none"> Manage Australian Ramsar sites so as to maintain the ecological character of each site Preserve and protect the natural condition of the parks and its natural and other features. <p>EPBC Act significant impact criteria for wetlands of international significance – an action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:</p> <ul style="list-style-type: none"> areas of the wetland being destroyed or substantially modified a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in 	<p>The project will have no measurable impact on the ecological values of the Corner Inlet Ramsar Site, as defined with the Ecological Character Description for the site, and the EPBC Act significant impact criteria for wetlands of international importance.</p>

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Receptor	Potential impacts and risks	Source of requirements	Specific requirements ¹	Assessment criteria
Australian Marine Parks	<p>Impacts</p> <ul style="list-style-type: none"> Underwater noise (transiting vessels) impacting on fauna and socioeconomic values of marine protected areas Construction vessel lighting, planned discharges or physical disturbance impacting on values of marine protected areas Displacement of values of marine protected areas or barrier effects created by the physical presence of offshore infrastructure <p>Risks</p> <ul style="list-style-type: none"> Introduction or establishment of invasive marine species within marine protected areas Accidental hydrocarbon spill from collision of a project vessel impacting on values of marine protected areas Accidental vessel discharges impacting on values of marine protected areas Vessel strike impacting marine mammal values of marine protected areas 	<ul style="list-style-type: none"> South-east Commonwealth Marine Reserves Network – Management Plan 2013-23 	<p>the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or</p> <ul style="list-style-type: none"> an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland. <p>South-east Commonwealth Marine Reserves Network – Management Plan 2013-23:</p> <ul style="list-style-type: none"> Protect and conserve biodiversity and other natural and cultural values of the South-east Marine Reserves Network. 	<p>The project will have no measurable impact on the conservation values of the Beagle AMP.</p>

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Receptor	Potential impacts and risks	Source of requirements	Specific requirements ¹	Assessment criteria
	<ul style="list-style-type: none"> Mortality of birds considered values of marine protected areas due to operating turbines 			
Victorian Marine Parks and Reserves	<p>Impacts</p> <ul style="list-style-type: none"> Underwater noise (transiting vessels) impacting on fauna and socioeconomic values of marine protected areas Construction vessel lighting, planned discharges or physical disturbance impacting on values of marine protected areas Changes to coastal processes of marine protected areas as a result of a change to local hydrodynamics from offshore infrastructure <p>Risks</p> <ul style="list-style-type: none"> Introduction or establishment of invasive marine species within marine protected areas Accidental hydrocarbon spill from collision of a project vessel impacting on values of marine protected areas Accidental vessel discharges impacting on values of marine protected areas Pollution of surface water from the shore crossing construction impacting values of the marine protected area Vessel strike impacting marine mammal values of marine protected areas Mortality of birds considered values of marine protected areas due to operating turbines. 	<ul style="list-style-type: none"> Wilson's Promontory Conservation Action Plan 2017 Corner Inlet Marine National Park Management Plan 2005 Gippsland Plains and Strzelecki Ranges Conservation Action Plan 2021 Wilson's Promontory Marine National Park Management Plan 2006 EES evaluation objectives 	<p>Wilson's Promontory Conservation Action Plan 2017</p> <ul style="list-style-type: none"> The resilience of natural assets in the Wilson's Promontory Park Landscape is increased and ecosystem services are maintained in the face of climate change and other stressors. <p>Corner Inlet Marine National Park Management Plan 2005</p> <ul style="list-style-type: none"> Natural processes, including competition, predation, recruitment and disturbance, will be protected to ensure an overall benefit to the biodiversity and variety of marine ecological communities in Corner Inlet Marine National Park Viable populations of seagrasses, particularly Broad-leaf Seagrass (<i>Posidonia australis</i>), will be maintained subject to natural ecological processes Intertidal feeding and roosting habitat for migratory and threatened shorebirds will be preserved and protected. <p>Gippsland Plains and Strzelecki Ranges Conservation Action Plan 2021</p> <ul style="list-style-type: none"> The resilience of natural assets in the Gippsland Plains and Strzelecki Ranges Parks Landscape is increased and ecosystem services are maintained in the face of climate change and other stressors. 	<ul style="list-style-type: none"> The project will not impact the values of Victorian Marine Parks and reserves The project will avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas]. The project will minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].

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Receptor	Potential impacts and risks	Source of requirements	Specific requirements ¹	Assessment criteria
			<p>Wilson's Promontory Marine National Park Management Plan 2006</p> <ul style="list-style-type: none"> Natural processes, including competition, predation, recruitment and disturbance, will be protected to ensure an overall benefit to the biodiversity and variety of marine ecological communities in the planning area. <p>EES evaluation objectives</p> <ul style="list-style-type: none"> To avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas]. To minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas]. 	
Tasmanian Marine Parks	<p>Impacts</p> <ul style="list-style-type: none"> Underwater noise (transiting vessels) impacting on fauna and socioeconomic values of marine protected areas Construction vessel lighting, planned discharges or physical disturbance impacting on values of marine protected areas <p>Risks</p>	<ul style="list-style-type: none"> <i>Nature Parks and Reserves Management Act 2002</i> 	The natural biological diversity and quality of water of Tasmanian Marine Parks are conserved.	The project will not impact the natural biological diversity and quality of water of the Kent Group Tasmanian Marine Nature Reserve.

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Receptor	Potential impacts and risks	Source of requirements	Specific requirements ¹	Assessment criteria
	<ul style="list-style-type: none">• Introduction or establishment of invasive marine species within marine protected areas• Accidental hydrocarbon spill from collision of a project vessel impacting on values of marine protected areas• Accidental vessel discharges impacting on values of marine protected areas.			

Note 1: Specific requirements (legal, standards and guidelines) are those that are applicable and relevant to the identified receptor (sourced from legislated requirements, management plan requirements, actions or objectives, stakeholder expectations)

3.5 Impact and risk assessment

This report considers the impact and risk assessments from other technical reports as they relate to the ecological character and values of the marine protected areas in the region.

Technical reports assigned impacts a level of consequence based on the potential outcome of an event and the impact affecting a receptor. It is determined by combining magnitude of the impact and sensitivity of the receptor using the matrix in Table 3-5. Magnitude and sensitivity were defined within Section 5 of each technical report, as relevant to the study.

Consequences were assigned based on the maximum credible impact for each pathway. Where uncertainty exists, a conservative approach to assessing consequence was adopted. The consequence levels were used to determine if the predicted impacts are within acceptable levels, or if additional mitigations are needed.

Table 3-5 Consequence level matrix

Magnitude	Sensitivity		
	Low	Medium	High
Negligible	Negligible (E)	Negligible (E)	Minor (D)
Low	Negligible (E)	Minor (D)	Moderate (C)
Medium	Minor (D)	Moderate (C)	Major (B)
High	Moderate (C)	Major (B)	Severe (A)
Very high	Major (B)	Severe (A)	Severe (A)

Risk ratings are assigned by combining the likelihood of an event occurring and the consequence of that event occurring using the risk matrix, presented in Table 3-6. Likelihood and consequence were defined within Section 5 of each technical report, as relevant to the study.

Table 3-6 Risk matrix

Likelihood	Consequence				
	Negligible (E)	Minor (D)	Moderate (C)	Major (B)	Severe (A)
Rare	Very low	Very low	Low	Medium	Medium
Unlikely	Very low	Low	Low	Medium	High
Possible	Low	Low	Medium	High	High
Likely	Low	Medium	Medium	High	Very high
Almost certain	Low	Medium	High	Very high	Very high

An assessment of the impact and risk to each MPA is presented in the Sections 4 to 7 for each phase of the project. As described in Section 2.9, potential impacts and risks during decommissioning are conservatively assumed to be equal to or less than those described for the construction phase therefore the decommissioning phase is not discussed in a separate subsection.

3.6 Cumulative impact assessment

Cumulative impacts are those that arise when the effects of a single project on a single receptor are considered alongside the effect of other projects on the same receptor. The project has considered the potential for cumulative impacts associated with other proposed projects. Where the likelihood of risks increases with additional projects that potentially affect the same receptors, these are also included in the CIA and treated as an impact. It is noted that industries that are already operational and any potential pressures they may be exerting on the environmental and/or socio-economic values of marine protected areas are considered as part of the baseline environment, with existing recognised threats discussed in Section 4.1.5.

A staged approach to CIA has been adopted (refer to Figure 3-1), and is described in EIS Chapter 6 - Assessment Framework and EES Chapter 6 - Assessment Framework). This approach is split into four stages:

- Stage 1 Identifying potentially cumulative projects or actions
- Stage 2 Shortlisting identified projects or actions
- Stage 3 Gathering information
- Stage 4 Assessment

This approach is focused on the assessment of potential adverse cumulative effects on receptors or similar groups of receptors, as relevant. The availability of information necessary to conduct a CIA depends on the status of the proposed project or action within the planning and approval regulatory steps. Therefore, a level of certainty reflecting the availability of detail and information necessary for the assessment is assigned to each proposal:

- Tier 1 High certainty – Project planning application/EIS/EES has been submitted to regulators, or the project has been approved, or the project is under construction.
- Tier 2 Medium certainty – Project referrals have been submitted to the regulators.
- Tier 3 Low certainty – Project is in the proposal stage and little information is publicly available.

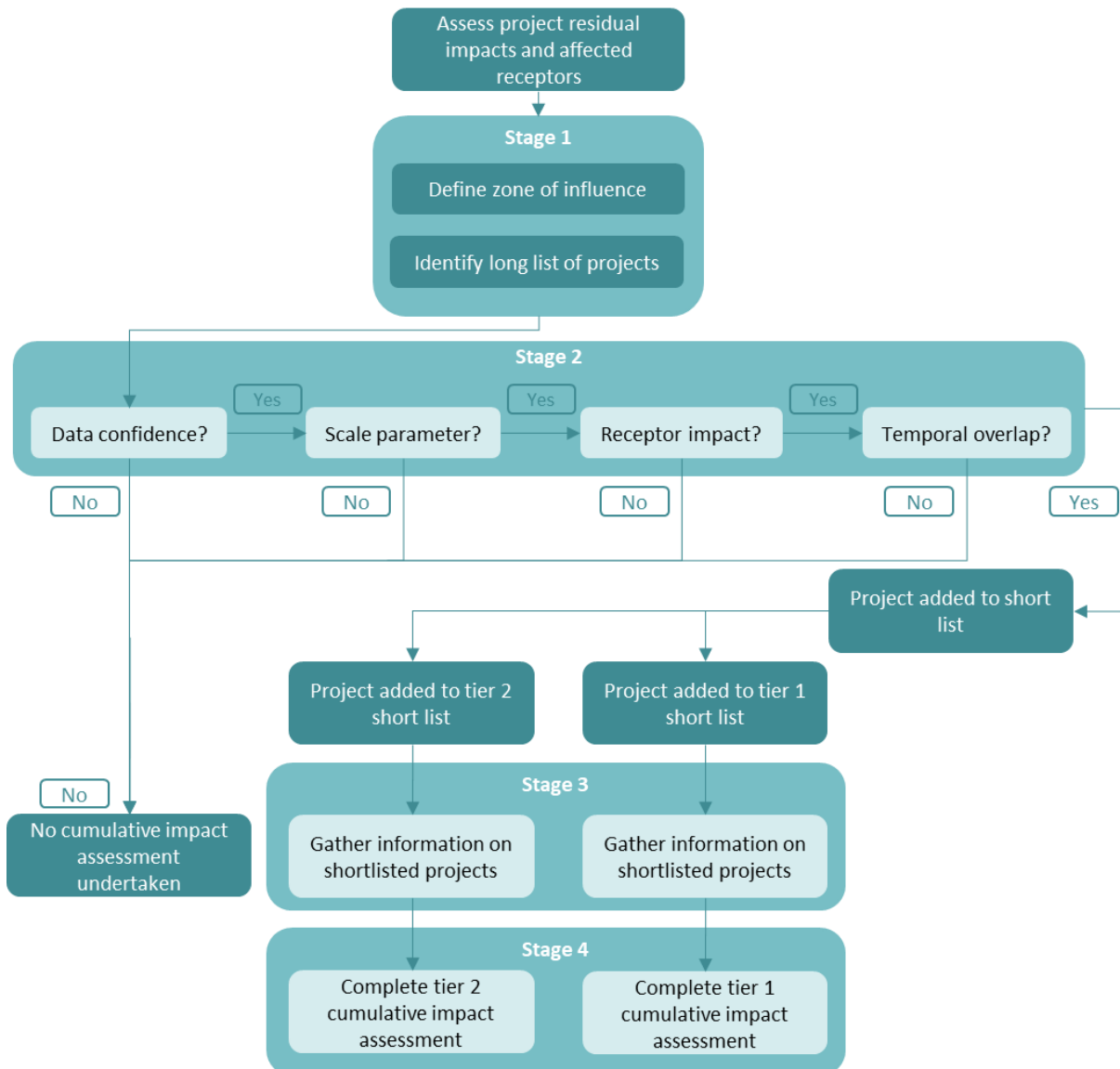


Figure 3-1 Cumulative impact assessment (CIA) process

4 CORNER INLET RAMSAR SITE

The Corner Inlet Ramsar site is approximately seven kilometres west of the OWFA at its nearest point (Figure 4-1). The tide-dominated marine embayment and intertidal mudflats of the Ramsar site are bound by the South Gippsland coastline to the west and north and Wilsons Promontory to the south, covering 67,186 hectares. The Ramsar site comprises all of the Corner Inlet Marine and Coastal Park (see Section 6.1), most of Nooramunga Marine and Coastal Park (see Section 6.4) and the Port of Corner Inlet which covers the area between the two coastal parks. The site also includes some areas of public land on islands: Sunday Island, Dog Island, Little Dog Island and Bullock Island, but excludes privately owned areas on these islands (DEPI, 2013).

Corner Inlet was recognised as a Ramsar site in 1982 due to its near natural condition, biological diversity, and significance to a large number of migratory shorebirds (DELWP, 2022) and the site is rated IUCN protected area category II (National Park) (Parks Victoria 2005).

Management of the Corner Inlet Ramsar site is implemented by the Corner Inlet Ramsar site Management Plan 2015, within the West Gippsland Waterway Strategy 2014-2022 (WGCMA, 2014). The site and its catchment area are a part of the West Gippsland Catchment Management Authority region, with the marine areas within the Victorian Embayments bioregion and the freshwater/terrestrial areas within the Southeast Coast Drainage division.

Port Anthony, Barry Beach Marine Terminal, Port Welshpool, and Port Albert all lie within the boundaries of the Ramsar site, and directly and indirectly support the commercial fishing industry, offshore oil and gas production, boating and minor coastal trade (DSEWPC, 2011). Port facilities at Port Anthony or Barry Beach Marine Terminal may be used by the project for operations and maintenance vessels and facilities. These facilities are neighbours and share an access channel and swing basin. Access to these ports is via the main entrance to Corner Inlet (between the northeast of Wilsons Promontory and Snake Island). The port areas are managed by Gippsland Ports, a Committee of Management appointed by the State of Victoria under the *Crown Land Reserves Act 1978*. Some parcels of land on the islands are privately owned and managed as grazing properties and remaining areas are either freehold land or unreserved Crown Land (Table 4-1).

Table 4-1 Management of Corner Inlet Ramsar site

Areas of Corner Inlet Ramsar site	Managed by
Victorian waters enclosed within: <ul style="list-style-type: none"> • Corner Inlet Marine and Coastal Park • Corner Inlet Marine National Park • Nooramunga Marine and Coastal Park. 	Parks Victoria
Land areas above the high-water mark of Doughboy Island, Bennison Island, Granite Island, Long Island and Corner Island (components of Wilsons Promontory National Park)	Parks Victoria
Intertidal areas in southern part of Corner Inlet	Parks Victoria
Land areas of Port Welshpool and Port Albert Waters within the Port of Corner Inlet and Port Albert	Gippsland Ports
Land parcels of Sunday Island, Dog Island, Little Dog Island, Hunter Island, Bullock Island	Private owners

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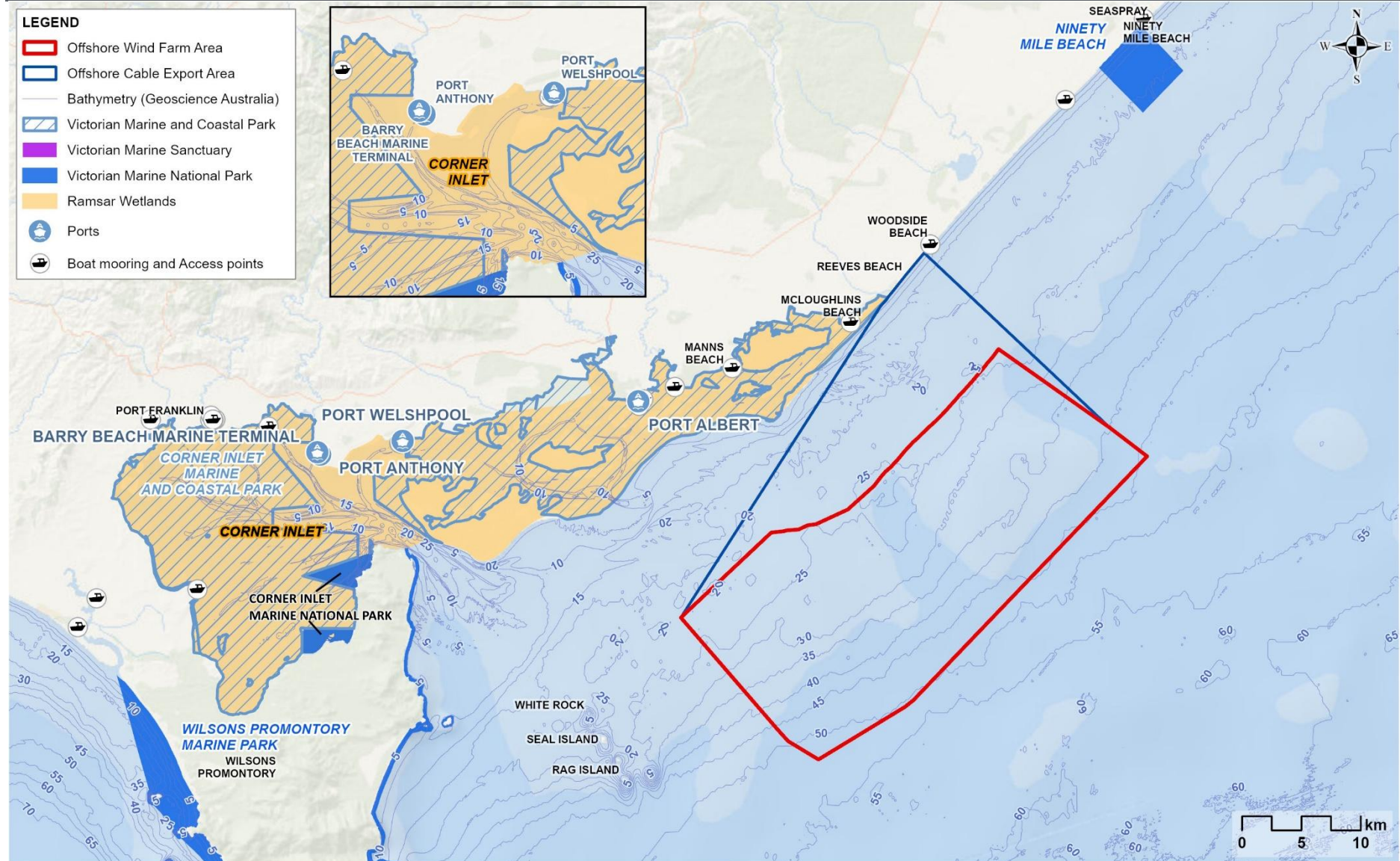


Figure 4-1 Corner Inlet Ramsar site location in relation to the Project

4.1 Ecological character description

An ecological character description (ECD) was published for the site in 2011 by the Australian Department of Sustainability, Environment, Water Population and Communities (DSEWPaC). The ECD provided an updated Ramsar Information Sheet, a site description, justification for the Ramsar listing, a description of the sites critical components, recognised threats and described the limits of acceptable change (LAC) for critical components, processes and services (CPS) identified for the site.

In 2017 an addendum was published (Hale 2017) that contained new information, reviewed the present wetland types, reviewed the Ramsar criteria met by the site, updated the description of critical components and updated the LACs.

A further update of the Ramsar Information Sheet (V.1.6) was published in February 2020.

4.1.1 Critical and supporting components, processes and services/benefits

The recognised critical and supporting components, processes and services/benefits for the Corner Inlet Ramsar Site (Hale, 2017) are summarised in the Table 4-2.

The management plan for the site lists a number of other social, economic and cultural values of the site, including the commercial port facilities at the Barry Beach Marine Terminal in Port Anthony, Port Franklin, Port Welshpool and Port Albert.

Table 4-2 Components of the Corner Inlet Ramsar site

Component type	Component
Critical	<ul style="list-style-type: none"> Several wetland mega-habitats (including seagrass, intertidal sand or mud flats, mangroves, saltmarshes, permanent shallow marine water) Abundance and diversity of waterbirds
Supporting	<ul style="list-style-type: none"> Important geomorphological features that control habitat extent and types (sand barrier islands and tidal deltas, tidal channels, mudflats, and sandflats) Invertebrate megafauna Diverse fish communities
Critical process	<ul style="list-style-type: none"> Waterbird breeding – important breeding sites are found on the sand barrier islands
Supporting processes	<ul style="list-style-type: none"> Climate – temperature and rainfall patterns Hydraulic and hydrological processes – physical coastal processes being the most relevant here (tides, currents, wind, erosion, and accretion) Water quality – particularly salinity, turbidity, dissolved oxygen, and nutrients Important biological processes (nutrient cycling and food webs)
Critical services/benefits	<ul style="list-style-type: none"> Nationally threatened fauna species (seven species of Palaeartic migratory waders, hooded plover, and Australian grayling) Fisheries resource values: important fish habitats, feeding areas, recruitment areas, dispersal and migration and spawning sites for species of direct and indirect fisheries significance
Supporting services/benefits	<ul style="list-style-type: none"> Recreation and tourism values – scenic values, boating, recreational fishing, camping, kayaking, cruising, bushwalking, birdwatching, snorkelling, and diving. Scientific research – particularly as a valuable reference site for future monitoring

4.1.2 Coastal morphology and hydrology

Corner Inlet is a tide-dominated embayment, resulting from the astronomical tide movement in Bass Strait. The tides are semi-diurnal, that is, approximately two high tide cycles occur each day. Corner Inlet has the lowest tidelines along the Victorian coastline, with a maximum tidal range of up to 2.5 metres (Hale, 2017). Modelling presented in Hale (2017) predicts that over 40 per cent of Corner Inlet is exposed during a spring low tide, which provides important habitat and foraging areas for multiple threatened bird species (Hale, 2017).

The diurnal change in tides, specifically from high to low in the Corner Inlet results in high current speeds (up to 1.5 metres per second) occurring in the narrow channels of the entrance of the Inlet. It is estimated that more than 60 per cent of the Inlet volume is exchanged over an average tidal cycle (Hale, 2017). This efficient tidal exchange results in sediment transportation from the Corner Inlet to the surrounding regions. The shoreline of the Corner Inlet and adjacent areas are highly dynamic, due to the large ebb-tide deltas (large underwater piles of sand) that form at the mouth of the inlet. These ebb-tide deltas are then reshaped by waves at the mouth of the inlet, reforming the shape of the coastlines. Corner Inlet is the main source of sediment supply to this region of the Victorian coastline, transporting sediment primarily composed of sand and gravel (DHI 2016).

4.1.3 Physio-chemical status of the wetland

A key driver of ecosystem health in the Corner Inlet is water quality, particularly as low levels of turbidity and nutrients maintain the health of seagrass meadows in the wetland. The key parameters of water quality in the Inlet are salinity, turbidity, nutrients, and dissolved oxygen (Hale, 2017). A number of rivers discharge into the Corner Inlet, such as the Tarra, Franklin, Agnes, Albert and Jack Rivers, which can impact water quality as they supply nutrients such as phosphorus and increased turbidity. Other sources of discharge, such as terrestrial freshwater run-off can supply a large amount of organic matter to the inlet. However, the saltmarshes, mangroves, and seagrass in the Inlet act to stabilise the sediments, process nutrients, and filter any pollutants, thus maintaining relatively good water quality (Hale, 2017). Further, the tidal exchange is an important determinant of water quality in the Corner Inlet, with the high level (approximately 60 per cent) diurnal flushing maintaining relatively good water quality in the Inlet (Hale, 2017).

4.1.4 Ecological character and condition

The Corner Inlet Ramsar site is the most southerly marine embayment and intertidal system of mainland Australia. It has a diverse range of wetland habitats in a near-natural state. The site has recorded a large number of flora and fauna species, supporting approximately 390 species of indigenous flora, 160 species of indigenous terrestrial fauna and 390 species of marine invertebrate, along with a number of marine mammals (Hale, 2017). Corner Inlet meets six of the nine Ramsar criteria under the present day Ramsar Convention criterion, most recently assessed in the Addendum to the Ramsar site Ecological Character Description (Hale, 2017; Ramsar Convention, 2020).

4.1.4.1 Criterion 1: Wetland types

The 2011 ECD found Corner Inlet Ramsar site contains 14 wetland types, as well as non-wetland habitat types. The more recent 2017 EDC addendum lists only 10 wetland types, notably not listing those associated with Snake Island (coastal freshwater lagoons, permanent freshwater marshes/pools, shrub-dominated wetlands and freshwater, tree-dominated wetlands). The 10 wetland types listed and mapped in the 2017 ECD addendum are:

- A – permanent shallow marine waters
- B – marine subtidal aquatic beds
- D – rocky marine shores
- E – sand, shingle, or pebble shores
- F – estuarine waters
- G – intertidal mud, sand, or salt flats
- H – intertidal marshes
- I – intertidal forested wetlands
- N – seasonal rivers/streams/creeks
- Ts – seasonal/intermittent freshwater marshes/pools on inorganic soils

The following points describe the wetland features of Corner Inlet Ramsar Site:

- Corner Inlet represents the second largest back barrier system, contains the most extensive intertidal flats and tidal sand banks, and supports among the largest *Posidonia* seagrass beds in the Bass Strait shelf Integrated Marine and Coastal Regionalisation of Australia (IMCRA) bioregion. The flats are made up of sand and mud deposits that accumulate in the low energy environment, often in-amongst seagrass cover.
- Permanent shallow marine waters occur in large areas in the south-eastern part of Corner Inlet through branching channels. The waters are typically less than six metres deep at low tide.
- Marine subtidal aquatic beds are present within Corner Inlet in the form of seagrass meadows present in shallow waters across whole embayment. The subtidal seagrass beds are dominated by ribbon-weed *Posidonia australis* and the black-stemmed eel grass *Heterozostera nigricaulis*. The paddle weed *Halophila australis* is also common, often in amongst *H. nigricaulis* or on its own on deeper, shelly sediment. Intertidal mud and sand flats support areas of Mueller's eelgrass *Zostera muelleri*.
- Small sections of rocky marine shoreline exist within the Ramsar site including Bennison Island and sea cliffs around Tin Mine Cove and Freshwater Cove, with approximately 0.002 hectares of the habitat type mapped within the site (BMT WBM 2011), providing habitat for a range of algae, fish and invertebrate species.
- The sandy beach habitats fringing Snake, Sunday and Shad islands and the coastal sand barrier complex sand spits along the eastern boundary of the site make up the 'sand, shingle or pebble shores' wetland type within Corner Inlet. This sandy habitat covers 29 hectares of the Ramsar site.
- Estuarine waters within Corner Inlet are classified as the areas within creeks and rivers where the freshwater and saline waters meet, such as the waters of Bruthen Creek, Agnes River, Albert River, Franklin River and Tarra River.
- Saltmarsh vegetation on marine clay plains and saline/brackish sedgeland make up intertidal marshes present along the northern shore of the site between Manns Beach and McLoughlins Beach and on most of the islands including Franklin, Snake and Saint Margaret Island, covering a total area of approximately 2,600 hectares (BMT WBM 2011). Vegetation in these areas is dominated by beaded glasswort *Sarcocornia quinqueflora*.
- Mangrove shrublands represent the intertidal forested wetlands within Corner Inlet, found in dense stands along the northern shoreline and in scattered patches along the southern shoreline, islands and estuarine areas, covering an area of approximately 2,100 hectares (BMT WBM 2011). Mangroves within the site comprise only one species, white mangrove *Avicennia marina* and represent the most southerly distribution of this species on a global scale (Ball in Plummer et al. 2003). Mangroves provide habitat for a range of invertebrates, fish and algae, and some bird species roost or forage amongst them.
- There are several coastal freshwater lagoons within the Corner Inlet Ramsar site, including Big Hole, Tree Bullock, and Bullock waterholes on Snake Island, as well as several unnamed waterholes on Saint Margaret Island. There are also seasonal rivers, streams and creeks represented by small, unnamed watercourses on Snake and Sunday Island. Seasonal freshwater marshes and swamps made up of herblands, sedgeland and rushlands exist throughout most of the growing season on Snake Island within the Ramsar site and cover approximately 1,400 hectares.
- A total of 28 ecological vegetation classes (EVCs) have been mapped throughout the Corner Inlet Ramsar site (DSE, 2005). The most dominant is the damp sands herb-rich woodland, making up 34 per cent of mapped vegetation. Other major vegetation types include coastal saltmarsh (19 per cent) and mangrove shrublands (15 per cent). Seagrass mapping is not included within EVC mapping by DSE (2005), however specialised seagrass mapping of the area has been undertaken by Morgan (1986) Roob et al (1998), and Pope et al (2013).
- The most recent assessment of seagrass extent and condition in Corner Inlet was in 2013. Pope et al, (2013) found 7,000 hectares of *Posidonia*, 1,530 hectares of *H. nigricaulis* and 3,500 hectares for *Z. muelleri*.
- Between 1965 and 2013 the total subtidal seagrass cover has fluctuated between 11,700 hectares (1975) and 8,530 hectares (2013) with weak (non-statistically significant) evidence for a long-term decline linked to sediment, nutrient and pesticide inputs from the catchment (Ford et al, 2016).
- Overall, the 2013 assessment suggests cover at that time was slightly lower than the LAC, set based on 2011 data. Ford et al (2016) found that:

- Total seagrass cover has declined over past 30 to 40 years
- Impacts from fires and floods at Wilsons Promontory from 2009 to 2011 negatively impacted cover of *H. nigricaulis* beds in particular and that overall cover was the 'lowest in memory'.
- *Posidonia* cover is largely stable on large banks but has likely declined elsewhere.
- Recent efforts aimed at restoring *Posidonia* beds in Corner Inlet have been successful in some areas (Yarram Landcare Network, pers comm.).

4.1.4.2 Criterion 2: Threatened species and communities

The most recent ecological character description of Corner Inlet (Hale, 2017) shows that it regularly supports one ecological community and eight fauna species listed as threatened under the EPBC Act and/or the IUCN Red List.

The 'Coastal saltmarsh' ecological community is listed as vulnerable under the EPBC Act. Coastal Saltmarsh in southeast Australia comprises a diverse range of mainly salt-tolerant vegetation including rushes, sedges, and succulent herbs, shrubs, and grasses. The community provides important habitat for a wide range of fauna species ranging from invertebrate infauna, gastropods, crabs, and small nekton species that swim into the saltmarsh at high tide (fish, shrimp, and prawns). Saltmarsh provides important foraging and roosting habitat for migratory shorebirds, terrestrial birds, bats, and frogs. When last assessed in 2011 by Boon et al., the coastal saltmarsh was considered to be in good condition. The saltmarsh habitat occurs along the tidal flats, embayments, and creeks within the site, bordering the mangrove zone along the northern mainland shore of the site and on some of the islands within the site including Franklin and Snake Island.

The Corner Inlet Ramsar site regularly supports nine species listed under the EPBC Act and FFG Act:

- Bar-tailed godwit (*Limosa lapponica baueri*) – Endangered (EPBC Act), Vulnerable (FFG Act)
- Curlew sandpiper (*Calidris ferruginea*) – Critically endangered (EPBC Act, FFG Act)
- Eastern curlew (*Numenius madagascariensis*) – Critically endangered (EPBC Act, FFG Act)
- Great knot (*Calidris tenuirostris*) – Vulnerable (EPBC Act), Critically endangered (FFG Act)
- Greater sand plover (*Charadrius leschenaultii*) – Vulnerable (EPBC Act, FFG Act)
- Hooded plover (*Thinornis rubricollis rubricollis*) – Vulnerable (EPBC Act, FFG Act)
- Lesser sand plover (*Charadrius mongolus*) – Endangered (EPBC Act, FFG Act)
- Red knot (*Calidris canutus*) – Vulnerable (EPBC Act), Endangered (FFG Act)
- Australian grayling (*Prototroctes maraena*) – Vulnerable (EPBC Act), Endangered (FFG Act).

Several of the threatened birds supported in the site are migratory species that breed in the northern hemisphere, then migrate via the East Asian-Australasian Flyway to southern hemisphere to feed, frequently visiting the Ramsar site to feed on the intertidal flats. Juveniles of all species who arrive in the Ramsar site spend their first one or two winters before heading to the northern hemisphere to breed. Other species such as the Australian fairy tern and the hooded plover are residents to Australia, observed breeding on sandy beaches within the Ramsar site and have extensive areas of suitable feeding habitat within the site, feeding on invertebrates or small schooling fish along the intertidal flats or shallow inshore waters (Mead et al. 2012).

Important roost sites for bird species present in Corner Inlet include the sandy points and inner shores of the barrier islands, Mangrove Root Island, and Barry Beach (Minton et al., 2012). Breeding locations of many of the species are seasonally variable, however, breeding is recognised as a critical process within the Ramsar site due to many locally breeding populations (BMT WBM, 2011).

A sustained decline in numbers of curlew sandpiper, red knot, and eastern curlew have been observed at the site since peak numbers in the 1990s, while populations of other species such as the bar-tailed godwit and the hooded plover appear to have sustained populations visiting the site.

The Australian grayling has been recorded in several of the freshwater rivers that flow directly into the site, including Franklin River, Agnes River, Albert River, and Tarra River (DSEWPAC, 2011). The Australian Grayling is an amphidromous species endemic to southeast Australia and may occur in the Corner Inlet Ramsar site during its juvenile stage as it is present in streams within the catchment. The Australian grayling spawns in the lower reaches of rivers and streams in autumn. Larvae drift downstream and into estuarine

and coastal waters where they spend the next 6 to 10 months. Juvenile fish return to streams and rivers after their marine life stage (DELWP, 2016). The distribution and abundance of the species has significantly declined due to degradation of their freshwater habitat and regulation of river flows (Crooke et al., 2006).

Wetland-dependent species that have previously been known to occur in Corner Inlet include the orange-bellied parrot (*Neophema chrysogaster*), listed as critically endangered under the EPBC Act and globally on the IUCN list, and the growling grass frog (*Litoria raniformis*), listed as vulnerable under the EPBC Act and endangered on the IUCN list (DSEWPaC, 2011b). Due to the lack of recent records and the primarily marine nature of the site, there is not enough evidence to suggest that Corner Inlet provides significant habitat for these species (Hale, 2017). Whilst Corner Inlet provides suitable habitat for the Australian fairy tern (*Sternula nereis nereis*) there have been insufficient recent counts to determine if this species is regularly supported by the site (Hale 2017).

4.1.4.3 Criterion 4: Support of critical life stages and refuge from adverse conditions

The Corner Inlet Ramsar site is of notable importance to bird species having recorded up to 35 bird species listed under Australia's bilateral migratory bird agreements (JAMBA, CAMBA, ROKAMBA) and the Bonn Convention for conservation of migratory species. It regularly supports 16 species of Palaearctic migratory waders (in two thirds of seasons). The site is a specifically important area to five beach nesting species - the Australian pied oystercatcher, Australian fairy tern, Caspian tern, crested tern, and hooded plover, but has recorded over 20 species of wetland dependant bird species that breed within the site, many utilising the islands as breeding sites (Hale 2017).

It also provides critical feeding, breeding, and resting habitats for several species of waterbird (DSEWPaC, 2011). Significant aggregations of the black swan (*Cygnus atracus*) and grey teal (*Anas gracilis*) and chestnut teal have been known to occur in seagrass, mangrove, and coastal saltmarsh habitats during the post-breeding stage or during adverse environmental conditions (DSEWPaC, 2011b).

4.1.4.4 Criterion 5: regularly supports 20,000 or more waterbirds

The 2011 ECD describes the site as supporting more than 20,000 waterbirds based on annual counts conducted from 1986 to 1990 (DSEWPaC, 2011). Birds Australia (2009) notes a mean annual abundance of 31,487 birds over 28 years to 2008. The 2017 ECD addendum includes analysis of waterbird counts up to 2017 and cites more recent BirdLife data indicating that Corner Inlet supports more than 20,000 waterbirds for every year except 2015 when the total maximum count was 19,000 (Hale 2017).

4.1.4.5 Criterion 6: Regularly supports 1 per cent of a waterbird species

The 2017 ECD addendum (Hale 2017) compares BirdLife Australia count data to global population estimates from Wetlands International (2012) and determined that the Corner Inlet Ramsar site regularly supports more than one per cent of individuals from populations of eight species of waterbird between 1981 and 2015. These species include:

- Australian pied oystercatcher (*Haematopus longirostris*) – 8.5 per cent
- Bar-tailed godwit (*Limosa lapponica*) – 3.7 per cent
- Chestnut teal (*Anas castanea*) – 1.1 per cent
- Curlew sandpiper (*Calidris ferruginea*) - 1.5 per cent
- Eastern curlew (*Numenius madagascariensis*) – 3.5 per cent
- Red-necked stint (*Calidris ruficollis*) – 4.6 per cent
- Red knot (*Calidris canutus*) – 2.2 per cent
- Sooty oystercatcher (*Haematopus fuliginosus*) – 7.6 per cent.

The Australian fairy tern previously met this criterion for the period between 1981 to 1994, however there is insufficient evidence to confirm this species still meets this criterion. Likewise, due to highly variable historical counts and a predicted increase in numbers in more recent years, it has been recommended that this criterion be reassessed for the double-banded plover.

Due to its significance in supporting more than one per cent of the world population of red-necked stint, eastern curlew, chestnut teal, pied oystercatchers and sooty oystercatchers, the site is also a listed Important Bird Area (BirdLife International, 2008).

4.1.4.6 Criterion 8: Important spawning ground, migration path or source of food for fish stocks

The shallow coastal habitats and riverine, swamp and lake habitats of the Corner Inlet Ramsar site provide important spawning, nursery, feeding grounds and migratory pathways for a number of fish species. The site supports approximately 171 fish species (DSEWPaC, 2011). The site is a known nursery for the Australian grayling, a pupping round for the school shark and likely acts as a nursery or spawning ground for around 18 species of commercially important fish and invertebrates (DSEWPaC, 2011).

Corner Inlet supports numerous fishes of economic importance including the King George whiting, Australian salmon, southern garfish, black bream, and gummy shark and well as calamari and arrow squid. Corner Inlet supports productive commercial and recreational fishery.

Fish and crustacean species may be found in a range of habitats throughout their life cycle. Surf zones and sandy channels are commonly used for fish spawning, while mangroves provide protection and seagrass meadows and intertidal zones within shallow nearshore waters are usually of high productivity and provide good food and shelter for juvenile and some adult fish.

Fish also use other habitats within the Ramsar site including sand channels, shoals, sparse rocky shores and tidal flats. Many fish species are also either estuarine residents or depend on estuaries in some way during their life cycle. Shallow sheltered bays, estuaries, and littoral areas such as mangrove lined creeks are of particular importance to school shark, these areas within the site known to be used as pupping areas.

4.1.5 Recognised threats

The Corner Inlet Ramsar site faces a number of threats that have the ability to impact the site’s ecological character. The recognised threats and their assessed level of risk used to prioritise assets and management are listed in the table below (from WGCMA, 2014 and DSEWPaC 2011). The subsequent reassessment (Hale 2017) did not identify any further threats (Hale, 2017).

Table 4-3 Recognised threats to the Corner Inlet Ramsar site (WGCMA 2014, DSWPaC 2011)

Threat	Potential impact to wetlands	Risk
Climate Change	Changes in the distribution of habitat due to changing water levels, including the loss of habitat due to inundation.	High
	Changes to water quality from increased extreme rainfall events.	
	Increased occurrences of drought and high temperatures leading to full system ecological impacts.	
Pollutant (sediment and nutrients) inputs affecting water quality	Changes to biological assemblage (e.g. seagrass loss) leading to loss of ecological functions	High
Altered hydrology	Impacts to water regimes and water quality, leading to impacts on ecological values of the site.	High
Invasive plants	Displacement of native flora and reduced habitat suitability for fauna species	High
Invasive animals – marine	Modification of marine fauna assemblages due to competition	High
Dredging	Injury/fatality of marine species and ecosystems	Medium
Natural resource utilisation	Impacts to water quality from grazing near waterways.	Medium
	Increased risk of weeds due to grazing	
	Changes to fish stocks due to recreational and commercial fishing	
Invasive animals – terrestrial	Disturbance and predation of birds at breeding and roosting sites by foxes and cats.	Medium
Urban development and encroachment	Impacts to vegetation and water regimes due to developments	Medium

Threat	Potential impact to wetlands	Risk
Habitat isolation	Seawalls may impact the breeding success of gummy sharks and the green-back flounder.	Medium
Recreational activities	Direct and indirect effects to habitats due to recreational activities. Impacts from tourism infrastructure development. Impacts to fish stock structure from recreational fishing	Medium
Accidental hydrocarbon spill and other incidents	Injury/fatality of marine species and ecosystems	Low
Acid sulfate soils	Impacts to water quality, fish and crustaceans from mobilised ASS during developments	Low

4.1.6 Limits of acceptable change

The limits of acceptable change (LAC) for the Ramsar site for CPS as presented in the ECD and its addendum are detailed in Table 4-4 (DSEWPaC 2011, Hale 2017).

Table 4-4 Limits of acceptable change (LAC) for the Corner Inlet Ramsar site (DSEWPaC 2011, Hale 2017)

Critical CPS	Limit of Acceptable Change
Seagrass	Seagrass extent will not decline below 900 hectares for <i>Posidonia</i> and 3,500 hectares for <i>Zosteraceae</i> (within the study area defined by Pope et al. 2013) for a period of greater than 20 continuous years
Saltmarsh	Total saltmarsh extent will not decline below 2,625 hectares.
Mangrove	Total mangrove extent will not decline below 2,250 hectares.
Permanent shallow marine waters	A greater than 20 per cent reduction in the extent of subtidal channel (10,520 hectares) observed on two sampling occasions within any decade (LAC – mapped area less than 8,416 hectares).
Intertidal flats	A greater than 20 per cent reduction in the extent of permanent saline wetland – intertidal flats (24,950 hectares, (LAC – mapped area less than 19,960 hectares).
Waterbird abundance	Abundance of waterbirds will not decline below the following (calculated as a rolling five-year average of maximum annual count; percentages calculated based on the latest Wetlands International Waterbird Population Estimates): <ul style="list-style-type: none"> • Total waterbirds - 15,000 • Australian fairy tern – 1.5% of population • Australian pied oyster catcher – 4% of population • Bar-tailed godwit – 3% of population • Chestnut teal – 1% • Curlew sandpiper – 1% of population • Eastern curlew – 2% of population • Red knot – 3.5% of population • Red-necked stint – 2% of population • Sooty oystercatcher – 3% of population
Waterbird breeding	Nesting of the following species recorded in at least 50% of years: <ul style="list-style-type: none"> • Australian fairy tern • Caspian tern • Crested tern • Hooded plover • Australian pied oystercatcher
Threatened species: birds	Great knot, greater sand plover, hooded plover and lesser sand plover recorded within the site in three out of five seasons.
Threatened species: fish	Australian grayling continues to be supported in one or more of the catchments draining into Corner Inlet.
Fish	An unacceptable change will have occurred if the long term (greater than five years) median catch falls below the 20th percentile historical baseline values in standardised abundance or catch-per unit effort of five or more commercially significant species (relative to baseline) due

Critical CPS	Limit of Acceptable Change
	<p>to altered habitat conditions within the site. The 25th percentile pre-listing baseline commercial catch per unit effort values for the site are as follows (units are tonnes per annum per number of boats):</p> <ul style="list-style-type: none"> • Australian salmon 379 • Rock flathead 316 • Southern sand flathead 373 • Greenback flounder 514 • Southern garfish 1,452 • Yelloweye mullet 740 • Gummy shark 167 • King George whiting 1,347.

4.2 Impact and risk assessment

The relevant values assessed are based on the ECD values for the qualifying Ramsar criterion that the Corner Inlet Ramsar site meets, as described in Section 4.1.4. Only those values of the ECD where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments have been assessed:

- seagrass, macroalgae
- intertidal flats
- saltmarsh
- mangroves
- permanent shallow marine waters
- waterbird abundance
- waterbird breeding
- threatened birds
- threatened fishes
- fish communities.

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Corner Inlet Ramsar site are:

- Transiting vessels (from ports to/from the project area)
 - underwater noise emissions
 - artificial light emissions
 - physical disturbance
 - introduction and establishment invasive marine species (IMS)
 - accidental hydrocarbon spills
- Shore crossing (HDD activities)
 - contaminated surface water from shore crossing construction site flowing into Corner Inlet
- Physical presence of the OWF:
 - changes to coastal processes
 - collision risk – waterbirds (with operating WTGs).

The assessment of impacts and risks to the values of the Corner Inlet Ramsar site are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report A: Coastal Processes and Sediment Transport
- Technical Report C: Fish and Invertebrates
- Technical Report D: Marine Mammals and Turtles
- Technical Report E: Offshore Ornithology and Bats
- Technical Report I: Surface Water.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 10.

4.2.1 Construction

Port facilities at Barry Beach (Barry Beach Marine Terminal or Port Anthony) may be used by construction management vessels. This port is located in the north of Corner Inlet, to the west of Port Welshpool (**Figure 4-1**). Access is via the Corner Inlet Entrance (20 kilometres northwest from the OWFA), Singapore Deep, Toora Channel and Barry Beach Channel.

There is no offshore construction planned within Corner Inlet and large construction vessels used during construction in the OPA will not enter the Corner Inlet Ramsar site. Vessels that may use port facilities at Barry Beach include crew transfer vessels (CTVs), guard vessels, tugs, accommodation vessels, support jack-ups for HDD and cable pull-in, bubble curtain deployment vessel, marine mammal observer vessel and a Remotely Operated Vehicle survey vessel. Existing traffic levels to Barry Beach are around 15 movements per month (Gippsland Ports Harbour Master, pers. comm). Overall project vessel movements during construction may lead to a large increase in commercial traffic levels assuming existing traffic levels are maintained. Any turbidity generated from vessel movements is confined to deep channels except at the berth at Barry Beach terminal where the dredged channel is maintained at six metres. On this basis, any changes in turbidity are not expected outside of the transit channels and are not expected to reach seagrass, mangrove or saltmarsh habitat within Corner Inlet.

4.2.1.1 Impacts during construction

The potential impact pathways for the Corner Inlet Ramsar site during the construction phase are only through transiting vessels and construction of the shore crossing at Reeves Beach (Figure 4-1). Transiting vessels may disturb wildlife that utilise and are supported by the Corner Inlet Ramsar site through noise and light emissions from vessels or their physical presence. Planned discharges from vessels are not permitted within the Ramsar site.

The Ramsar site supports services such as 'recreation and tourism values' and 'scientific research'. The vessel activities will be occurring at locations that already support a baseline level of commercial and industrial activities such as vessel movements through channels. Impacts associated with transiting vessels are unlikely to measurably impact on recreational and tourism use of the Ramsar site, and will not prevent scientific research from occurring in Corner Inlet.

4.2.1.1.1 Underwater noise – transiting vessels

The area of the Ramsar site predicted to be impacted by underwater noise generated by transiting vessels is small. The route from the entrance to port within the Ramsar site is around 18.5 kilometres. Depths in the channels range from around 7 m (entrance) to 40 m (Singapore Deep), though are mostly less than 10 m. Channels have steeply sloping banks onto intertidal mud and sand flats. There are no speed restrictions within these channels (Gippsland Ports, 2016a), though the Port Information Handbook (Gippsland Ports, 2016b) advises reduced speeds in shallow areas or near channel banks to avoid interaction with the seabed, and at turns. The combination of mostly shallow water, narrow channels and complex bathymetry, will tend to attenuate noise over short distances. This means the area affected by underwater noise from project vessels will be extremely small relative to the size of the Ramsar site.

The underwater noise modelling predicts that fish with swim bladders involved in hearing, (which are the most sensitive fish group to noise emissions), would be exposed to recoverable injury and/or temporary threshold shift (TTS) thresholds to within 20 m of vessels that are stationary and holding position using dynamic positioning (DP), (refer to Technical Report C: Fish and Invertebrates). Underwater noise from a transiting (moving) vessel would yield exposure ranges that are even smaller than this. Given this extremely

small area of potential disturbance and that vessels would be moving until reaching the offshore project area (i.e. they would not remain stationary on DP within the Corner Inlet Ramsar site), impacts to threatened fish species (Australian Grayling) and other fish species that may spawn / migrate through Corner Inlet from underwater noise from transiting vessels is expected to be negligible.

4.2.1.1.2 Vessel disturbance – transiting vessels

Waterbird abundance and breeding, including that of threatened bird species, may be impacted by transiting vessels. Some species of seabird and shorebird have been observed to fly off in response to approaching vessels, dive or increase alertness, which can result in loss of energy and foraging opportunities and displacement from the area (Fleissbach et al. 2019). As described in Technical Report E: Offshore Ornithology and Bats, important waterbird breeding, roosting and/or feeding sites are located to the north and northeast of the Corner Inlet entrance channel on the sandy points and inner shores of the barrier islands – Clonmel Island, Box Bank and Dream Island. Transiting vessel traffic to/from Barry Beach (Toora Channel) or Port Albert (Port Albert Channel) should not affect beach nesting or roosting habitats as long as vessels respect posted speed limits and do not stray from identified channels. Wake wash from vessels has the potential to alter sediment build-up but is not expected to affect beach nesting or roosting habitats. However, given that vessels will be transiting in a defined / localised area that is not important for waterbird foraging, roosting, or nesting, exposure to increased vessel traffic is expected to have a negligible impact on migratory and resident waterbird species.

4.2.1.1.3 Artificial light emissions – transiting vessels

Vessels are a dynamic source of light pollution in the marine environment, often brightly lit and temporarily increasing light levels in otherwise relatively dark areas (Austad et al. 2023). As described in Technical Report E: Offshore Ornithology and Bats, waterbirds are not expected to be impacted by artificial lighting from vessels transiting through Corner Inlet as the channels used to travel between ports and the entrance are not used by waterbirds for foraging, and lighting from construction vessels is not predicted to be significantly greater than existing conditions within the channels. The primary roosting and breeding areas are located to the north of the channel, around Clonmel and Box Bank, with Clonmel Sands and Clonmel Island located at least 16 kilometres east of the Corner Inlet entrance channel. Given that vessels will not be transiting through important waterbird foraging, roosting, or nesting habitats, artificial light from the increased vessel traffic is expected to have a negligible impact on waterbird species.

Threatened fish and other fish species may be impacted by the light emissions of transiting vessels. The most sensitive receptors would therefore be surface dwelling pelagic species, in particular those attracted to light such as small mackerel, squid, and plankton. However, any potential impact are expected to be temporary and negligible as the vessels would transiting to/from the port (i.e. not stationary) within the Ramsar site and the OPA.

4.2.1.2 Risks during construction phase

4.2.1.2.1 Invasive marine species – transiting vessels

Three invasive marine species (IMS) (North Pacific seastar, European fan worm and European green shore crab) are a recognised high-risk threat to Corner Inlet Ramsar site due to their documented impacts on species and biodiversity elsewhere. The site currently has just two known IMS, wakame *Undaria pinnatifida* and ‘dead man’s fingers’ *Codium fragile*. The small number of IMS present likely reflect the low levels of vessel traffic, small number of nodes to introduce IMS, and the near-natural state of the inlet. Introductions of new invasive marine species may have impacts on biodiversity, economic activity and social/cultural values, with flow-on effects to Ramsar site components, processes and services. However, the likelihood of IMS introduction and establishment in the Corner Inlet Ramsar site during the construction phase is considered rare.

CTVs and SOVs will be modern vessels using modern antifouling technology and follow the Australian best practice Anti-fouling and In-Water Cleaning Guidelines (DoA/DoE, 2015). These vessels are not expected to have ballast tanks, but if so, will comply with Australian Ballast Water Management Requirements (DAWE, 2020). The vessels will be regularly maintained, in particular, antifouling coatings will be maintained according to manufacturer specifications and internal pipework and sea-chests kept clean, to maximise operational efficiency and minimise the risk of developing harmful biofouling.

There is very low risk of vessels translocating IMS from the OPA to Corner Inlet due to its open-ocean location and absence of IMS that might establish in Corner Inlet, with the only IMS currently known from the OPA being the New Zealand screw shell *Maoricolpus roseus*, which is a deep-water, oceanic species. Due to the relatively natural state of the Corner Inlet ecosystem, combined with its high flushing rate and relatively low disturbance regime, introductions are less likely to establish self-sustaining populations than busier, more disturbed, more quiescent environments.

Corner Inlet includes a number of threatened marine invertebrate species as well as economically important species targeted by recreational and commercial fisheries. Introduction of IMS such as the North Pacific seastar, may impact populations of these species at the local level, with flow on effects on biodiversity, ecological function, and economic, social and cultural values, impacts which would be permanent, though would be likely to moderate over time as the ecosystem adapted to the new introduction. Following the implementation of mitigation measures (see Section 10), in particular biosecurity compliance of project vessels and subsea equipment (including a biofouling risk assessment), there is a Very Low residual risk of the introduction of IMS in the Corner Inlet Ramsar site.

4.2.1.2.2 Accidental hydrocarbon spill

The key risk of a hydrocarbon spill to the Corner Inlet Ramsar site is from the collision or grounding of a vessel whilst transiting to port. In this instance the seabed, marine flora and fauna, water birds and fishery resources would be exposed to hydrocarbons, and depending on the size and location of the spill, potentially above thresholds that are harmful. However, the likelihood of a hydrocarbon spill due to a collision is considered very rare. Vessel traffic within this area will be around four to five project vessel movements per day. Navigable channels are well marked and port rules requiring local knowledge certificates for vessel masters and limiting overtaking or passing by commercial vessels to areas with space to do so safely, minimises the risk of collision or grounding. The project has also committed to implement a range of mitigation measures to reduce the risk of a hydrocarbon spill occurring that are detailed in Section 10 of this report.

The types of vessels operating within Corner Inlet will be small to medium sized commercial vessels that are highly manoeuvrable (equipped with twin screws and/or dynamic positioning). Immediate notification of authorities and mobilisation of an emergency response means the source of the spill would likely be contained quickly, limiting the volume spilled. Nevertheless, in the event of a spill, several cubic meters of fuel could be spilled over a short period. The spill may be rapidly transported through the inlet due to tide and wind resulting in exposure of broad areas of habitat (including waterbird habitat), marine biota and fishery resources, where they may persist for weeks to months (medium term). Degradation and dissipation of marine diesel oil/marine gas oil would reduce concentrations below thresholds preventing long-term (months to years) harm to the environment.

Exposure to hydrocarbons from a hydrocarbon spill from a collision of large construction vessels in the OWFA was modelled for the project (Attachment II: Oil spill modelling summary). Potential impacts to Corner Inlet Ramsar site from this scenario are limited to the open coast shoreline of the Ramsar site and a small portion of the entrance (Singapore Deep), in the rare event a spill occurred. No exposure to surface oil is predicted within Corner Inlet, including the intertidal mud and sandflat habitat. Shoreline hydrocarbons at concentrations that may affect socio-economic values ($> 10 \text{ g/m}^2$) are predicted for ten per cent of spills or less in this area. Exposure to entrained hydrocarbons at or above 100 parts per billion are predicted for less than five per cent of spills in this area, for dissolved hydrocarbons, around five per cent of spills. The residual risk for intertidal flats, saltmarsh and mangroves is considered to be Very Low.

Seagrasses and macroalgae are generally considered less vulnerable to the effects of oil spill. However, direct effects of exposure to an oil slick can act as a physical barrier to photosynthesis and respiration, whilst reported phytotoxic impacts include reduced growth rates, germination rates, flowering success and bleaching (Lewis & Pryor 2013, Houghton et al. 1993, Dean et al. 1998). Seagrass meadows have also been found to be unaffected by oil spill, in a study where pre-spill baseline data were available (Taylor et al. 2006, Taylor & Rasheed 2011). The residual risk for seagrass is considered to be Low.

Waterbird species that are year-round residents can be expected to have greater exposure than seasonally migratory species. It is very unlikely that oil would reach the most significant foraging and roosting habitats for shorebirds, which are sited on the western side of the barrier islands. The likelihood of a hydrocarbon release is rare and the residual risk to waterbirds in the Corner Inlet Ramsar site are considered to be Low.

For the fish species known to be present and/or spawn / migrate through Corner Inlet, such as the Australian Grayling, their larvae embryonic, larval and juvenile life stages are the most vulnerable to pollutants. Overall,

there may be a medium-term temporal disruption to the activities of fish within the hydrocarbon release area in the event a spill, however this would have negligible consequences at the population level. The residual risk for fish is considered to be Low.

4.2.1.2.3 Contaminated surface water – HDD shore crossing

The CPS of the Ramsar site may be impacted by pollution during construction of the shore crossing site at Reeves Beach (Figure 4-1). The majority of the onshore transmission route is outside the surface water catchment of the Corner Inlet Ramsar site. The shore crossing construction site at Reeves Beach is adjacent to a small, unnamed waterway that creates a hydrological connection between Freshwater Swamp (1.2 kilometres north of the shore crossing site) and the Corner Inlet Ramsar site at the mouth of Bruthen Creek (six kilometres south of the shore crossing site). The waterway is fed by runoff from adjacent agricultural land and is seasonally dry.

The waterway at the Reeves Beach shore crossing site has a floodplain that is around 250 metres wide that is likely to be inundated during storm events (Technical Report I – Surface Water) and could be impacted by extreme storm tides (when storm surge combines with high astronomical tides). During flood conditions, the waterway could allow contaminants to flow from the construction site to the Corner Inlet Ramsar Site, if not managed appropriately.

Potential impacts on surface water quality in this area may lead to downstream impacts on sedimentation and water quality within the Ramsar site. Good water quality is a supporting process for the Corner Inlet Ramsar site and impacts on water quality due to catchment activities are recognised as a high-level threat.

Suspended sediments, sedimentation and poor water quality can cause a range of impacts in wetland environments including smothering aquatic vegetation, reducing light penetration, clogging respiratory systems of fish and invertebrates, nutrient enrichment and ecotoxicity. Potential impact pathways include:

- Construction of the waterway crossing, mobilising soils and leading to sediment runoff.
- Flooding of the construction site mobilising soils and pollutants from the site.
- Runoff due to wind and rain mobilising soils from disturbed ground or pollutants (fuels, chemicals or wastes) from the construction site.

With implementation of initial mitigation measures at the shore crossing construction site, impacts to downstream water quality at the Corner Inlet Ramsar Site are not expected. Management of runoff to ensure that pollution does not adversely affect waterways is standard practice on projects of this nature and scale. It is therefore likely that the initial mitigation measures can effectively manage construction activities so that sediments and contaminants are not mobilised. In the unlikely event that runoff were to occur, the impacts would be localised and unlikely to be detected. Shore crossing construction activities are not expected to cause a substantial or measurable change in water quality within the Corner Inlet Ramsar site. The residual risk is therefore considered to be Very Low.

4.2.2 Operations

Port facilities at Barry Beach (Barry Beach Marine Terminal or Port Anthony), within Corner Inlet (Figure 4-1), may be used by smaller vessels supporting the operations phase. Therefore, there is the potential for transiting vessels to impact Ramsar CPS during the operations phase. In addition, the physical presence and operation of the offshore wind farm may impact on coastal processes and waterbirds supported by the Ramsar site.

4.2.2.1 Impacts during operations

4.2.2.1.1 Changes in coastal processes – physical presence of infrastructure

The coastal processes impact assessment in Technical Report A: Coastal Processes and Sediment Transport used numerical modelling (RPS-Cardno, 2022) to understand potential impacts on coastal processes by placement of the WTG and OSS for the duration of the operations phase. The impact assessment considered winds, waves, currents in and around the OWFA, longshore sediment transport and onshore-offshore sediment transport (storm bite) at 29 onshore-offshore profiles between Five-Mile beach on

the north-east side of Wilsons Promontory (30 kilometres southwest of the OWFA) to Seaspray on Ninety-Mile Beach (50 kilometres northeast of the OWFA).

Model results showed that the small spatial scale and low magnitude modification of the wind and wave regime on the open coast between Wilsons Promontory and Seaspray resulted in small changes to longshore sediment transport. Changes to longshore sediment transport will be indistinguishable from natural variation and climate-change effects, namely reorientation of the shoreline (changed wind and wave regime) and landward movement of barrier islands (sea level rise). The models demonstrated that there would be no change in tidal currents or tide levels, no changes to onshore-offshore sediment transport and no change in aeolian sediment transport due to the project. Overall, no detectable changes to longshore sediment transport or coastal landforms are expected in Corner Inlet or along the coastline between Corner Inlet and Ninety Mile Beach during project operation. The geomorphology of the open coast of the Ramsar site is considered relatively resilient to both climate change impacts and project impacts due to the abundant sediment supply from Corner Inlet and Wilsons Promontory. The residual risk is therefore considered to be minor for seagrass habitat and negligible for permanent shallow marine waters.

4.2.2.1.2 Vessel disturbance – transiting vessels

Exposure of the Corner Inlet Ramsar site to underwater noise from vessels would be limited to when vessels transit between the OPA and the Barry Beach Marine Terminal within Corner Inlet (Figure 4-1). As described in the assessment of construction impacts to the Corner Inlet Ramsar site in Section 4.2.1.1, impacts to fish species, waterbird populations, threatened species (birds, fish), and critical life stages (waterbird roosting, fish spawning/migration) within the Ramsar site from transiting vessels (physical disturbance, underwater noise, artificial light emissions) expected to be negligible.

4.2.2.2 Risks during operations phase

4.2.2.2.1 Invasive marine species – transiting vessels

The consequences of introduction and establishment of IMS in the Corner Inlet Ramsar site during the operations phase is the same as described during the construction phase, however the number of vessel movements will be significantly reduced from construction and likelihood is considered rare (Section 4.2.1.2.1). Vessels during the operations phase will predominantly be locally based and transit between Corner Inlet and the OPA. Following the implementation of mitigation measures (see Section 10), there is a Very Low risk of IMS being introduced in the Corner Inlet Ramsar site.

4.2.2.2.2 Accidental hydrocarbon spill

The key risk of a harmful fuel spill to the Corner Inlet Ramsar site during operations is from the collision or grounding of a vessel whilst transiting to/from port waters. The types of vessels operating within Corner Inlet will be small to medium sized commercial vessels that are highly manoeuvrable (equipped with twin screws and/or dynamic positioning). The potential impact to Corner Inlet values will be smaller than during the construction phase (given the smaller size of vessels), in the rare event of a hydrocarbon spill from a transiting vessel during operations (Section 4.2.1.2.2).

As during construction, exposure to hydrocarbons from a hydrocarbon spill in the OWFA during the operations phase is limited to the open coast shoreline of the Ramsar site and a small portion of the entrance (Singapore Deep), in the rare event a spill occurred. No exposure to surface oil is predicted within this area. Mitigations that will be implemented by the project to reduce the risk of hydrocarbon spill during the operations phase are described in Section 10. The residual risk of a hydrocarbon spill in the rare event of a vessel collision during transit through the Ramsar site is therefore considered to be Very Low.

4.2.2.2.3 Bird collision risk – operation of turbines

Bird mortality due to collisions with operating wind turbines is a key potential impact associated with operating windfarms (Marques et al. 2014). Coastal seabirds and shorebirds (waterbirds) were assessed as having a Low to Very Low initial risk in Technical Report E: Offshore Ornithology and Bats based on in-field observations and collision risk modelling conducted for the Project. A summary of the outcomes from Technical Report E of relevance to the waterbird species supported by the Corner Inlet Ramsar site is provided below.

Receptor sensitivity for Greater Crested Tern, which breeds within Corner Inlet, was assessed as Medium being a species with low conservation status under the EPBC Act, but potentially sensitive to collision risk based on the results of collision risk modelling. The predicted worst-case proportion of the population that may be affected annually is 0.02 per cent per annum. This level of possible mortality under a worst-case scenario is not considered to be an ecologically significant proportion of the population, nor likely to lead to measurable population level impacts over the life of the project.

Resident shorebirds in Corner Inlet are expected to have little exposure to turbine collision. Year-round residents can be expected to have a low exposure because they are effectively confined to coastal environments, and they are not known to fly through the OWFA. It is unlikely the project would lead to a significant impact on the species (i.e. impacts that lead to population level effects) – the residual risk for these species is Very Low.

Corner Inlet Ramsar site also supports trans-equatorial migratory species (including threatened species), which were also assessed in Technical Report E: Offshore Ornithology and Bats. Receptor sensitivity for the Bar-tailed Godwit, Common Greenshank, Curlew Sandpiper, Great Knot, Greater Sand Plover, Grey-tailed Tattler, Latham's Snipe, Lesser (Mongolian) Sand Plover, Red Knot, Ruddy Turnstone, Sanderling and Sharp-tailed Sandpiper was assessed as Low due to these species being predominantly, inshore diurnal foragers with available evidence indicating low levels of exposure to offshore turbines due to flight heights on migration and migration pathways over mainland Australia. Behaviour would not be significantly affected and therefore migration, foraging, reproduction and/or survival rates are not likely to be affected. The consequence rating was Minor resulting in a Very Low initial and residual risk.

Receptor sensitivity for the Far Eastern Curlew overwintering in Victoria was assessed as Medium. Available evidence suggests the Far Eastern Curlew flies at lower altitudes, particularly when overflying the marine environment, which may increase their risk of exposure to turbines whilst on migration, but noting evidence of micro avoidance and increasing flight altitude to avoid wind farms (Schwemmer et al. 2023). Behaviour would not be significantly affected and therefore migration, foraging, reproduction and/or survival rates are not likely to be affected. The consequence rating was Medium resulting in a Low initial and residual risk.

In summary, there were no threatened or migratory seabird or waterbird species for which the residual collision risk would result in a significant decline in population nor impede the recovery of any species. The predicted residual risk to protected species is not of a magnitude that will seriously disrupt the lifecycle of an ecologically significant proportion of the population. The presence of operational turbines will not result in significant impacts to the ecological character of the Corner Inlet Ramsar site, nor will it have any significant impact on any waterbird habitat.

The project has committed to a minimum airgap for turbine blades of 35 metres above LAT, significantly reducing potential collision impacts from the previous airgap of 25 metres, in response to field data from site showing great majority of flights occur below 35 metres. In addition, due to the lack of offshore wind farms in Australia there is a level of inherent uncertainty in the risk assessment, therefore monitoring and adaptive mitigation measures are proposed, as detailed within the Seabird monitoring and management framework (EIS Attachment IV: Seabird monitoring and management framework). These are summarised in Section 10 of this report.

4.2.3 Residual impact and risk to values

Table 4-5 specifies the impact pathways and Table 4-6 the relevant risk pathways, that have been assessed for construction and operation and the parameters of the maximum design scenarios (MDS) that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values as defined within the ECD for the Corner Inlet Ramsar site (refer to Section 4.1.4).

The consequence (impact) and risk levels presented in Table 4-5 and Table 4-6 are those residual impacts and risks concluded from the relevant assessments for the receptors defined within the ECD for the Corner Inlet Ramsar site. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale) and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports. The predicted impacts for construction and operation activities on the ECD values of the Corner Inlet Ramsar site are Minor as a result of potential changes to coastal processes and Negligible for all other impact pathways. The potential risks during construction and operations range from Low to Very Low for events that have a likelihood of occurrence as rare. Given there are no significant impacts predicted for the Corner Inlet Ramsar site and that

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the ECD values will not be changed by the project, there is no requirement to demonstrate a net benefit as stated in the EIS guideline.

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Table 4-5 Impact pathways and residual consequence ratings relevant to the CPS of the Corner Inlet Ramsar Site

Impact pathway	Maximum Design Scenario	Marine Protected Area (MPA) Value (based on the ECD)										
		Seagrass	Intertidal flats	Saltmarsh	Mangrove	Permanent shallow marine waters	Waterbird abundance	Waterbird breeding	Threatened birds	Threatened fish	Fish	
Construction												
Underwater noise from vessels transiting through Corner Inlet Ramsar site	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Negligible	Negligible
Vessel presence: light, physical disturbance		N/A	N/A	N/A	N/A	N/A	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Operations												
Changes to coastal processes	Offshore installation of: <ul style="list-style-type: none"> • 147 WTG and 5 OSS • Up to 2.2 GW total wind farm capacity • Minimum spacing of 1,062 m between WTGs • Maximum monopile diameter of 11.8 m • Maximum volume of 388,133 m³ of scour protection • Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Minor	N/A	N/A	N/A	Negligible	N/A	N/A	N/A	N/A	N/A	N/A
Underwater noise from vessels transiting through Corner Inlet Ramsar site	Up to 1,202 project vessel round trips from Corner Inlet per year during the 30-year operations period	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Negligible	Negligible
Vessel presence: light, physical disturbance		N/A	N/A	N/A	N/A	N/A	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Table 4-6 Risk pathways and residual risk ratings relevant to CPS of the Corner Inlet Ramsar Site

Risk pathway	Maximum Design Scenario	MPA Value									
		Intertidal flats	Saltmarsh	Mangrove	Permanent shallow marine waters	Waterbird abundance	Waterbird breeding	Threatened birds	Threatened fish	Fish	
Construction											
Introduction and establishment of IMS	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Very low	Very low
Accidental hydrocarbon spill within Corner Inlet Ramsar site		Very low	Very low	Very low	N/A		Low	Low	Low	Low	Low
Contaminated surface water from shore crossing construction site flowing to the Corner Inlet Ramsar Site	<ul style="list-style-type: none"> Trenchless shore crossing of up to 10 bores (8 plus 2 contingency) with maximum length of 1400 m and depth of up to 35 m Up to 8 transition joints and bays with upper limit footprints of 10 m x 30 m x 5 m (W/L/D) per bay Temporary total construction footprint in the shore crossing zone: approx. 18 ha. Causeway crossing across waterway to allow vehicle crossings Trenchless crossing of waterway for cable installation Temporary construction areas are likely to be required in the floodplain (for example, the shore crossing location). Dewatering of excavations will be required where shallow groundwater depths are encountered. 	Very low	Very low	N/A	N/A		N/A	N/A	N/A	N/A	N/A
TROperation											
Introduction and establishment of IMS	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period	N/A	N/A	N/A	N/A		N/A	N/A	N/A	Very low	Very low

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Risk pathway	Maximum Design Scenario	Maximum Design Scenario					MPA Value				
		Intertidal flats	Saltmarsh	Mangrove	Permanent shallow marine waters	Waterbird abundance	Waterbird breeding	Threatened birds	Threatened fish	Fish	
Accidental hydrocarbon spill within Corner Inlet Ramsar site		Very low	Very low	Very low	N/A	Very Low	Very Low	Very Low	Very Low	Very Low	
Bird collision with WTGs	<ul style="list-style-type: none"> Up to 147 wind turbines throughout the OWFA extent with safety shapes and lights Turbine blades as low as 35 m LAT Turbine height up to 350 m Start-up wind speed 3 m/s Shut-down wind speed 35 m/s Annual percentage downtime for turbines 1% to 7%. 	N/A	N/A	N/A	N/A	Low to Very Low ¹	Low to Very Low ¹	Low to Very Low ¹	N/A	N/A	

Note 1: Residual risk ranges from low to very low depending on the waterbird species.

4.2.4 Evaluation of residual impacts and risks against assessment criteria

The predicted levels of impact and risk are within the defined assessment criteria as demonstrated below.

Table 4-7 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
<p>The project will have no measurable impact on the ecological values of the Corner Inlet Ramsar Site, as defined with the Ecological Character Description, ECD Addendum and Ramsar Information Sheet for the site, and the EPBC Act significant impact criteria for wetlands of international importance.</p>	<p>There is a maximum of Low risk and Minor consequence predicted for impacts from the Project to values of the Corner Inlet Ramsar site from all impact pathways during the construction, operations and decommissioning of the Project, therefore it is considered that the ECD values for Corner Inlet would not be impacted by the Project.</p> <p>Specifically, project activities both directly occurring in Corner Inlet (transiting vessels) and indirectly from construction, operation and decommissioning of the offshore wind farm infrastructure. The outcomes relevant to the Corner Inlet Ramsar site are:</p> <ul style="list-style-type: none"> • The project will not result in a modification of critical habitats (permanent shallow waters, intertidal flat, saltmarsh, mangroves, seagrass, macroalgae) • The project will not impact breeding or foraging for any waterbird species to the degree that it could lead to a decline in abundance waterbird abundance or waterbird breeding • The project will not impact the catchments draining into Corner Inlet and therefore cannot impact Australian grayling within those catchments • The project will not impact threatened waterbird species presence within the site • The project will not alter the fish communities and habitats for commercially important species to the degree that catch rates of these species would be reduced • Strict biosecurity measures, adherence to MARPOL requirements and spill prevention measures (Section 9) will ensure no impacts to benthic / fish / waterbird communities • The project will not prevent site services (recreation, tourism, scientific research) from continuing to occur within the site. 	<p>High level of confidence in receptor technical reports as the assessment in each technical Report has been based on a combination of Project-specific field surveys, peer-reviewed literature, and modelling.</p> <p>The area identified with some uncertainty is for collision risk for birds with operating wind turbines, which has been addressed by proposing ongoing monitoring during the operation of the offshore wind farm and adaptive management measures.</p> <p>High level of confidence in underwater noise predictions as impact ranges are based on modelling that uses site specific input data, e.g. geotechnical data which informs the understanding geoacoustic properties of geological layers down to pile penetration depth.</p> <p>High level of confidence in hydrocarbon spill risk predictions based on robust, validated model used extensively by AMSA and oil and gas companies in Australia.</p>

5 BEAGLE AUSTRALIAN MARINE PARK

Australian marine parks (AMPs) are protected areas between 3 to 200 nautical miles from shore, usually managed by Parks Australia, under the Department of Climate Change, Energy, the Environment and Water (DCCEEW). They are representative marine habitats created to protect and maintain biodiversity and ecological processes through management of sustainable activities (AMP, 2022). AMP areas were chosen based on their diversity to ensure that representative examples of marine habitats and the life they support are conserved and protected, aiming to cover all provincial regions, depth ranges, benthic/demersal biological features, and seafloor types. AMPs are zoned, each zone indicating the activities that are permitted in that area, though undertaking of research, camping and certain commercial activities such as fishing, tourism, mining, and shipping are subject to the attainment of a permit or class approval from the Director of National Parks (DNP). Zoning is separated into Sanctuary zones, Marine National Park zones, Habitat Protection zones, Recreational Use zones, Special Purpose zones and Multiple use zones, with the level of protection and activities permitted varying between the six zone types.

One AMP has been identified within the study area and is part of the South-east Marine Park network. The Beagle AMP is 20 kilometres south of the OPA and lies within the South-east Marine Park Network, encompassing the waters surrounding offshore islands groups and structures - Kent Island Group, Hogan Island group, Curtis Island group, Southwest Island, Moncoeur Islands and Devil's Tower (Figure 5-1). The marine park sits between the southeast point of Wilsons Promontory and Flinders Island in the Bass Strait, covering 2,928 square kilometres and ranging in depth between 50 and 70 metres.

5.1 Environment and socio-economic values

The marine park is classified as a 'multiple use zone' (IUCN VI), which allows for a range of activities. Vessels are allowed to transit the area freely and recreational use of the area is permitted including recreational fishing. Permits are required to conduct research or monitoring in the area, for structure building and maintenance works, and for commercial tourism. Commercial fishing (excluding trawling, Danish seine and scallop dredging), mining and mining related activities are only allowable in specified areas in accordance with a class approval authorised by the Director of National Parks. The marine park is managed by Parks Australia and conservation and management of the area is South-east Marine Park Network Management Plan 2025 (DNP 2025).

The Beagle AMP is a continental shelf marine park covering basin, plateau and other continental shelf features supporting a diversity of habitats thought to be representative of central Bass Strait. The benthic environments include reefs supporting encrusting, erect and branching sponges which have encouraged the establishment of a rich array of benthic faunal groups. The islands within and surrounding the marine park provide critical breeding habitat to a range of seabird colonies such as little penguins and short-tailed shearwaters, and for the Australian fur seal. The high productivity and diversity of the area supports foraging of these breeding species, along with a number of other seabirds and high order predators including killer whales and white sharks.

The park includes biologically important foraging areas for many seabirds, including six species of albatross (including the endangered shy albatross; the vulnerable black browed, Campbell, Indian yellow nosed and wandering albatrosses; and Bullers albatross), white faced storm petrel, common diving petrel, short-tailed shearwater and little penguin. There are also biologically important areas in the park for white shark (foraging), southern right whale (migration) and pygmy blue whale (foraging) (DNP 2025).

The major conservation values of the AMP are the ecosystems, habitats and communities associated with the Southeast Shelf transition area including various seafloor features. The rocky reef habitats of the AMP are of specific interest, as they are targeted for recreational and commercial fishing, which may affect local fish populations.

The AMP area holds cultural significance to a number of Aboriginal communities as up until approximately 10,000 years ago the area in which the park sits was once dry land which made up part of the land bridge between Victoria and Tasmania and was lived and travelled upon by the indigenous people. Humpback whales and short-tailed shearwaters (mutton birds) are culturally significant species, as their seasonal movements are in songlines and dreaming for some First Nations groups (DNP 2025). There are also two shipwrecks contained within the AMP, the Eliza Davies, and the SS Cambridge.

As a multiple use zone, the Beagle AMP is potentially subject to human-induced pressures such as noise, oil and light pollution from vessels and construction or mining activities, establishment of invasive marine

species and diseases brought in on vessels and extraction of living species and by-catch associated with commercial fishing, recreational fishing, and illegal, unregulated, and unreported fishing. The impacts associated with climate change are also a threat to the conservation of the marine park, with rising sea levels and sea temperatures, ocean acidification and extreme weather events putting pressure on a number of species and ecological communities (DELWP, 2020). The management plan in place aims to reduce and manage these pressures.

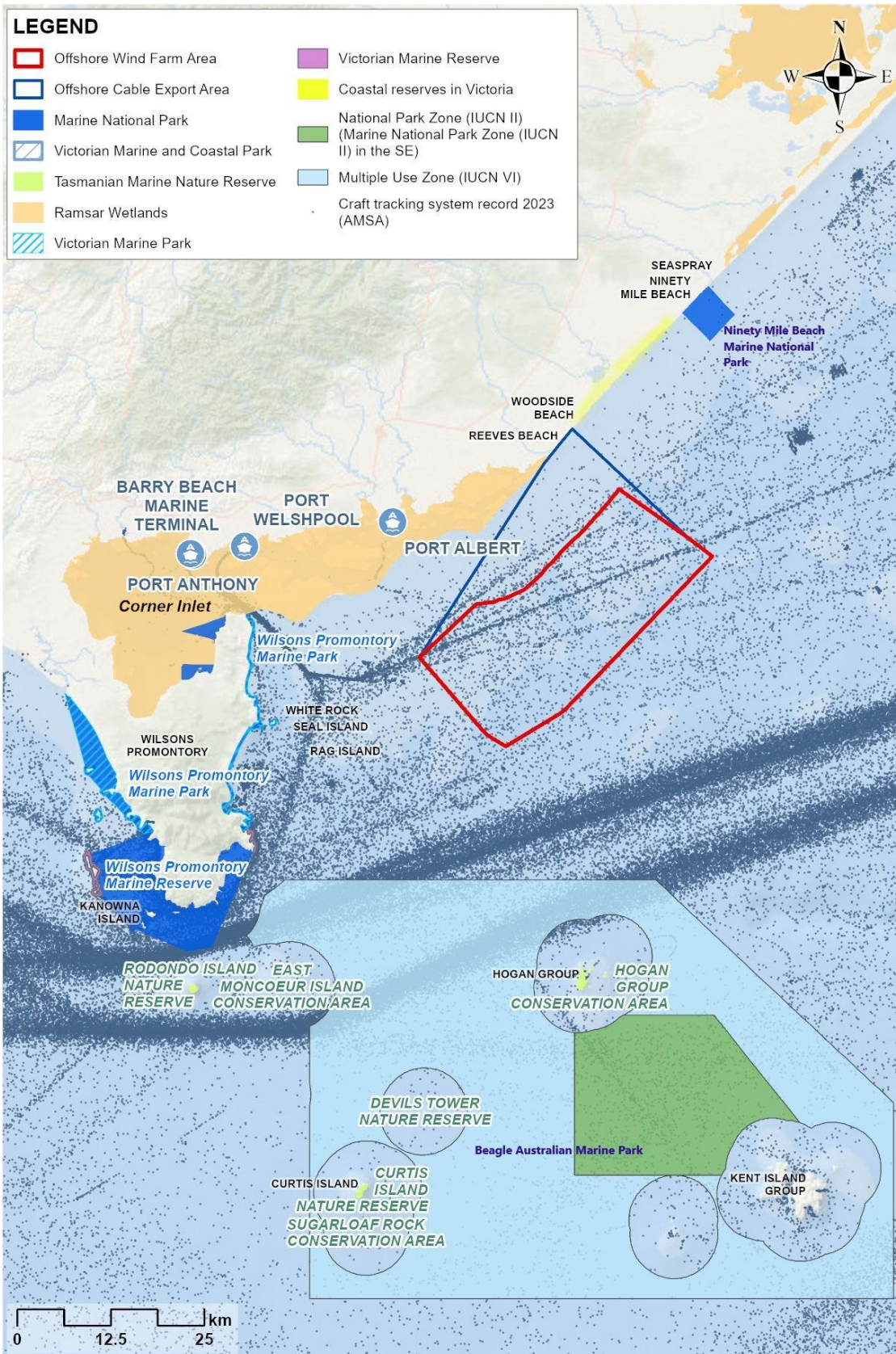


Figure 5-1 Marine protected areas in relation to the Project area

5.2 Impact and risk assessment

The relevant values assessed are based on only those values of the Beagle AMP where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- shelf rocky reefs and hard substrates (key ecological feature)
- threatened species (pygmy blue whale foraging, southern right whale migration, white shark (foraging), seabirds (foraging))
- fur seal foraging
- fish
- commercial and recreational fishing

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Beagle AMP are:

- Transiting vessels (between ports and the OPA):
 - underwater noise emissions artificial light emissions
 - introduction and establishment invasive marine species (IMS)
 - accidental hydrocarbon spills
 - vessel strike (whales)

The assessment of impacts and risks to the values of the Beagle AMP are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report C: Fish and Invertebrates
- Technical Report D: Marine Mammals and Turtles
- Technical Report E: Offshore Ornithology and Bats.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 10.

5.2.1 Construction

5.2.1.1 Impacts during construction

Construction feeder ports, such as Bell Bay (Tasmania) and Geelong (Victoria), may be used to support large project vessels which may result in construction vessels transiting the Beagle AMP during the construction period. Up to 500 vessel transits may occur between the construction feeder ports (Port of Geelong or Bell Bay) and the OPA during the 4 years 11 month construction period. Therefore, the values of the Beagle AMP may be impacted by vessels transiting through the AMP. There are no other credible impact or risk pathways during operation of the project given the distance from the OPA and vessels are not expected to transit through the AMP.

5.2.1.1.1 Underwater noise – transiting vessels

Underwater noise emitted from vessels is produced mainly by propeller and thruster cavitation, with a smaller fraction of noise produced by sound transmitted through the hull, such as by engines, gearing, and other mechanical systems. Sound levels are higher when the vessel is stationary and using thrusters to hold position (dynamic positioning). It is unlikely that underwater noise generated by transiting vessels would yield exposure ranges that could impact noise sensitive marine fauna species given that the vessels would be moving through the AMP and would not be stationary at any time. The area that may be ensonified would therefore be a small mobile area as the vessel moves along its defined route between the construction feeder ports and the OPA. Impacts from underwater noise from transiting vessels passing through the AMP is expected to be negligible.

5.2.1.1.2 Artificial light emissions - transiting vessels

The Beagle AMP includes areas identified as BIAs for foraging for six species of seabird (Section 5.1), however these foraging BIAs cover significantly larger areas than the extent of the AMP (refer to Technical Report E: Offshore Ornithology and Bats). Seabirds could be attracted by artificial lighting from vessels transiting through the AMP, however given that the vessels will not be stationary and that the available foraging ranges for seabirds cover much larger areas than the AMP, lighting from transiting vessels is expected to have a negligible impact on seabirds.

5.2.1.2 Risks during construction

5.2.1.2.1 Invasive marine species – transiting vessels

The likelihood of invasive marine species being introduced and establishing within the Beagle AMP from transiting vessels is considered rare. Project vessels will apply best-practice biofouling and ballast water management practices to minimise the risk of translocating invasive marine species as described in the mitigation measures listed in Section 10. Therefore, introductions of invasive marine species during construction would be via propagules, larvae or adults drifting into the AMP on ambient currents. Propagules, larvae or adult IMS drifting with ambient currents in the open coastal environment have a very low probability of reaching the AMP and finding suitable habitat (which is mostly deep seabed). Most IMS are suited to sheltered habitats such as those found within ports and coastal embayments, the exposed nature of the Beagle AMP is unlikely to be suitable for these species.

While there is no evidence to show that offshore wind farms have resulted in impacts to local marine communities (Degraer et al., 2020), the subsea structures could provide habitat for colonisation. Once established, some pests can be difficult to eradicate (Hewitt, et al., 2004) and therefore there is the potential for a long-term or persistent change in habitat structure. However, it has been found that highly disturbed environments (such as ports and marinas) are more susceptible to colonisation than open water / oceanic environments, where the number of dilutions and the degree of dispersal are high (Paulay et al., 2002). The benthic habitat within the offshore project area is characterised by a soft sediment and shell/rubble seabed, infauna communities, and sparse epibenthic communities. The Beagle AMP is located more than 15 kilometres from the OPA. The Beagle AMP largely consists of deep reef and mobile sediment. The habitats support a diverse range of species and are subject to moderate levels of anthropogenic disturbance (primarily recreational and commercial fishing). If an IMS was introduced and if it did colonise the offshore wind farm area, it is expected that any colony would remain fragmented and isolated, and only within the vicinity of the turbine foundations / scour protection (i.e. it would not be able to propagate to the Beagle AMP, or other protected marine areas in the wider region).

Australia has strict marine biosecurity requirements and large piling installation vessels that may be mobilised from international waters will be subject to stringent ballast water and biofouling management requirements prior to arrival at the project area/local ports. These management measures substantially reduce the likelihood of introduction and establishment of IMS. The residual risk is therefore considered Very Low.

5.2.1.2.2 Accidental hydrocarbon spill – transiting vessels

Modelling of a hydrocarbon spill from the collision of large construction vessels in the OWFA during the construction phase of the project predicted less than a two per cent probability of contact of oil (entrained or dissolved) in the Beagle AMP in the rare event of a spill (Hydrocarbon Spill Modelling Summary Report). A hydrocarbon spill from a project vessel moving to or from the OWFA is considered lower risk as close quarter situations are very unlikely. The risk of a hydrocarbon spill in the rare event of a vessel collision during transit through the MNP is therefore considered Very Low. The project has committed to implement a range of mitigation measures to reduce the risk of a hydrocarbon spill from vessels (as detailed in Section 10). The residual risk of a hydrocarbon spill in the rare event of a vessel collision during transit through the AMP is therefore considered to be Very Low.

5.2.1.2.3 Vessel strike with marine mammals

There is a low risk that transiting construction vessels may come into contact with (strike) a marine mammal on the sea surface whilst transiting through the Beagle AMP between the OPA and Bell Bay or Geelong

ports. Vessels used during construction may encounter SRWs seasonally over construction period. Given the small population size of the eastern subpopulation of SRWs (less than 300 individuals; Stamation et al., 2020) and little evidence of recovery, the loss of an individual could be significant (DSEWPaC, 2012). The routes taken by project vessels between local and regional ports do not overlap known high-use areas for the Blue Whale, however PBWs may occasionally be encountered over the construction period as they transit to and from areas of higher productivity, particularly during the early winter months. Vessel strike is unlikely given the low likelihood of occurrence of blue whales within the OWFA, which is expected to be limited to occasional migratory individuals. Notwithstanding, the risk of injury / mortality from vessel strike will be minimised through the implementation of vessel speed restrictions and best practice measures for monitoring marine fauna (e.g. MFOs) such that vessel strike is not expected to occur, as described in Section 10. The residual risk in the rare event of a vessel strike with a marine mammal during transit through the AMP is therefore considered to be Very Low.

5.2.2 Residual impact and risk to values

Table 5-1 specifies the impact pathways, and Table 5-2 the relevant risk pathways, that have been assessed for the construction phase, and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the Beagle AMP.

The consequence (impact) and risk levels presented in Table 5-1 and Table 5-2 are those residual impacts and risks concluded from the relevant assessments for the receptors identified as sensitive values of the Beagle AMP. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale) and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports.

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Table 5-1 Impact pathways and residual consequence rating relevant to values of the Beagle AMP

Impact pathway	MDS	MPA Values				
		Shelf rocky reefs and hard substrates	Threatened species (with overlapping BIAs)	Fur seal foraging	Fish	Recreational fishing
Construction						
Transiting vessels: underwater noise, artificial light	Up to 500 vessel round trips from construction feeder ports (including from international locations)	N/A	Negligible	Negligible	N/A	N/A

Table 5-2 Risk pathways and residual risk ratings relevant to values of the Beagle AMP

Risk pathway	MDS	MPA Values				
		Shelf rocky reefs and hard substrates	Threatened species (with overlapping BIAs)	Fur seal foraging and breeding	Fish	Recreational fishing
Construction						
Introduction and establishment of IMS	Up to 500 vessel round trips from construction feeder ports (including from international locations)	Very low	N/A	N/A	Very low	Very low
Accidental hydrocarbon spill – transiting vessel collision		Very low	Very low	Very low	Very low	Very low
Vessel strike (with marine mammals)		N/A	Very low	Very low	N/A	N/A

5.2.3 Evaluation of residual impacts and risks

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 5-3 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will have no measurable impact on the conservation values of the Beagle AMP.	The conservation values of the Beagle AMP may be impacted by vessels transiting en-route to Bell Bay in Tasmania. The highest consequence level for predicted impact to the values is Negligible and there is a Very Low risk of accidental events impacting the values of the AMP. Overall, the conservation values will be protected through the implementation of mitigation measures and adaptive management as described in Section 1010.	The assessment values and thresholds used in assessment in each of the Technical Reports was conservative, therefore there is a high confidence in the outcome.

6 VICTORIAN MARINE PARKS AND RESERVES

Marine protected areas in the Victorian marine area include marine national parks, marine sanctuaries, marine and coastal parks, marine reserves, and coastal reserves and Ramsar sites.

Marine national parks and sanctuaries are areas established to protect and conserve marine habitats and the wildlife within them by restricting extractive processes. Victoria's marine national parks and sanctuaries were planned to protect areas representative of Victorian's marine biodiversity. No form of animal harvesting, including aquaculture, recreational or commercial fishing, of any kind is permitted within these areas. Damaging processes or those involved in resource extraction are also prohibited, including oil and gas activities, exploration drilling, dredging and waste disposal. Recreational activities such as snorkelling, scuba diving, surfing and boating are permitted within these areas. Scientific research is allowed with a permit, these areas often being used as scientific reference areas due to their natural state. Management of these areas is conducted by Parks Victoria, acting in accordance with the *Parks Victoria Act 2016*. The areas are classified as IUCN 'Category II National Park' under the International Union for Conservation of Nature and Natural Resources and are reserved and managed under the *National Parks Act 1975*. To manage these areas, Parks Victoria work in collaboration with a number of research institutes on a marine research and monitoring program, aiming to improve baseline knowledge and address management challenges.

Marine reserves are classed as IUCN 'Category VI Protected area with sustainable resource use' which aims to conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems, by allowing sustainable use of resources (IUCN, 2008). There is only one marine reserve listed in Victoria (Wilson's Promontory Marine Reserve). Under Parks Victoria, the Wilson's Promontory Marine Reserve is protected under 'Marine B' protection (Parks Victoria, 2017). Commercial and recreational harvesting is permitted within marine reserves under the *Fisheries Act 1995*.

Marine coastal parks are classed as a 'Category VI Protected area with sustainable resource use' marine protected area under the IUCN, as areas that conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. Generally, the areas are large and in near natural condition, with the aim of low-level non-industrial use of natural resources compatible with nature conservation (IUCN, 2008). Sustainable use of these areas, including commercial and recreational fishing, is permitted under the *Fisheries Act 1995*. Marine and Coastal Parks in Victoria are managed by Parks Victoria, under the Department of Environment, Land, Water and Planning (DELWP). Parks Victoria manages parks and reserves according to an established legislative and policy framework, including the specific land-based legislation under which each park or reserve is established, any Government approved recommendations of the Victorian Environmental Assessment Council or its predecessors, approved park management plans and government policy.

6.1 Corner Inlet Marine National Park and Marine and Coastal Park

6.1.1 Environment and socio-economic values

Both the Corner Inlet Marine National Park (MNP) and Marine and Coastal Park (MCP) are situated inside the Corner Inlet Ramsar site, approximately 26 kilometres west of the OPA (Figure 4-1).

6.1.1.1 Corner Inlet MNP

The Corner Inlet Marine National Park comprises two separate areas protecting sections of inshore coastline along the north-eastern end of Wilson's Promontory, including Freshwater Cove, Shallow Bight, Tin Mine Cove, and areas southeast of Bennison Island (Figure 4-1). The MNP lies entirely Corner Inlet and Nooramunga MCP sub-catchment, adjoining the Corner Inlet Ramsar Site (Section 4). In total the marine national park covers 1,333 hectares.

The MNP is classified as a 'Special Protection Area – Natural Values overlay', highlighting further special protection and management focused primarily on ecosystem protection and recreation.

The MNP protects nine marine ecological communities including the only extensive beds of the broad-leafed seagrass *Posidonia australis* in Victoria as well as a network of deep channels, mangroves, subtidal reef, mud banks and saltmarshes. There is a high diversity of almost 400 invertebrate species and 70 fish species that have been recorded in the soft sediments of the seabed and surrounding seagrass beds, producing an important foraging and wintering ground for a number of shorebirds and migratory wading birds.

The MNP holds cultural significance for the Boon Wurrung, Bunurong and Gunaikurnai people identifying the area as their Traditional country. Many first Australian heritage sites have been recorded in the area by Parks Victoria (2005), displaying a strong connection of indigenous groups to the land.

With its diversity of unique habitats, the Corner Inlet MNP has significant recreational and tourism values for visitors including nature watching, swimming, snorkelling, scuba diving, sailing, canoeing and wind surfing, with additional socio-economic values resulting from these activities.

The Corner Inlet Marine National Park Management Plan (2005) notes that increased turbidity from higher sediment loads may negatively affect the ecological communities and hydrodynamic processes of the area. Likewise chemical pollution or hydrocarbon spills could have significant negative impacts on park values, particularly on seabirds, seagrass, and intertidal areas. The park is also susceptible to a number of other threatening processes, including invasive marine species and physical disturbance (for example anchoring and propeller scouring).

6.1.1.2 Corner Inlet MCP

The Corner Inlet Marine and Coastal Park encompasses a stretch of coastal area from north of Barry Beach around Corner Inlet adjacent to Wilsons Promontory National Park (Figure 4-1). The majority of the MCP is made up of the sheltered coastal waters of the Corner Inlet embayment and covers an area of 28,500 hectares.

The park as a whole is managed by Parks Victoria. A small section of the foreshore along the coastline of the township of Yanakie is separately managed by the South Gippsland Shire Council. The waterways within the Corner Inlet MCP are managed by Gippsland Ports (Gippsland Coastal Board, 2015).

The values of the park are similar to those of the Corner Inlet Ramsar site described in Section 4.1. This includes natural values of complex networks of mangroves, saltmarsh, mudbanks and the largest area of broad-leafed seagrass in Victoria; Indigenous cultural value to the Gunaikurnai people, recognised under the *Native Title Act 1993* as Traditional Owners of the coastal areas Corner Inlet; European cultural heritage including 31 shipwrecks estimated to be present in and around the Ramsar site (DNRE, 2002); economic values with the four ports operating within the site; and recreational value to users of the area by means of sightseeing/wildlife observation, snorkelling and scuba diving, swimming, surfing, wind surfing/sailing/boating, commercial and recreational fishing of all forms, education, research and tourism (Gippsland Coastal Board, 2015).

The main threats to the values of the Corner Inlet MCP surround the potential disturbance humans and vessels may have on the marine environment. Vessel related impacts such as ballast water discharge, spread of invasive species, increased traffic, hydrocarbon spills and potential anchor damage may have a negative impact on the benthic community and other marine flora and fauna. Likewise human behaviour has the potential to disturb breeding, feeding and nesting shorebirds. Other problems include nutrient inputs and turbidity and potential impacts associated with dredging and port maintenance (Gippsland Coastal Board, 2015). The Gippsland Plains and Strzelecki Ranges Conservation Action Plan (Parks Victoria, 2021) covers the Corner Inlet MCP and lists the priority threats to the conservation assets in the park as; inappropriate fire regimes, altered hydrology/reduced water quality, terrestrial weeds, diseases, and pathogens, introduced herbivores, introduced predators, invasive marine species, recreation/natural resource extraction, extreme weather events and climate change.

6.1.2 Impact and risk assessment

The relevant values assessed are based on only those values of the Corner Inlet MNP and MCP where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- seagrass
- saltmarsh
- mangrove
- permanent shallow marine waters
- waterbird abundance / breeding
- threatened birds

- threatened fish
- fish communities
- recreation and tourism.

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Corner Inlet MNP and MCP are:

- Transiting vessels (from ports to/from the project area)
 - underwater noise emissions
 - artificial light emissions
 - physical disturbance
 - introduction and establishment invasive marine species (IMS)
 - accidental hydrocarbon spills
- Physical presence of the OWF:
 - changes to coastal processes
 - collision risk of operating turbines – waterbirds.

The assessment of impacts and risks to the values of the Corner Inlet NP and MCP are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report A: Coastal Processes and Sediment Transport
- Technical Report B: Benthic Ecology
- Technical Report E: Offshore Ornithology and Bats.

There is no credible risk pathway for surface water contamination from the shore crossing at Reeves Beach for either the MNP or the MCP due to the significant distance (more than 26 kilometres) from the crossing location.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 1010.

6.1.2.1 Construction

The impact and risk pathways described for the Corner Inlet MNP and MCP during the construction phase of the project are:

- Light and physical presence associated with transiting vessels to and from port facilities at Barry Beach (Barry Beach Marine Terminal or Port Anthony) and the OPA may impact waterbirds and fish within the MPAs. However, given that vessels will not be transiting through important waterbird foraging, roosting, or nesting habitats, artificial light and vessel disturbance from the increased vessel traffic is expected to have a negligible impact on waterbird species.
- Accidental hydrocarbon spills and the introduction and establishment of IMS associated with transiting vessels may pose risks to values of the MNP and MCP. However, given the likelihood of either a hydrocarbon spill or the introduction and establishment of IMS is rare due to the implementation of mitigation measures (see Section 10), the residual risk to the values of the Corner Inlet MNP and MCP are considered to be Low for waterbird and fish species and Very Low for seagrass, saltmarsh and mangrove habitats.

6.1.2.2 Operations

The impact and risk pathways described for the Corner Inlet MNP and MCP during the operations phase of the project are:

- the presence of offshore infrastructure may alter coastal processes resulting in impacts to seagrass. Numerical modelling of coastal processes in Technical Report A: Coastal processes and sediment transport indicated that the small spatial scale and low magnitude modification of the wind and wave regime on the open coast between Wilsons Promontory and Seaspray resulted in small changes to longshore sediment transport that are indistinguishable from natural variation and climate-change effects. The modelling demonstrated that there would be no change in tidal currents or tide levels, no changes to onshore-offshore sediment transport and no change in aeolian sediment transport due to the project. The residual impact is therefore considered to be negligible.
- Light, noise and physical presence associated with transiting vessels during operations between the ports and the OPA will comprise fewer transits and smaller vessels. Given that vessels will be transiting in a defined / localised area that is not important for waterbird foraging, roosting, or nesting, exposure to increased vessel traffic is expected to have a negligible impact on migratory and resident waterbird species.
- Bird species that are supported by the Corner Inlet MNP and MCP may be at risk of collision with operating WTGs within the OWFA. There were no threatened or migratory waterbird species identified as values of the Corner Inlet MNP or MCP for which collision risk would result in a significant decline in population or impede the recovery of any species (refer to Technical Report E: Offshore Ornithology and Bats). The project has committed to a minimum airgap for turbine blades of 35 metres above LAT. In addition, due to the lack of offshore wind farms in Australia there is a level of inherent uncertainty in the risk assessment, therefore monitoring and adaptive mitigation measures are proposed, as detailed within the Seabird monitoring and management framework (EIS Attachment IV: Seabird monitoring and management framework). These are summarised in Section 9 of this report. The residual impact is therefore considered to be Low for waterbirds in the Corner Inlet MNP and MCP.
- The consequence to the values of the Corner Inlet MNP and MCP from a hydrocarbon spill in the rare event of a vessel collision during transit between the ports within Corner Inlet and the OPA is significantly less than that described during the construction phase due to fewer and smaller vessels. The residual risk is therefore considered to be Very Low.
- The introduction and establishment of IMS within the Corner Inlet MNP and MCP as a result of the presence of vessels transiting between the ports and Corner Inlet during the operations phase is also considered to be highly unlikely given the fewer vessels and due to the implementation of mitigation measures (see Section 10). The residual risk to the values of the MNP and MCP are considered to be Very Low

6.1.2.3 Residual impact and risk to values

Table 6-1 specifies the impact pathways, and Table 6-2 the relevant risk pathways that have been assessed for construction and operation and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the Corner Inlet MNP and the MCP.

The consequence (impact) and risk levels presented in Table 6-1 and Table 6-2 are those residual impacts and risks concluded from the relevant assessments for the receptors identified as sensitive values of the Corner Inlet MNP and the MCP. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale) and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports.

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Table 6-1 Impact pathways and residual consequence rating relevant to values of the Corner Inlet MNP and MCP

Impact pathway	MDS	MPA Values			
		Seagrass	Saltmarsh / mangrove	Waterbird abundance / breeding / threatened birds	Threatened fish / fish communities
Construction					
Vessel presence: light, physical disturbance	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months)	N/A	N/A	Negligible	Negligible
Operations					
Vessel presence: light, physical disturbance	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period	N/A	N/A	Negligible	Negligible
Changes to coastal processes	Offshore installation of: <ul style="list-style-type: none"> • 147 WTG and 5 OSS • Minimum spacing of 1,062 m between WTGs • Maximum monopile diameter of 11.8 m • Maximum volume of 388,133 m³ of scour protection • Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Negligible	N/A	N/A	N/A

Table 6-2 Risk pathways and residual risk ratings relevant to values of the Corner Inlet MNP and MCP

Risk pathway	MDS	MPA Values			
		Seagrass	Saltmarsh / mangrove	Waterbird abundance / breeding / threatened birds	Threatened fish / fish communities
Construction					
Accidental hydrocarbon spill from transiting vessels	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months)	Very low	Very low	Low	Low
Introduction and establishment of IMS		N/A	N/A	N/A	Low
Operations					
Accidental hydrocarbon spill from transiting vessels	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period	Very low	Very low	Very low	Very low
Introduction and establishment of IMS		N/A	N/A	N/A	Very low
Bird collision with WTGs	<ul style="list-style-type: none"> Up to 147 wind turbines throughout the OWFA extent with safety shapes and lights Turbine blades as low as 35 m LAT Turbine height up to 350 m Start-up wind speed 3 m/s Shut-down wind speed 35 m/s Annual percentage downtime for turbines 1% to 7%. 	N/A	N/A	Low	N/A

6.1.2.4 Evaluation of residual impacts and risks

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 6-3 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will not impact the values of Victorian Marine Parks and reserves	The predicted levels of impact are from Negligible to Minor, and for risks from Low to Very low. With the application of the mitigation measures summarised in Section 10, project activities will be conducted to preserve the values of the natural assets of Victorian Marine Parks and reserves.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results is high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas].	It is recognised that there are opportunities to avoid and minimise/mitigate environmental impacts and risks during the many stages of project development. Once avoidance and minimisation measures have been exhausted, mitigation measures have been proposed and are summarised in Section 1010 of this report. Monitoring and adaptive management has also been proposed where relevant and is summarised in Section 1010 of this report. In the event impacts cannot be confidently mitigated or managed to below significant levels using management and mitigations, Star of the South has committed to develop offsets for the project. There have been no requirements for offsets identified in the impact assessment presented for this marine protected area.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results is high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].	Impacts to values through accidental hydrocarbon spills or IMS have been managed through the application of legislative requirements around marine pollution and vessel design. These are summarised in Section 10 of this report. The predicted levels of impact to the environment from these activities, with the application of mitigations, is Low to Very low.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results is high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.

6.2 McLoughlins Beach - Seaspray Coastal Reserve

6.2.1 Environment and socio-economic values

The McLoughlins Beach - Seaspray Coastal Reserve lies within the Wellington Shire, covering the foreshore coastal areas between McLoughlins Beach and the township of Seaspray, between 20 and 200 metres inland from the shoreline and eight kilometres longshore from the Reeves Beach shore crossing site (Figure 5-1). The reserve sits adjacent to both the Jack Smith Lake Game Reserve and the high-water mark across the Ninety Mile Beach Marine National Park foreshore. It also includes an offshore area, extending 200 metres offshore beginning at the Ninety Mile Beach Marine National Park and running south along the coast to Woodside Beach. The coastal reserve covers 1,740 hectares in total, including approximately 800 hectares of coastal waters.

The coastal reserve is managed by Parks Victoria, with the assistance of many local groups and is reserved under the Crown Land (Reserves) Act. The coastal reserve is not classified under IUCN. Parks Victoria has set the park as a 'D' level of protection due to a relatively lower species diversity that represents a moderate proportion of the bioregions with only a small number of threatened species present. The area is managed under recommendations to protect and conserve natural landscapes and ecosystems, ensure conservation of all fauna and flora (aquatic and terrestrial) and provide opportunities for recreation.

The coastal reserve is made up of sandy intertidal beach and a series of sand dunes bordering the beach. There are three different vegetation communities present within the coastal reserve, with majority of the area covered in coastal dune scrub and grasslands, scattered areas of estuarine wetland and sparse patches of coastal saltmarsh. The offshore component of the coastal reserve is largely unmapped but is predicted to be similar to that of the Ninety Mile Beach Marine National Park (Section 6.3) with fine rippled sand hosting a high diversity of epibenthic and infaunal species and sparse patches of low-profile reef (Parks Victoria, 2013). The coastal reserve is of high value to a number of shorebirds, seabirds and waders, with over 36 species of bird present including the EPBC listed red knot and hooded plover recorded foraging or roosting along the sandy beaches or past the high-tide mark in the coastal dunes during the project MESP (see Technical Report E: Offshore Ornithology and Bats).

The coastal reserve is largely utilised for recreational activities including surfing, swimming, beach and boat fishing, wildlife watching, boating, and walking. Dogs are permitted within the reserve and four wheel drives use parts of the beach. Camping is also popular along many parts of the coastline within the reserve, especially during the summer months, with campgrounds often full.

The values of McLoughlins Beach – Seaspray Coastal Reserve are threatened by the introduction and establishment of a number of exotic species. Noxious weeds such as boneseed *Chrysanthemoides monilifera* and African box-thorn *Lycium ferocissimum* are at risk of inundating the native scrubland and grassland covering the dune system. Invasive pest animals such as rabbits and foxes are also an issue within the coastal reserve, and along with the presence of dogs on the beach, have an impact on nesting shorebirds. There are three waterway entrances within the coastal reserve that have the potential to reduce coastal water quality within the area during floods with their catchments in agricultural areas.

6.2.2 Impact and risk assessment

The relevant values assessed are based on the on only those values of the McLoughlins Beach – Seaspray Coastal Reserve where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- coast and dune system
- shorebirds, seabirds and waders
- recreation.

The project activities and resulting potential impact and risk pathways relevant to the assessment of the McLoughlins Beach – Seaspray Coastal Reserve are:

- Vessels (OWFA) and transiting vessels (from ports to/from the project area)
 - accidental hydrocarbon spills

- Physical presence of the OWF:
 - changes to coastal processes
 - accidental release of hydrocarbons during operations on OSS'.

The assessment of impacts and risks to the values of the McLoughlins Beach – Seaspray Coastal Reserve are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report A: Coastal Processes and Sediment Transport
- Technical Report E: Offshore Ornithology and Bats
- Technical Report Q: Business and Tourism.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 10.

6.2.2.1 Construction

6.2.2.1.1 Accidental hydrocarbon spill – vessels

There are no planned construction activities within the McLoughlins Beach – Seaspray Coastal Reserve. There are no impacts predicted to the McLoughlins Beach – Seaspray Coastal Reserve during construction, however, there is a risk that, in the highly unlikely event of a hydrocarbon spill from a vessel collision in the OFWA, there is a very low probability that oil may contact the shorelines of the reserve.

Hydrocarbon spill modelling conducted for the project (Attachment II: Oil spill modelling summary) showed that in the highly unlikely event of a spill, six per cent of spills at concentrations at or above 10 g/m² could reach the shoreline along small areas of reserve. There is a very low probability of four per cent of entrained oil at concentrations at or above 100 ppb reaching the waters of the reserve, and two per cent probability of exposure to dissolved hydrocarbons above 50 ppb. This park consists of highly dynamic beaches and mobile nearshore sandbars with some low-profile reefs, therefore hydrocarbons are expected to be rapidly dispersed, entrained, buried or transported away from the reserve (days to weeks).

Tourism and recreation activities may be reduced by shoreline oil within the coastal reserve during the immediate oiling phase and shortly thereafter during the hydrocarbon spill response activities to remove the oil. Overall, the residual risk to the McLoughlins Beach – Seaspray Coastal Reserve is considered Very Low.

6.2.2.2 Operations

6.2.2.2.1 Changes to coastal processes

There are no operational activities within the McLoughlins Beach – Seaspray Coastal Reserve, however, the potential for impact of the placement of operational wind turbines causing changes to coastal sediment transport was considered. Coastal processes impacted by the project were modelled as described in Technical Report A: Coastal Processes and Sediment Transport, with no detectable changes to the geomorphology of the beaches or coastal landforms of the coastal reserve predicted as a result of the operation of the project. The residual impact is therefore considered to be negligible.

6.2.2.2.2 Accidental hydrocarbon spill – vessels and OSS

The consequence to the values of the McLoughlins Beach – Seaspray Coastal Reserve from a hydrocarbon spill in the rare event of a vessel collision during the operations phase of the project is significantly less than that described during the construction phase due to fewer and smaller vessels. No shoreline contact with oil from a spill is predicted. The residual risk is therefore considered to be Very Low.

The modelled scenario of a spill of naphthenic oil from an OSS in the OFWA indicated no shoreline contact and a very low probability of entrained oil (three per cent) within the waters of the MNP. No dissolved oil is predicted. The residual risk of oil from an OSS in the rare event of a spill reaching the waters of the reserve is therefore considered Very Low.

6.2.2.3 Residual impact and risk to values

Table 6-4 specifies the impact pathways, and Table 6-5 the relevant risk pathways, that have been assessed for construction and operation and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the McLoughlins Beach – Seaspray Coastal Reserve.

The consequence (impact) and risk levels presented in Table 6-4 and Table 6-5 are those residual impacts and risks concluded from the relevant assessments for the receptors identified as sensitive values of the McLoughlins Beach – Seaspray Coastal Reserve. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale) and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports.

Table 6-4 Impact pathways and residual consequence rating relevant to values of the McLoughlins Beach – Seaspray Coastal Reserve

Impact pathway	MDS	MPA value		
		Coast and dune system	Shorebirds, seabirds and waders	Recreation
Operations				
Changes to coastal processes	Offshore installation of: <ul style="list-style-type: none"> • 147 WTG and 5 OSS • Minimum spacing of 1,062 m between WTGs • Maximum monopile diameter of 11.8 m • Maximum volume of 388,133 m³ of scour protection • Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Negligible	N/A	N/A

Table 6-5 Risk pathways and residual risk ratings relevant to values of the McLoughlins Beach – Seaspray Coastal Reserve

Impact pathway	MDS	MPA value		
		Coast and dune system	Shorebirds, seabirds and waders	Recreation
Construction				
Accidental hydrocarbon spill from vessel collision in OPA	Up to 8,320 vessel round trips, including up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months) Up to 8,390 vessel movements within the OPA.	Very low	Very low	Very low
Operations				
Accidental hydrocarbon spill from vessel collision in OPA Accidental release of hydrocarbons during operations on the OSS	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period Naphthenic oil in OSS' in the OFWA – realistic worst-case release: 40 m ³	Very low	Very low	Very low

6.2.2.4 Evaluation of residual impacts and risks

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 6-6 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will not impact the values of Victorian Marine Parks and reserves	The predicted levels of impact are Negligible and risks predicted as Very low. With the application of the mitigation measures summarised in Section 10, project activities will be conducted to preserve the values of Victorian Marine Parks and reserves.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas].	It is recognised that there are opportunities to avoid and minimise/mitigate environmental impacts and risks during the many stages of project development. Once avoidance and minimisation measures have been exhausted, mitigation measures have been proposed and are summarised in Section 10 of this report. Monitoring and adaptive management has also been proposed where relevant and is summarised in Section 10 of this report. In the event impacts cannot be confidently mitigated or managed to below significant levels using management and mitigations, Star of the South has committed to develop offsets for the project. There has been no requirements for offsets identified in the impact assessment presented for this marine protected area.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].	Impacts to water quality through hydrocarbon spill have been managed through the application of legislative requirements around marine pollution and vessel design. These are summarised in Section 10 of this report. The predicted levels of impact to the environment from these activities, with the application of mitigations, is Very low.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.

6.3 Ninety Mile Beach Marine National Park

6.3.1 Environment and socio-economic values

The Ninety Mile Marine National Park (MNP) is approximately 26 kilometres north of the OPA, stretching five kilometres along the coast between Seaspray and Golden Beach (Figure 5-1). The MNP covers five kilometres of protected Ninety Mile Beach coastline and extends offshore to the limit of Victorian waters, covering 2,750 hectares of coastal waters in total. The MNP has a sandy bottom with intermittent reef areas and reaches up to approximately 30 metres in depth.

The Ninety Mile Beach Marine National Park hosts a high diversity of epibenthic and infaunal species, with over 860 species living on and below the sandy seafloor plains (Parks Victoria, 2013). Limited patches of low-profile sand and wave inundated reef can be found within the MNP area, at water depths 15 to 20 metres, supporting a range of sponges, small red algae, ascidians, fish, crustaceans, and other larger

marine species, likely feeding on the high abundance of benthic species. A periodic upwelling in the area results in cool coastal surface waters and may contribute to the high biodiversity of the MNP (Plummer et al., 2003). The large southern Australian seastar *Coscinasterias muricata*, soft coral *Pseudogorgia godeffroyi* exist within the MNP and are endemic to the coastline. Crab species *Halicarcinus* spp. also exist with the park, thought to be endemic to the only Ninety Mile Marine National Park itself. The shoreline of the MNP is utilised for feeding and roosting by up to 20 species of seabirds and shorebirds including EPBC listed species (fairy prion *Pachyptila turtur*) and FFG listed species (red knot, fairy tern and little egret *Egretta garzetta*). The marine environment within the MNP is known to be used by juvenile white shark *Carcharodon carcharias*, snapper, salmon, long-finned pike, and short-finned pike and is commonly passed through by transient whales (Barton et al., 2012).

The MNP is part of the Country to the Gunaikurnai people, holding significant heritage values (Parks Victoria, 2006a). It is a popular scuba and snorkelling site due to the rich marine life and is commonly used by recreational boaters. Access to the coastline of the MNP is restricted to due private property so entry to the site is commonly made by boat via Seaspray (Parks Victoria, 2013).

The Ninety Mile Beach Marine National Park is threatened by climate change, with increasing water temperatures and rising sea levels having impacts on productivity, a driver in species distribution (McInnes et al, 2009). Introduction of invasive marine species through ballast water or hull fouling is of particular concern as there are currently no pests recorded within the MNP. Likewise, the introduction of pathogens from fishing bait used in areas adjacent to the MNP or hydrocarbon spills from surrounding vessels could have serious effects on the health of the marine fauna and flora. On the shoreline, coastal shorebirds are at risk of disturbance by humans, beach vehicles and dogs. The Gippsland Plains and Strzelecki Ranges Conservation Action Plan (2021) covers the Ninety Mile Beach MNP and lists the priority threats to the conservation assets in the MNP as; inappropriate fire regimes, altered hydrology/reduced water quality, terrestrial weeds, diseases, and pathogens, introduced herbivores, introduced predators, invasive marine species, recreation/natural resource extraction, extreme weather events and climate change.

6.3.2 Impact and risk assessment

The relevant values assessed are based on only those values of the Ninety Mile Beach MNP where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- soft sediment supporting infauna species
- low profile reefs supporting invertebrate fauna species
- marine mammals (whales)
- seabirds and shorebirds
- fish
- recreation.

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Ninety Mile Beach MNP are:

- Vessels (OWFA) and transiting vessels (between ports and the OPA)
 - accidental hydrocarbon spills
- Physical presence of the OWF:
 - changes to coastal processes
 - accidental release of hydrocarbons during operations on OSS'.

The assessment of impacts and risks to the values of the Ninety Mile Beach MNP are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report A: Coastal Processes and Sediment Transport
- Technical Report B: Benthic Ecology
- Technical Report C: Fish and Invertebrates

- Technical Report D: Marine Mammals and Turtles
- Technical Report E: Offshore Ornithology and Bats.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 10.

6.3.2.1 Construction

6.3.2.1.1 Accidental hydrocarbon spill – vessels

There are no construction activities within the Ninety Mile Beach MNP, however it may be at risk of impact from an accidental hydrocarbon spill occurring in the rare event of a vessel collision whilst transiting to/from the OPA or whilst vessels are operating within the OPA. Ninety Mile Beach Marine National Park is predicted to be exposed to higher concentrations of hydrocarbons with a higher probability than other coastal marine protected areas in the event of a hydrocarbon spill from a construction vessel in the OPA as the prevailing northeasterly coastal current places it directly downstream of a spill. Hydrocarbon spill modelling predicted that Ninety Mile Beach MNP may be exposed to entrained or dissolved hydrocarbons within the water column above relevant thresholds in the unlikely event of a spill. There is a 30 per cent and 35 per cent probability respectively, that entrained and dissolved hydrocarbons would contact the waters within the Ninety Mile Beach MNP at a concentration of ≥ 100 ppb. The minimum time to contact is 38 hours with the average maximum entrained loading reaching 125 ppb and average maximum dissolved loading reaching 13 ppb. No shoreline contact is predicted for the MNP.

In the event of oil exposure, epibenthic species within the MNP may be exposed to entrained or dissolved oil resulting in toxicological impacts. Species with an exoskeleton would be afforded some protection from the oil, however species would be impacted by reduced oxygen in the lower layers of the water column as bacteria degrade the spilled oil.

The MNP holds cultural significance with the Gunaikurnai group. A hydrocarbon spill may impact sites of cultural importance in addition to impacting spiritual connections with the area. The highly dynamic nature of Ninety Mile Beach means hydrocarbons would be rapidly dispersed, entrained or transported away from the MNP. The residual risk in the rare event of a hydrocarbon spill is therefore considered to be Very Low.

6.3.2.2 Operations

6.3.2.2.1 Changes to coastal processes

Once built, the offshore wind farm will cause localised modification of hydrodynamics (winds, waves and currents) in and around the wind farm. The shorelines and landforms inshore from the OWFA include sand barrier islands, beaches and dunes which are shaped by waves, currents, winds and changes in sea level. Changes to the offshore wind, wave and current regime due to the presence and operation of the offshore wind farm could result in changed coastal processes along the coastline inshore from the OWFA. Numerical modelling results showed that changes the project is very unlikely to result in changes to coastal aeolian sand transport, wind-driven currents or waves at or in the vicinity of Ninety Mile Beach MNP. Changes to longshore sediment transport northeast along Ninety Mile Beach to Golden Beach were negligible and smaller than natural variation. Impacts to the MNP a result of changes to coastal processes are therefore expected to be negligible.

6.3.2.2.2 Accidental hydrocarbon spill – vessels and OSS

There are no operational activities within the Ninety Mile Beach Marine National Park, however it may be at risk of impact from an accidental hydrocarbon spill occurring in the rare event of a vessel collision whilst transiting to/from the OPA or whilst vessels are operating within the OPA.

The consequence to the values of the Ninety Mile Beach MNP from a hydrocarbon spill in the rare event of a vessel collision during the operations phase of the project is significantly less than that described during the construction phase due to fewer and smaller vessels. No shoreline contact with oil from a spill is predicted. The residual risk is therefore considered to be Very Low.

The modelled scenario of a spill of naphthenic oil from an OSS in the OFWA indicated no shoreline contact and a very low probability of entrained oil and dissolved oil (eight per cent and less than one per cent,

respectively) within the waters of the MNP. The residual risk of oil from an OSS in the rare event of a spill reaching the Ninety Mile Beach MNP is therefore considered Very Low.

6.3.2.3 Residual impact and risk to values

Table 6-7 specifies the impact pathways, and Table 6-8 the relevant risk pathways, that have been assessed for construction and operation and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the Ninety Mile Beach MNP.

The consequence (impact) and risk levels presented in Table 6-7 and Table 6-8 are those residual impacts and risks concluded from the relevant assessments for the receptors identified as sensitive values of the Ninety Mile Beach MNP. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale) and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports.

Table 6-7 Impact pathways and residual consequence rating relevant to values of the Ninety Mile Beach MNP

Impact pathway	MDS	MPA Value					
		Infauna (soft sediments)	Invertebrates (low profile reef)	Marine mammals (whales)	Seabirds and shorebirds	Fish	Recreation
Operations							
Changes to coastal processes	<ul style="list-style-type: none"> Up to 147 turbine monopile foundations plus 5 offshore substation monopile foundations. Up to 2.2 gigawatt total wind farm capacity, Minimum spacing of 1,062 m Maximum monopile diameter: 11.8 m (see note on sensitivity testing above). Maximum volume of 388,133 m³ of scour protection Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Negligible	Negligible	N/A	N/A	N/A	N/A

Table 6-8 Risk pathways and residual risk ratings relevant to values of the Ninety Mile Beach MNP

Risk pathway	MDS	MPA Value				
		Epibenthic fauna and infauna	Marine mammals (whales)	Seabirds and shorebirds	Fish	Recreation
Construction						
Accidental hydrocarbon spill from vessel collision in OPA	Up to 8,320 vessel round trips, including up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months) Up to 8,390 vessel movements within the OPA.	Very low	Very low	Very low	Very low	Very low
Operations						
Accidental hydrocarbon spill from vessel collision in OPA or during vessel transit	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period	Very low	Very low	Very low	Very low	Very low
Accidental release of hydrocarbons during operations on OSS'	Naphthenic oil in OSS' in the OFWA – realistic worst-case release: 40 m ³	Very low	Very low	Very low	Very low	Very low

6.3.2.4 Evaluation of residual impacts and risks

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 6-9 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will not impact the values of Victorian Marine Parks and reserves	There are no impact pathways predicted for this MNP, and the predicted levels of risks are Very low. With the application of the mitigation measures summarised in Section 9, project activities will be conducted to preserve the values of Victorian Marine Parks and reserves.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas].	It is recognised that there are opportunities to avoid and minimise/mitigate environmental impacts and risks during the many stages of project development. Once avoidance and minimisation measures have been exhausted, mitigation measures have been proposed and are summarised in Section 10 of this report. Monitoring and adaptive management has also been proposed where relevant and is summarised in Section 10 of this report. In the event impacts cannot be confidently mitigated or managed to below significant levels using management and mitigations, Star of the South has committed to develop offsets for the project. There has been no requirements for offsets identified in the impact assessment presented for this marine protected area.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].	Impacts to water quality through hydrocarbon spill have been managed through the application of legislative requirements around marine pollution and vessel design. These are summarised in Section 10 of this report. The predicted levels of impact to the environment from these activities, with the application of mitigations, is Very low.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.

6.4 Nooramunga Marine and Coastal Park

6.4.1 Environment and socio-economic values

The Nooramunga Marine and Coastal Park overlaps the eastern half of the Corner Inlet Ramsar site (Section 3.5), extending from Port Welshpool around Little Snake Island and Snake Island (Figure 5-1), approximately ten kilometres northwest of the OPA. The park also includes onshore areas of coastline and the land area surrounding the Albert River, ending in Alberton covering a total of 30,170 hectares (VNPA, 2016). Parts of Sunday Island, Big Dog Island, Little Dog Island, Hunter Island and Bullock Island are not included within the boundary of the park and are privately owned and managed for grazing or game management (DSEWPac, 2011).

The Nooramunga Marine and Coastal Park is managed by Parks Victoria under the *National Parks Act 1975* requiring the park to be preserved and its natural condition and features to be protected, while allowing

sustainable use of the park for recreation and education (Dickson M, 2014). The waterways within the park are managed by Gippsland Ports (Gippsland Coastal Board, 2015).

The values of the park consist of a range of habitats including isolated granite islands and sand barrier islands which protect the park waters from the strong swell of Bass Strait, as well as extensive areas of intertidal and subtidal sand and mudflats supporting a high diversity of invertebrates and migratory wading birds. The is considered a significant coastal habitat for waterbirds nesting, feeding and roosting along the shoreline and within the coastal heathland. The park also contains the significant mangrove, saltmarsh and seagrass habitats, supporting a diverse range of invertebrates, fish, and crustaceans.

The coastal land and waters of Nooramunga Marine and Coastal Park hold cultural significance to the Gunaikurnai people, located on the traditional lands of the Brataualung people (part of the Gunaikurnai Nation), as well as the Boon Wurrung people. Several cultural heritage sites exist within the park including an extensive series of shell middens located along the coastal dunes of the park, representative of the historical use of the area for fishing and food resourcing. The barrier islands were also known to be used extensively by the Gunaikurnai people, providing shelter food and resources (Parks Victoria, 2005; WGCMA, 2014). A number of confirmed and unconfirmed shipwrecks are located within and in close proximity to the park (see Technical Report M: Non-Aboriginal Cultural Heritage).

The park holds economic values with the Port Albert operating within the site, an important launching place for a number of recreational and commercial boats and recreational value to users of the area by means of sightseeing/wildlife observation, snorkelling and scuba diving, swimming, surfing, wind surfing/sailing/boating, commercial and recreational fishing of all forms from the beach and boats, bush camping along the coastline and on the barrier islands, education, research and tourism (VNPA, 2014).

As with other parks and reserves in the area, Nooramunga Marine and Coastal Park is threatened by the potential disturbance humans and vessels may have on the marine environment. Vessel related impacts such as ballast water discharge, increased traffic, hydrocarbon spills and potential anchor damage may have a negative impact on the benthic community and other marine flora and fauna. Invasive marine species also pose a risk to the park, a project removing invasive sea urchin species was undertaken in the park in 2018 (French, 2018). Likewise human behaviour has the potential to disturb breeding, feeding and nesting shorebirds. Other problems include poor water quality, erosion and sedimentation as a result of agricultural, forestry and urban runoff and practises, impacting several waterways including the Albert River (WGCMA, 2014).

6.4.2 Impact and risk assessment

The relevant values assessed are based on only those values of the Nooramunga Marine and Coastal Park where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- seagrasses
- saltmarsh
- mangrove
- sand barrier islands
- waterbird abundance and breeding
- threatened birds
- threatened fish
- fish
- recreation and tourism.

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Nooramunga Marine and Coastal Park are:

- Transiting vessels (from ports to/from the project area)
 - underwater noise emissions
 - artificial light emissions

- physical disturbance
- introduction and establishment invasive marine species (IMS)
- accidental hydrocarbon spills
- Shore crossing (HDD activities)
 - contaminated surface water from shore crossing construction site
- Physical presence of the OWF:
 - changes to coastal processes
 - collision risk of operating turbines – birds.

The assessment of impacts and risks to the values of the Nooramunga Marine and Coastal Park is informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report A: Coastal Processes and Sediment Transport
- Technical Report C: Fish and Invertebrates
- Technical Report E: Offshore Ornithology and Bats
- Technical Report I: Surface water
- Technical Report M: Non-Aboriginal Cultural Heritage.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 9.

6.4.2.1 Construction

The impact and risk pathways described for the Nooramunga Marine and Coastal Park during the construction phase of the project and are:

- Light, underwater noise and physical presence associated with transiting vessels to and from Port facilities at Barry Beach (Barry Beach Marine Terminal or Port Anthony) and the OPA causing disturbance to waterbird species. However, given that vessels will be transiting in a defined / localised area that is not important for waterbird foraging, roosting, or nesting, exposure to increased vessel traffic is expected to have a negligible impact on migratory and resident waterbird species.
- Accidental hydrocarbon spills and the introduction and establishment of IMS associated with transiting vessels may pose risks to values of the Nooramunga MCP. However, given the likelihood of either a hydrocarbon spill or the introduction and establishment of IMS is rare due to the implementation of mitigation measures (see Section 10), the residual risk to the values of the MCP are considered to be Low for waterbird and fish species and seagrass habitat, and Very Low for saltmarsh and mangrove habitats, sand barrier island habitat and tourism and recreational values.
- Contaminated surface water from shore crossing construction site. Management of runoff to ensure that pollution does not adversely affect waterways is standard practice on projects of this nature and scale. It is therefore likely that the initial mitigation measures can effectively manage construction activities so that sediments and contaminants are not mobilised. In the unlikely event that runoff were to occur, the impacts would be localised and unlikely to be detected. Shore crossing construction activities are not expected to cause a measurable change in water quality or seagrass habitat of conservation value for the Nooramunga MCP. The residual risk is therefore considered to be Very Low

6.4.2.2 Operations

The impact and risk pathways described for the Nooramunga Marine and Coastal Park during the operations phase of the project and are:

- the presence of offshore infrastructure may alter coastal processes resulting in impacts to seagrasses. The modelling of coastal processes in Technical Report A: Coastal processes and sediment transport using numerical modelling (RPS-Cardno, 2022) indicated that the small spatial scale and low magnitude modification of the wind and wave regime on the open coast between Wilsons Promontory and Seaspray resulted in small changes to longshore sediment transport that are indistinguishable from natural

variation and climate-change effects. The models demonstrated that there would be no change in tidal currents or tide levels, no changes to onshore-offshore sediment transport and no change in aeolian sediment transport due to the project. The residual impact is therefore considered to be minor for seagrass and negligible for the sand barrier islands values of the Nooramunga MCP.

- Bird species that are supported by the Nooramunga MCP may be impacted by operating wind turbines within the OWFA. There were no threatened or migratory waterbird species identified as values of the Nooramunga MCP for which collision risk would result in a significant decline in population or impede the recovery of any species (refer to Technical Report E: Offshore Ornithology and Bats). The project has committed to a minimum airgap for turbine blades of 35 metres above LAT and implementation of monitoring and adaptive mitigation measures as detailed within the Seabird monitoring and management framework (EIS Attachment IV: Seabird monitoring and management framework). These are summarised in Section 10 of this report. The residual impact is therefore considered to be Low for waterbirds in the Nooramunga MCP.
- The consequence to the values of the Nooramunga MCP from a hydrocarbon spill in the rare event of a vessel collision during transit between the ports within Corner Inlet and the OPA is significantly less than that described during the construction phase due to fewer and smaller vessels. The residual risk is therefore considered to be Very Low.
- The introduction and establishment of IMS within the Nooramunga MCP as a result of the presence of vessels transiting between the ports and Corner Inlet during the operations phase is also considered to be highly unlikely given the fewer vessels and due to the implementation of mitigation measures (see Section 10.10). The residual risk to the values of the MCP are considered to be Very Low.

6.4.2.3 Residual impact and risk to values

Table 6-10 specifies the impact pathways, and Table 6-11 the relevant risk pathways, that have been assessed for construction and operation and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the Nooramunga MCP.

Table 6-10 Impact pathways and residual consequence rating relevant to values of the Nooramunga MCP

Impact pathway	MDS	MPA Value									
		Seagrass	Saltmarsh	Mangrove	Sand barrier islands	Waterbird abundance	Waterbird breeding	Threatened birds	Threatened fish	Fish	Tourism and recreation
Construction											
Transiting vessel presence: light, underwater noise, physical disturbance	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months)	N/A	N/A	N/A	N/A	Negligible	Negligible	Negligible	Negligible	Negligible	N/A
Operations											
Changes to coastal processes	Offshore installation of: <ul style="list-style-type: none"> • 147 WTG and 5 OSS • Up to 2.2 GW total wind farm capacity • Minimum spacing of 1,062 m between WTGs • Maximum monopile diameter of 11.8 m • Maximum volume of 388,133 m³ of scour protection • Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Minor	N/A	N/A	Negligible	N/A	N/A	N/A	N/A	N/A	N/A
Transiting vessel presence: light, underwater noise, physical disturbance	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period	N/A	N/A	N/A	N/A	Negligible	Negligible	Negligible	Negligible	Negligible	N/A

Table 6-11 Risk pathways and residual risk ratings relevant to values of the Nooramunga MCP

Risk pathway	MDS	MPA Value										
		Seagrass	Saltmarsh	Mangrove	Sand barrier islands	Waterbird abundance	Waterbird breeding	Threatened birds	Threatened fish	Fish	Tourism and recreation	
Construction												
Introduction and establishment of IMS	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low	Low	N/A
Accidental hydrocarbon spill from transiting vessels	Up to 500 vessel round trips from construction feeder ports (including from international locations)	Low	Very low	Very low	Very low	Low	Low	Low	Low	Low	Low	Very low
Contaminated surface water from shore crossing construction site	<ul style="list-style-type: none"> Trenchless shore crossing of up to 10 bores (8 plus 2 contingency) with maximum length of 1400 m and depth of up to 35 m Up to 8 transition joints and bays with upper limit footprints of 10 m x 30 m x 5 m (W/L/D) per bay Temporary total construction footprint in the shore crossing zone: approx. 18 ha. Causeway crossing across waterway to allow vehicle crossings Trenchless crossing of waterway for cable installation Temporary construction areas are likely to be required in the floodplain (for example, the shore crossing location). Dewatering of excavations will be required where shallow groundwater depths are encountered. 	Very low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operations												
Introduction and establishment of IMS		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Very low	Very low	N/A

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Risk pathway	MDS	MPA Value									
		Seagrass	Saltmarsh	Mangrove	Sand barrier islands	Waterbird abundance	Waterbird breeding	Threatened birds	Threatened fish	Fish	Tourism and recreation
Accidental hydrocarbon spill from transiting vessels	Up to 1,202 project vessel round trips per year from Corner Inlet during the 30-year operations period	Very low	Very low	Very low	Very low	Very low	Very low	Very low	Very low	Very low	Very low
Bird collision with WTGs	<ul style="list-style-type: none"> Up to 147 wind turbines throughout the OWFA extent with safety shapes and lights Turbine blades as low as 35 m LAT Turbine height up to 350 m Start-up wind speed 3 m/s Shut-down wind speed 35 m/s Annual percentage downtime for turbines 1% to 7%. 	N/A	N/A	N/A	N/A	Low	Low	Low	N/A	N/A	N/A

6.4.2.4 Evaluation of residual impacts and risks

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 6-12 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will not impact the values of Victorian Marine Parks and reserves	The predicted levels of impact described in the section above are Minor to Negligible and for predicted risks, Low to Very Low. With the application of the mitigation measures summarised in Section 8, project activities will be conducted to preserve the values of Victorian Marine Parks and reserves.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas].	It is recognised that there are opportunities to avoid and minimise/mitigate environmental impacts and risks during the many stages of project development. Once avoidance and minimisation measures have been exhausted, mitigation measures have been proposed and are summarised in Section 10 of this report. Monitoring and adaptive management has also been proposed where relevant and is summarised in Section 10 of this report. In the event impacts cannot be confidently mitigated or managed to below significant levels using management and mitigations, Star of the South has committed to develop offsets for the project. There has been no requirements for offsets identified in the impact assessment presented for this marine protected area.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].	Impacts to water quality through construction of the shore crossing site, hydrocarbon spill or accidental vessel discharges have been managed through design choices, including location and style of shore crossing construction, and the application of legislative requirements around marine pollution and vessel design. These are summarised in Section 10 of this report. The predicted levels of impact to the environment from these activities, with the application of mitigations, is Low to Very low.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.

6.5 Wilsons Promontory Marine National Park and Marine Reserve

6.5.1 Environment and socio-economic values

On 26 March 1986, Wilsons Promontory Marine Park and Wilsons Promontory Marine Reserve were temporarily reserved under the *Crown Lands (Reserves) Act 1967*. Wilsons Promontory Marine Park was temporarily reserved 'for the conservation of areas of natural interest or beauty or of scientific, historic or archaeological interest and areas for public recreation'. Wilsons Promontory Marine Reserve was temporarily reserved 'for the conservation of areas of natural interest or beauty or of scientific, historic or archaeological interest'. The MNP and reserve were added to Schedule 4 of the *National Parks Act* on 23 April 1986. Wilsons Promontory Marine Reserve and Wilsons Promontory Marine Park are managed in combination with Wilsons Promontory Marine National Park by Parks Victoria.

Wilsons Promontory Marine Reserve is classified as a 'Marine B' area, protecting vegetation communities of moderate significance with relatively lower species diversity, representing a moderate proportion of the bioregion's species diversity (about 20 to 40 per cent) and a moderate number of threatened species present. The reserve is comprised of two sections, making up an area of 1,185 hectares. One section extends from the southern part of Refuge Cove to the southern point of Cape Wellington on Wilsons Promontories east coast approximately 31 kilometres southwest of the OPA, while the other section surrounds the all the islands from the Glennie Group (Great Glennie Island, Dannevig Island, Citadel Island and McHugh Island) on the western side of Wilsons Promontory, approximately 52 kilometres from the OPA (Figure 5-1). Both sections extend 300 metres seaward from the low water mark. The reserve is designated IUCN Category VI, managed primarily for the sustainable use of natural ecosystems.

Wilsons Promontory Marine National Park (MNP) is Victoria's largest marine national park covering 15,500 hectares, approximately 33 kilometres west of the OPA at its closest point. The MNP reaches across 45 kilometres of coastline, from Norman Bay on the west coast of Wilsons Promontory and extends 4.78 nautical miles offshore to 300 metres from the Low Water Mark of the Glennie Group islands, around the coast to Cape Wellington in the east (Figure 5-1). It sits within the Flinders marine bioregion characterised by predominately granite and unconsolidated sediments. The MNP encompasses and includes a number of offshore islands of the Anser Group (Anser Island, Kanowna Island, Wattle Island and Anderson Islets). The MNP was the first in Australia to receive a Global Ocean Refuge System Platinum Award for its strong protection of marine ecosystems and biodiversity.

Management of the Wilsons Promontory MNP is outlined in the Wilsons Promontory Conservation Action Plan (Parks Victoria, 2017) and the Wilsons Promontory Marine National Park Management Plan (Parks Victoria, 2006b). Wilsons Promontory MNP is assigned IUCN Category II and is managed primarily for ecosystem protection and recreation.

The MNP and Marine Reserve hold great environmental value to a range of marine flora and fauna including hundreds of fish species, invertebrates (sponges, ascidians, sea whips and bryozoan), seagrass, as well as a number of marine mammal and seabird species. Kanowna Island and other islands in the Anser Group are breeding colonies to Australian fur seals *Arctocephalus pusillus*, New Zealand fur seals *Arctocephalus forsteri*, little penguins *Eudyptula minor*, short-tailed shearwaters *Puffinus tenuirostris*, common diving-petrels *Pelecanoides urinatrix*, fairy prions and black-faced cormorants *Phalacrocorax fuscescens*, and important feeding and roosting habitat to a number of seabirds and shorebirds. These species along with a number of other migratory seabirds, southern right whales *Eubalaena australis*, humpback whales *Megaptera novaeangliae*, killer whales *Orcinus orca*, leatherback turtles *Dermochelys coriacea* and green turtles *Chelonia mydas* have been recorded utilising the waters of the MNP for foraging or transiting (Parks Victoria, 2006b). The MNP is also a nationally significant area for the recovery of white shark populations and a recorded calving area of both southern right whales and humpback whales (Barton et al., 2012).

Cleft, Kanowna, Anser and Wattle Islands within the MNP make up part of the Wilsons Promontory Islands IBA for supporting more than one per cent of the global populations of short-tailed shearwater, pacific gull *Larus pacificus* and potentially black-faced cormorants (BirdLife International, 2020). As the meeting point between the Flinders and the Twofold shelf bioregions, the MNP is the distribution limit for over 126 species including wire weed seagrass *Amphibolis antarctica* and is the presumed endemic range for four species of mollusc.

The values of the Wilsons Promontory Marine Reserve and MNP are shallow subtidal reefs dominated by dense canopy cover kelp and a high diversity of invertebrates and fish species, deep subtidal reefs consisting of large sponges, a variety of corals and colonial ascidians, and seagrass beds in soft subtidal

substrates. There are five intertidal reef sites studied as part of Victorian Government's long term reef monitoring program (Parks Victoria, 2006b).

The Wilsons Promontory MNP and Marine Reserve hold traditional and cultural significance to the Gunaikurnai and BoonWurrung people, with many places and objects part of the dreaming culture of the Traditional Owners and evidence of terrestrial use of the 'land bridge' areas where Victoria was once connected to Tasmania. The areas also hold significant European cultural values, with history of 19th century shipping, sealing, and whaling, with a number of historic shipwrecks listed on the Victorian Heritage Register resting within the MNP and relics from the Refuge Cove whaling station evident within the area (Parks Victoria, 2006b).

Diving and snorkelling are extremely popular within the MNP at both reef and shipwreck sites, the area known for frequently clear water. The remote and natural setting also attracts swimming, boating and bird/nature watching visitors. Wilderness boat tours operate within the area, passing the pinnacles used by fur seals and seabirds (Pennicott Wilderness Journeys, 2022). As an undisturbed area, the MNP also provides a suitable site for conducting scientific marine surveys, including a long-term subtidal reef monitoring at thirteen sites, as part of a program established by the Victorian Government.

The Wilsons Promontory Marine Reserve is also a recreationally valuable area. Boat-based fishing is permitted within the marine reserve, with green and black lip abalone, demersal fish, and southern rock lobster industries prominent within the area. Fishing competitions, including spear fishing are not permitted within the marine reserve area. The reef areas and wrecks encourage diving and snorkelling within the area, as well as swimming, recreational boating, canoeing/kayaking, sailing, surfing, and nature watching.

Threats to the Wilsons Promontory Marine Reserve and MNP include human-induced pressures including vessel noise disturbing marine mammals or breeding seabird colonies, potential oil/chemical spills, and anchorage and propeller scour impacting marine species and reef habitats, introduction and establishment of invasive marine species from ballast water discharge and vessel biofouling. Recreational and commercial fishing impacts including by-catch and illegal take also pose a threat to the biodiversity of the area.

6.5.2 Impact and risk assessment

An assessment of the impact and risk to the Wilsons Promontory Marine Reserve and the Wilsons Promontory Marine Park is presented in the sections below for each phase of the project. As described in Section 2.9, potential impacts and risks during decommissioning are conservatively assumed to be equal to or less than those described for the construction phase therefore the decommissioning phase is not discussed in a separate subsection.

The relevant values assessed are based on only those values of the Wilsons Promontory Marine Reserve and MNP where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- benthic habitats
- marine fauna species (seabirds, marine mammals and turtles, fish)
- shipwrecks
- recreation and tourism.

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Wilsons Promontory Marine Reserve and MNP are:

- Transiting vessels (from ports to/from the project area)
 - introduction and establishment of IMS
 - accidental hydrocarbon spills
- Physical presence of the OWF:
 - changes to coastal processes.

The assessment of impacts and risks to the values of the Wilsons Promontory MNP and Marine Reserve are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report A: Coastal Processes and Sediment Transport

- Technical Report B: Benthic Ecology
- Technical Report E: Offshore Ornithology and Bats
- Technical Report Q: Business and Tourism.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 9.

6.5.2.1 Construction

The impact and risk pathways for the Wilsons Promontory Marine Reserve and Wilsons Promontory Marine Park are accidental hydrocarbon spills and the introduction and establishment of IMS from transiting vessels.

6.5.2.1.1 Invasive marine species – transiting vessels

Project vessels will apply best-practice biofouling and ballast water management practices to minimise the risk of translocating IMS. Project vessels are not expected to transit through or anchor within the Wilsons Promontory MNP or Marine Reserve during construction. Therefore, introductions of IMS during construction would be via propagules, larvae or adults drifting into the parks on ambient currents. Propagules, larvae or adult IMS drifting with ambient currents in the open coastal environment have a very low probability of reaching either of the MPAs and finding suitable habitat. Most IMS are suited to sheltered habitats such as those found within ports and coastal embayments, therefore, the exposed nature of Wilsons Promontory is unlikely to be suitable for these species.

The consequence of the introduction and establishment of an IMS has considered the areas within the Wilsons Promontory Marine Reserve and MNP closer to Corner Inlet and is considered minor. Assemblages comprise a wide diversity of species. Most marine species within the parks are widely distributed in Victoria, hence local impacts on biodiversity and individual species are unlikely to lead to impacts at the population level. Amenity, social and cultural values may be reduced if IMS become established, but due to the diversity of habitats and resilience of the largely undisturbed ecosystem, IMS are unlikely to become dominant and if they do be localised to specific habitats. The risk to the Wilsons Promontory Reserve and MNP from IMS is therefore considered Very Low.

6.5.2.1.2 Accidental hydrocarbon spill – vessels

Based on hydrocarbon spill modelling of a vessel collision in the OPA during the construction phase, the risk of oil from a vessel collision in the OPA contacting the Wilsons Promontory Marine Reserve and MNP is very low, with only a seven per cent probability of the dissolved component of a spill potentially contacting with the waters of the MNP. Given the low probability of contact and low concentrations (less than 50 ppb) of dissolved oil if reaching the waters of the MNP, it is highly unlikely that any detectable change to the values of the MNP would occur. The risk of a hydrocarbon spill in the rare event of a vessel collision during transit through the MNP is therefore considered to be Very Low.

6.5.2.2 Operations

6.5.2.2.1 Changes to coastal processes

Model results showed that changes to longshore sediment transport on the northeast coast of Wilsons Promontory (profiles 01 and 02) within the Wilsons Promontory Marine Reserve and MNP were the smallest of all the profiles, hence the change is negligible and very much smaller than natural variation and predicted climate change induced effects. No changes to currents (or tide levels) or onshore-offshore sediment transport will occur at these locations. Impacts to the MCP and marine reserve as a result of changes to coastal processes are therefore expected to be negligible.

6.5.2.2.2 Accidental hydrocarbon spill – vessels

The consequence to the values of the MNP and marine reserve from a hydrocarbon spill in the rare event of a vessel collision during the operations phase of the project is significantly less than that described during

the construction phase due to fewer and smaller vessels. No shoreline contact with oil from a spill is predicted. The residual risk is therefore considered to be Very Low.

6.5.2.3 Residual impact and risk to values

Table 6-13 Impact pathways and residual consequence rating relevant to values of the Wilsons Promontory Marine Reserve and Marine National Park

Impact pathway	MDS	MPA value			
		Benthic habitats	Marine fauna species	Shipwrecks	Recreation and tourism
Operations					
Changes to coastal processes	<ul style="list-style-type: none"> Up to 147 turbine monopile foundations plus 5 offshore substation monopile foundations. Up to 2.2 gigawatt total wind farm capacity, Minimum spacing of 1,062 m Maximum monopile diameter: 11.8 m Maximum volume of 388,133 m³ of scour protection Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Negligible	N/A	N/A	Negligible

Table 6-14 specifies the impact pathways that have been assessed for construction and operation and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the Wilsons Promontory Marine Reserve and MNP.

The consequence (impact) and risk levels presented in Table 6-13 Impact pathways and residual consequence rating relevant to values of the Wilsons Promontory Marine Reserve and Marine National Park

Impact pathway	MDS	MPA value			
		Benthic habitats	Marine fauna species	Shipwrecks	Recreation and tourism
Operations					
Changes to coastal processes	<ul style="list-style-type: none"> Up to 147 turbine monopile foundations plus 5 offshore substation monopile foundations. Up to 2.2 gigawatt total wind farm capacity, Minimum spacing of 1,062 m Maximum monopile diameter: 11.8 m Maximum volume of 388,133 m³ of scour protection Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Negligible	N/A	N/A	Negligible

Table 6-14 are those residual impacts and risks concluded from the relevant assessments for the receptors identified as sensitive values of the Wilsons Promontory Marine Reserve and MNP. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale) and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports.

Table 6-13 Impact pathways and residual consequence rating relevant to values of the Wilsons Promontory Marine Reserve and Marine National Park

Impact pathway	MDS	MPA value			
		Benthic habitats	Marine fauna species	Shipwrecks	Recreation and tourism
Operations					
Changes to coastal processes	<ul style="list-style-type: none"> Up to 147 turbine monopile foundations plus 5 offshore substation monopile foundations. Up to 2.2 gigawatt total wind farm capacity, Minimum spacing of 1,062 m Maximum monopile diameter: 11.8 m Maximum volume of 388,133 m³ of scour protection Maximum volume of 288,600 m³ for remedial protection of cables and shore crossing 	Negligible	N/A	N/A	Negligible

Table 6-14 Risk pathways and residual consequence rating relevant to values of the Wilsons Promontory Marine Reserve and Marine National Park

Risk pathway	MDS	MPA value			
		Benthic habitats	Marine fauna species	Shipwrecks	Recreation and tourism
Construction					
Introduction and establishment of IMS	Up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months) Up to 500 vessel round trips from construction feeder ports (including from international locations)	Very low risk	N/A	Very low risk	Very low risk
Accidental hydrocarbon spill from vessel collision in the OPA	Up to 8,320 vessel round trips, including up to 7,820 project support vessel round trips from Corner Inlet during the construction period (4 years and 11 months) Up to 8,390 vessel movements within the OPA.	Very low risk	Very low risk	N/A	Very low risk
Operations					
Accidental hydrocarbon spill from vessel collision in the OPA or vessels transiting between ports and the OPA	<ul style="list-style-type: none"> Up to 1,202 project vessel round trips from Corner Inlet per year during the 30-year operations period 	Very low risk	Very low risk	N/A	Very low risk

6.5.2.4 Evaluation of residual impacts and risks

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 6-15 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will not impact the values of Victorian Marine Parks and reserves	The predicted levels of impact described in the section above are Negligible and Low to Very low. With the application of the mitigation measures summarised in Section 9, project activities will be conducted to preserve the values of Victorian Marine Parks and reserves.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will avoid, and where avoidance is not possible, minimise, potential adverse effects on protected native vegetation and listed threatened species and their habitat and listed ecological communities, in both onshore and offshore environments, as well as address offset requirements consistent with state policies [within Victorian marine protected areas].	It is recognised that there are opportunities to avoid and minimise/mitigate environmental impacts and risks during the many stages of project development. Once avoidance and minimisation measures have been exhausted, mitigation measures have been proposed and are summarised in Section 10 of this report. Monitoring and adaptive management has also been proposed where relevant and is summarised in Section 10 of this report. In the event impacts cannot be confidently mitigated or managed to below significant levels using management and mitigations, Star of the South has committed to develop offsets for the project. There has been no requirements for offsets identified in the impact assessment presented for this marine protected area.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.
The project will minimise adverse effects on water (including groundwater, waterway, wetland, estuarine, intertidal and marine) quality and movement [within Victorian marine protected areas].	Impacts to water quality through hydrocarbon spill have been managed through the application of legislative requirements around marine pollution and vessel design. These are summarised in Section 10 of this report. The predicted levels of impact to the environment from these activities, with the application of mitigations, is Low to Very low.	The risk assessment has been undertaken with precaution and using the best available peer reviewed literature and site specific and project specific studies. Confidence in the assessment results are high. Adaptive management measures are proposed in areas where there was uncertainty in the assessment.

7 KENT GROUP TASMANIA MARINE NATURE RESERVE

7.1 Environment and socio-economic values

The Kent Group Marine Nature Reserve (MNR) is centred around a cluster of five small islands and several islets located in Bass Strait, including Deal Island, Dover Island, Edith Island, North East Isle, and Anvil Rock, with Deal Island the largest and centre of the group (Figure 5-1). Combined, the islands and islets cover an area of approximately 23 square kilometres. The Kent Group is located approximately 30 kilometres south east of the Hogan Group and approximately 70 kilometres south of the OWFA.

The MNR extends out to a three nautical mile boundary from all azimuths of the islands, covering an area of approximately 290 square kilometres. The MNR is divided into two zones: a no take zone on the western half of the Reserve and a restricted take zone on the eastern half of the Reserve, restricting netting or set lines for fishing activities (Tasmanian Parks and Wildlife Service, 2024a). Only line fishing with up to five hooks, and rock lobster fishing using pots or diving is allowed in the eastern zone. Management of the Kent Group Marine Nature Reserve is undertaken by Tasmanian Parks and Wildlife Service, as a division of the Department of Natural Resources and Environment.

The Kent Group MNR is most notably the convergence point of the East Australian Current and westerly influence of Bass Strait, resulting in high diversity of marine life, with an Australian fur seal breeding sanctuary and with more fish species occurring than any other region in Tasmania. Key species present include the mosaic leatherjacket, Māori wrasse, and eastern shovelnose ray. The islands are also an important habitat for many seabird species (AMCS, 2024). As a result of this elevated marine diversity, the Kent Group Marine Reserve has high recreational value to users for recreational fishing and SCUBA diving, particularly for underwater photography. Research dives also occur annually in the Marine Reserve, with sites identified on the northern extent and south eastern extent. However, the Kent Group islands are only accessible by water, in private or chartered vessels, therefore recreational access is restricted (Tasmanian Parks and Wildlife Service, 2024a).

A rich Aboriginal cultural heritage is documented on the Kent Group islands, with human occupation occurring between an estimated 8,000 to 13,000 years ago. European settlers established sealer settlements on the islands and constructed a lighthouse, which is now used as a museum open to visitors (Tasmania Parks and Wildlife Service, 2024b).

Threats to the Kent Group MNR include human-induced pressures disturbing the breeding seal colonies, and introduction and establishment of invasive marine species and diseases. Recreational and commercial fishing impacts including by-catch and illegal take also pose a threat to the biodiversity of the MNR.

7.2 Impact and risk assessment

The relevant values assessed are based on only those values of the Kent Group Marine Nature Reserve where a potential impact or risk pathway has been demonstrated within the relevant technical report assessments, being:

- pygmy blue whales
- southern right whales
- fur seals
- threatened birds
- fishes
- recreational fishing
- recreation (scuba divers).

The project activities and resulting potential impact and risk pathways relevant to the assessment of the Kent Group Marine Nature Reserve are:

- Transiting vessels (from ports to/from the project area)
 - underwater noise emissions

- artificial light emissions
- physical disturbance
- introduction and establishment invasive marine species (IMS)
- accidental hydrocarbon spills

The assessment of impacts and risks to the values of the Kent Group MNR are informed by the assessments in the following technical reports, which should be referred to for more detail:

- Technical Report C: Fish and Invertebrates
- Technical Report D: Marine Mammals and Turtles
- Technical Report E: Offshore Ornithology and Bats.

A summary of the mitigation measures applied to the impact and risk assessments are provided in Section 10.

7.2.1 Construction

Construction feeder ports, such as Bell Bay (Tasmania) and Geelong (Victoria), may be used to support large project vessels which may result in construction vessels transiting the marine nature reserve during the construction period. Up to 500 vessel transits may occur between the construction feeder ports (Port of Geelong or Bell Bay) and the OPA during the 4 years and 11-month construction period. Therefore, the values of the marine nature reserve may be impacted by vessels transiting through the reserve's waters. There are no credible impact or risk pathways during operation of the project given the distance from the OPA and vessels are not expected to transit through the marine reserve.

Vessel traffic may disturb wildlife through underwater noise emissions, light pollution (causing disorientation in seabirds), planned discharges or physical disturbance (startling marine fauna, including birds and marine mammals). It is also possible that during vessel movements in the construction phase, accidental events including introduction of IMS, vessel hydrocarbon spill could occur within the Kent Group MNR.

7.2.1.1 Impacts during construction

7.2.1.1.1 Underwater noise – transiting vessels

Underwater noise emitted from vessels is produced mainly by propeller and thruster cavitation, with a smaller fraction of noise produced by sound transmitted through the hull, such as by engines, gearing, and other mechanical systems. Sound levels are higher when the vessel is stationary and using thrusters to hold position (dynamic positioning). It is unlikely that underwater noise generated by transiting vessels would yield exposure ranges that could impact noise sensitive marine fauna species given that the vessels would be moving through the marine nature reserve and would not be stationary at any time. The area that may be ensonified would therefore be a small mobile area as the vessel moves along its defined route between the construction feeder ports and the OPA. Impacts from underwater noise from transiting vessels passing through the marine reserve is expected to be negligible.

7.2.1.1.2 Artificial light emissions – transiting vessels

Light emissions from vessels are expected to impact pelagic species and plankton more than other species because the impacted area would generally be confined to the surface layer near each vessel. Artificial light can attract and/or disorient birds causing collision, entrapment, stranding, grounding (also known as 'fallout'), and interfere with their navigation (such as being drawn off course from their intended route) (Rodriguez et al. 2017; Commonwealth of Australia 2023). Artificial light produced by vessels operating at night has been shown to negatively impact seabird behaviour (Goat 2023) and change the behaviour and distribution of shorebirds (Commonwealth of Australia 2023). Impacts from artificial light emissions from transiting vessels passing through the marine reserve is expected to be negligible.

7.2.1.2 Risks during construction

7.2.1.2.1 Invasive marine species – transiting vessels

The likelihood of IMS being introduced and establishing within the Kent Group Marine Nature Reserve is considered rare. Project vessels will apply best-practice biofouling and ballast water management practices to minimise the risk of translocating invasive marine species and vessel presence would be limited to transiting en-route between the OPA and Bell Bay during construction. Therefore, introduction of invasive marine species during construction would be via propagules, larvae or adults drifting into the parks on ambient currents. Propagules, larvae or adult IMS drifting with ambient currents in the open coastal environment have a very low probability of reaching the parks and finding suitable habitat. Most invasive marine species are suited to sheltered habitats such as those found within ports and coastal embayments, the exposed nature of the MNR is unlikely to be suitable for these species.

The consequence of an IMS introduction to MNR is considered minor. Amenity, social and cultural values may be reduced if IMS become established, but due to the resilience of the largely undisturbed ecosystem, IMS are unlikely to become dominant and if they do be localised to specific habitats. Invasive marine species (and hence their impacts) tend to fluctuate over time, so impacts may be intermittent. The residual risk of IMS on the values of the MNR is considered to be Rare with a Minor consequence, therefore the overall risk is considered to be Very Low.

7.2.1.2.2 Accidental hydrocarbon spill – transiting vessels

Hydrocarbon spill modelling of the scenario of a vessel collision in the OPA during the construction phase did not predict any contact of oil (shoreline, surface, entrained or dissolved) with the Kent Group MNR, however, in the rare event of a hydrocarbon spill from a transiting vessel en-route to or from Bell Bay, oil could potentially make contact with waters /shorelines in the MNR.

Oil or fuel that is floating has the potential to lead to fouling of pelagic seabirds and/or ingestion, including the albatross and other seabirds that are values of the MNR. Because much of the spilled oil is buoyant, fish in the water column or on the seabed typically have limited exposure to the spill and are able to move away from the area to avoid direct contact with it. Fur seals exhibit behaviours that lead to more possible interactions with hydrocarbon spills, e.g. time spent at the surface, time spent below surface swimming and foraging, and time spent on the shore during hauling out. Information on the impacts to pinnipeds from hydrocarbon spills is known from large-scale spill events, orders of magnitude much larger and released over a much longer period than that possible during the project. Potential impacts include direct oiling, skin or eye irritation and inhalation or ingestion of volatile compounds (AMSA, 2011). Young seals or sea lions are more vulnerable to mortality than adults as their coats cannot provide insulation when oiled. In addition, mothers may not feed pups when they are oiled leading to starvation (Michel and Fingas, 2016).

Tourism and recreation activities within the MNR would be impacted during the immediate oiling phase and shortly thereafter, however these impacts are not expected to be temporary.

The residual risk of an accidental hydrocarbon spill impacting on the values of the MNR is considered to be Very Low.

7.2.1.2.3 Vessel strike – transiting vessels

There is a very low risk that transiting construction vessels may come into contact with (strike) a marine mammal on the sea surface whilst transiting within the MNR between the OPA and project ports. This risk is the same described for the Beagle AMP, with a residual risk rating of Very Low.

7.2.2 Residual impact and risk to values

Table 7-1 specifies the impact pathways, and Table 7-2 the relevant risk pathways, that have been assessed for the construction phase and the parameters of the MDS that are relevant to the described impact pathway. The MDS represent the project parameters from the project envelope that would have the greatest potential impact to the identified sensitive values of the MNR.

The consequence (impact) and risk levels presented in Table 7-1 and Table 7-2 are those residual impacts and risks concluded from the relevant assessments for the receptors identified as sensitive values of the MNR. The definitions of the consequence (impact) levels are a combination of magnitude (nature and scale)

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and sensitivity of the receptor, and of the risk levels are a combination of impact and likelihood – these are defined in each of the receptor assessments in other technical reports.

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Table 7-1 Impact pathways and residual consequence ratings relevant to the Kent Group Marine Nature Reserve

Impact pathway	MDS	MPA Value						
		Southern right whales	Pygmy blue whales	Fur seals	Threatened birds	Fish	Recreational fishing	SCUBA divers
Construction								
Underwater noise from transiting vessels	Up to 500 vessel round trips from construction feeder ports (including from international locations)	Negligible	Negligible	Negligible	N/A	N/A	N/A	Negligible
Transiting vessel presence: artificial light emissions		N/A	N/A	N/A	Negligible	Negligible	Negligible	N/A

Table 7-2 Risks pathways and residual risk ratings relevant to the Kent Group Marine Nature Reserve

Risk pathway	MDS	MPA Value						
		Southern right whales	Pygmy blue whales	Fur seals	Threatened birds	Fish	Recreational fishing	SCUBA divers
Construction								
IMS from transiting vessels	Up to 500 vessel round trips from construction feeder ports (including from international locations)	N/A	N/A	N/A	N/A	Very low	N/A	N/A
Accidental hydrocarbon spill from transiting vessels		Very low	Very low	Very low	Very low	Very low	Very low	Very low
Vessel strike (with marine mammals)		Very low	Very low	Very low	N/A	N/A	N/A	N/A

7.2.3 Evaluation of residual impacts and risks against assessment criteria

The predicted levels of impact are within the defined assessment criteria as demonstrated below.

Table 7-3 Evaluation of residual impacts and risks against assessment criteria

Assessment criteria	Evaluation	Confidence
The project will not impact the natural biological diversity and quality of water of the Kent Group Tasmanian Marine Nature Reserve.	<p>The assessment demonstrated Negligible impacts to the values of the Kent Group MNR, therefore substantial impact to the values of the site are not expected.</p> <p>Inherent controls implemented by industry as standard, in addition to following legislative requirements will manage the risk to a Very Low level.</p> <p>Emergency response procedures mean that any pollution would be of negligible consequence to values of the Kent Group MNR.</p>	<p>The assessment has been conservative in the assessment of risk. The potential impacts are well understood and the proposed controls are standard, tested and well accepted in the industry. Confidence in the evaluation is therefore high.</p>

8 DECOMMISSIONING

Few offshore wind farms have been decommissioned and given their long lifecycles there are uncertainties regarding the decommissioning process, particularly for large projects. These uncertainties include (Bennun et al., 2021):

- The regulatory environment (in many jurisdictions, regulations regarding offshore wind farm decommissioning are at present limited)
- Strategies for recycling components
- The economic case for recycling and reuse of infrastructure at the time of decommissioning
- The consequences of removal of habitats that has developed on project infrastructure.

Consistent with the requirements outlined in the OEI Act 2021 (section 116(2)), at the end of the operation phase of the Star of the South project it is envisaged that all offshore infrastructure above the seabed would be removed. Offshore inter-array or export cables, either buried or protected, would likely be left in-situ to avoid impacts to the environment associated with their removal. The exact decommissioning activities to take place would be in accordance with requirements of relevant legislation in place at the time and the approved management plan.

Innovation in decommissioning techniques is likely to progress significantly over the period of time before it is required for this project. The offshore decommissioning activities are conservatively assumed to impact the same receptors at the same or lesser magnitude and scale as construction operations. The anticipated duration is up to three years within the Commercial Licence period (noting options for re-powering post 30 years). While details of these activities will not be resolved for a number of years, indicative activities may include:

- Removal of offshore substation topsides and foundations to just below seabed
- Removal of WTG, transition pieces and monopiles to just below seabed
- Removal of scour protection where possible and appropriate to do so
- Retention of subsea cables *in situ*
- Return seabed to baseline conditions as far as reasonably practicable.

A Marine Decommissioning Management Plan (DEC-M01) will be developed prior to commencement of decommissioning activities. The plan will detail the final agreed infrastructure proposed to be removed or left in situ, an assessment of potential impacts of decommissioning activities for the removal or retention of infrastructure on protected matters and specify how activities associated with decommissioning will be carried out in accordance with the project approval conditions.

9 CUMULATIVE IMPACT ASSESSMENT

This section provides an assessment of cumulative impacts on marine protected areas from other proposed projects and actions in the surrounding region. As required by the EIS guidelines (DAWE, 2021) and EES scoping requirements (DELWP, 2021) the impact assessment include a review and analysis of residual impacts of the proposed development and of other known proposals where there may be a spatial and temporal overlap (i.e. cumulative impact).

Cumulative impacts are those that arise when the effects of a single project on a single receptor are considered alongside the effect of other projects on the same receptor. Unplanned risks are excluded from the cumulative impact assessment (CIA) because they would be a rare event with uncertain outcomes, for example the trajectory and effects of a hydrocarbon spill

Methods used to consider cumulative impacts are described above in Section 3.6 and also in Chapter 6 – Assessment Framework within both the EIS and EES.

Specifically with regard to marine protected areas, the EIS guidelines (Section 3.1.1) require “*consideration of the potential for cumulative impacts on the ecological character of the Corner Inlet Ramsar site*”, and the EES scoping requirements (Section 3.1.2) to “*identify and evaluate effects of the project on groundwater, waterway, wetland, estuarine, intertidal, and marine waters [in Victorian marine protected areas] potentially affected by project works, including with appropriate consideration of climate change scenarios and possible cumulative effects*”.

The CIA for marine protected areas draws upon the cumulative impact assessments undertaken for the environmental and socio-economic values of these areas within the individual technical reports (Technical Reports B: Benthic Ecology, C: Fish and Invertebrates, D: Marine Mammals and Turtles, and E: Offshore Ornithology and Bats). This report does not intend to repeat the information provided in the individual technical reports, but rather presents a summary with cross referencing (as and where appropriate) to the relevant outcomes of the CIAs within these technical reports.

The cumulative impact assessment has been based on publicly available information on each relevant project as of August 2025, to allow sufficient time to assess the effects and incorporate findings into technical assessments and chapters ahead of EIS/EES submission.

9.1 Project Screening

Based on the screening process undertaken in the individual receptor technical reports, the projects that were short-listed for assessment of cumulative impacts on receptors are summarised in Table 9-1. It is noted that operational projects, such as oil and gas and existing vessel operations, are considered part of the baseline conditions and thus captured in the assessment of impacts and risks in Sections 4 - 7. Other existing threats to the marine protected areas including climate change, fisheries, invasive species and marine pollution (Director of National Parks 2025) are also considered part of the baseline conditions during assessment.

Temporally, the CIA assessment will extend from the proposed start of construction, i.e. no earlier than 2028 for the onshore construction period and no earlier than 2030 for offshore construction, to the likely end of decommissioning works in 2068 (based on an operational life of 30 years and five years each of construction and decommissioning).

The impact pathways identified for the MPA values in Table 8-1 are taken from the CIAs within the relevant technical reports. The potential for the SOTS project to result in cumulative impacts when combined with these projects has been considered for the relevant environmental and socio-economic values of the MPAs assessed in Section 8.2.

Where there are no SOTS project alone impact pathways, and therefore no cumulative impact pathways, identified for any particular value of an MPA, that value has been scoped out of the assessment of cumulative impacts. Where a potential effect for the project alone was assessed as negligible and/or there is low spatial overlap with external projects, these were not considered within the CIA assessment, due to the potential for cumulative effects being of a very small magnitude (refer to Technical Reports B: Benthic Ecology, C: Fish and Invertebrates, D: Marine Mammals and Turtles, and E: Offshore Ornithology and Bats).

Although unplanned risks are excluded from the CIA because they would be a rare event with uncertain outcomes, bird collision risk has however been scoped into the cumulative impact assessments for relevant MPAs.

Table 9-1 Short-list projects screened in for the CIAs for relevant MPA values

Project	Stage	Project description	Certainty	Receptor group	Relevant receptor group cumulative impact pathways	Project screened in for MPA assessment?	Relevant MPA impact pathways
Great Eastern Offshore Wind (GEOW) project, Corio Generation	Referred	<p>The GEOW project is a referred offshore wind farm located 24 km off the coast, adjacent and offshore of the OWFA. Potential landfall areas are still being considered. Up to 172 fixed foundation wind turbines, eight offshore sub-stations and associated infrastructure in operation, generating up to 2.5 GW of electricity. Construction is expected to occur from 2028 and operations from 2032.</p>	Tier 2 Seeking Approval (Medium)	Benthic ecology	<ul style="list-style-type: none"> Temporary seabed disturbance Changes to water quality Altered hydrodynamics Permanent loss of benthic habitat Physical presence of artificial substrate 	Yes – all MPAs	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) Changes to coastal processes (operation)
				Fish and invertebrates	<ul style="list-style-type: none"> Seabed disturbance and sediment plumes during the construction phase Routine discharges from project vessels Underwater noise emissions from pile driving, drilling, vessels and operating wind turbines (construction and operation phases) Light emissions from project vessels Electromagnetic fields from cables causing behavioural disturbance Habitat change due to presence of project infrastructure 	<p>Yes (transiting vessels only) – all MPAs</p> <p>Seabed disturbance, electromagnetic fields and habitat change impact pathways are not relevant to the MPA's CIA as no project infrastructure is proposed within the MPAs.</p>	<ul style="list-style-type: none"> Underwater noise from vessels transiting between construction / operations ports and the OPA Transiting vessel presence: light, physical disturbance (construction and operation)
				Ornithology	<ul style="list-style-type: none"> Artificial light emissions burrow-nesting seabirds Underwater noise from piling and vessels (Little Penguin) Physical presence of turbines: displacement (Black-faced Cormorant, albatross and giant petrels) 	<p>Yes – all MPAs. Screened in for species / species groups identified as values of MPAs</p>	<ul style="list-style-type: none"> Underwater noise from vessels transiting between construction / operations ports and the OPA Transiting vessel presence: light, physical disturbance (construction and operation) Bird collision risk impacting waterbirds within Corner

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Project	Stage	Project description	Certainty	Receptor group	Relevant receptor group cumulative impact pathways	Project screened in for MPA assessment?	Relevant MPA impact pathways
					<ul style="list-style-type: none"> Physical presence of turbines: collision risk (Shy Albatross, White-capped Albatross, Short-tailed Shearwater) 		Inlet Ramsar site (operation)
				Marine mammals and turtles	<ul style="list-style-type: none"> Underwater noise during piling, drilling and vessel activities (pygmy blue whale, southern right whale, humpback whale and other mysticetes) 	Underwater noise emissions from pile driving is not relevant to the MPA's CIA as there is no project alone impact pathway.	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) Underwater noise from vessels transiting between construction / operations ports and the OPA
Gippsland Offshore Wind Farm Marine Survey Investigations, Ørsted	Approved	The EPBC referral covers marine field investigations that include marine geophysical and geotechnical surveys to be undertaken within the offshore marine environment, wind measurement surveys using Floating LiDAR (buoy/uncrewed surface vessel to establish turbine locations. Geophysical and geotechnical surveys may span up to an eight-year period.	Tier 1 Approved (High)	Marine mammal and turtle values	<ul style="list-style-type: none"> Underwater noise from geophysical methods and vessel operations (pygmy blue whale, southern right whale, humpback whale and other mysticetes) 	Yes – Beagle AMP, Ninety Mile Beach Marine National Park, Kent Group Tasmania Marine Nature Reserve	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) Underwater noise from vessels transiting between construction / operations ports and the OPA
Gippsland Skies Offshore Wind Project marine surveys	Referred	Marine survey investigations, which include geophysical investigations, geotechnical investigations, benthic habitat surveys and wind and oceanography surveys. Geophysical surveys proposed to commence between 2028	Tier 1 Approved (High)	Marine mammal and turtle values	<ul style="list-style-type: none"> Underwater noise from geophysical methods and vessel operations (pygmy blue whale, southern right whale, humpback whale and other mysticetes) 	Yes – Beagle AMP, Ninety Mile Beach Marine National Park, Kent Group Tasmania Marine Nature Reserve	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) Underwater noise from vessels transiting between construction / operations ports and the OPA

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Project	Stage	Project description	Certainty	Receptor group	Relevant receptor group cumulative impact pathways	Project screened in for MPA assessment?	Relevant MPA impact pathways
		or 2029, taking up to 6 weeks. Geotechnical investigations proposed to commence between 2029 and 2032.					
Gelliondale Onshore Wind Farm Synergy Wind Pty Ltd	Referred	Gelliondale is a proposed renewable energy facility centred around the district of Gelliondale in south-east Victoria. The site is approximately 7 km south-west of Yarram, 3 km west of Alberton and 8 km east of Welshpool. Up to 13 wind turbines and ancillary infrastructure including an energy storage system and substation, generating up to 80 MW of electricity.	Tier 2 Seeking Approval (Medium)	Ornithology values	<ul style="list-style-type: none"> Physical presence of turbines: collision risk (White-throated Needletail) 	No – The only receptor that has the potential to be impacted by both projects is the White-throated Needletail. This species is not identified as a value of the MPAs included within this assessment.	N/A
Marinus Link Cable Installation and Operation Marinus Link Pty Ltd	Planning and Development	Marinus Link involves the installation of approximately 255 kilometres of (buried) undersea High Voltage Direct Current (HVDC) cable across Bass Strait from Heybridge, Tasmania, to Waratah Bay, Victoria. It will be built in two 750 MW stages from 2025, with a final investment decision on Stage 1 planned for May 2025. Both stages include installing seabed HVDC cables as the main activity.	Tier 1 (High)	Fish values	<ul style="list-style-type: none"> Electromagnetic fields from cables causing behavioural disturbance (white sharks). 	No – the white shark is not listed as a value of Corner Inlet Ramsar Site or the Victorian Marine Parks and Reserves. There is no spatial overlap with the Beagle AMP where the white shark is a listed as a value. The location at Waratah Bay where the cable will make landfall in Victoria is located approximately 26 km west of Wilsons Promontory and a further 46 km west of the OPA. The Beagle AMP is	N/A

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Project	Stage	Project description	Certainty	Receptor group	Relevant receptor group cumulative impact pathways	Project screened in for MPA assessment?	Relevant MPA impact pathways
		Marinus Link is currently in planning and development, with Stage 1 construction expected to begin in 2026 and completed by 2030.		Marine mammal and turtle values	<ul style="list-style-type: none"> Underwater noise from geophysical methods and vessel operations (pygmy blue whale, southern right whale, humpback whale and other mysticetes) 	approximately a further 20 km south of the OPA. Yes – Beagle AMP, Ninety Mile Beach Marine National Park, Kent Group Tasmania Marine Nature Reserve	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) Underwater noise from vessels transiting between construction / operations ports and the OPA

9.2 Assessment of cumulative impacts

The assessment of potential adverse cumulative impacts on MPAs from the Star of the South project and the projects screened into the assessment above in Table 9-1 is based upon the outcomes of the CIAs undertaken for the relevant MPA environmental and/or socio-economic values within the relevant receptor technical reports (Technical Reports B: Benthic Ecology, C: Fish and Invertebrates, D: Marine Mammals and Turtles, and E: Offshore Ornithology and Bats). A detailed description of the cumulative effects upon each of these receptor groups and relevant species is provided in these technical reports.

For the MPAs where Aboriginal Cultural Heritage is identified as a value of the MPA, the potential impacts associated with project activities throughout the construction, operation and decommissioning phases have been assessed in Technical Report K: Aboriginal Cultural Heritage and Technical Report Z: Submerged Aboriginal Cultural Heritage.

Table 8-2, Table 9-3 and Table 9-4 present the cumulative impact assessments for the Corner Inlet Ramsar Site, the Beagle Australian Marine Park and the Victorian and Tasmanian Marine Parks and Reserves, respectively.

9.2.1 Commonwealth Protected Areas

Corner Inlet Ramsar Site

There is a maximum of Low risk and Minor consequence predicted for impacts and risks from the Project to the Corner Inlet Ramsar site from all impact pathways during the construction, operations and decommissioning of the Project, therefore it is considered that the CPS for Corner Inlet would not be impacted by the Project.

The cumulative impact assessment for the Corner Inlet Ramsar Site is provided in Table 9-2.

Table 9-2 Assessment of cumulative impacts on Corner Inlet Ramsar Site

Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual consequence / risk	Assessment of cumulative impacts for MPA
Underwater noise from vessels transiting through Corner Inlet Ramsar site (construction and operation)	<ul style="list-style-type: none"> Threatened fish Fish 	Negligible	Negligible. During all project phases the final consequence of underwater noise from transiting project vessels is predicted to be Negligible for all fish receptor groups (Section 4.2.1.1.2). Therefore, no further assessment of cumulative impacts is required.
Transiting vessel presence: light, physical disturbance (construction and operation)	<ul style="list-style-type: none"> Waterbird breeding 	Minor	Minor. Unmitigated, there is the potential for numerous individuals to be impacted because of light attraction and, potentially grounding on vessels, particularly during foggy conditions. However, with mitigations and management procedures in place, cumulative impacts to light-affected species are not predicted and the CIA residual consequence was considered Minor.
Changes to coastal processes (operation)	<ul style="list-style-type: none"> Permanent shallow marine waters 	Negligible	Negligible. The preliminary desktop assessment for the Great Eastern Offshore Wind project indicates that changes to hydrodynamics may occur. However, it is not possible to determine the nature and scale of potential cumulative effects of the Great Eastern Offshore Wind project with the SOTS project without detailed modelling. There are likely cumulative impacts during operations on winds, waves and coastal sediment transport processes in the lee of the two wind farms. Effects on coastal processes and sediment transport from each project on the coastline from the Nooramunga to Ninety Mile Beach will overlap. The nature of cumulative impacts is similar to impacts from Star of the South alone, but of greater magnitude. Nevertheless, the magnitude of likely cumulative impacts remains small relative to natural

Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual consequence / risk	Assessment of cumulative impacts for MPA
Bird collision risk with WTG impacting waterbirds within Corner Inlet Ramsar site (operation)	<ul style="list-style-type: none"> Threatened birds 	Very Low to Low ²	<p>variation and the assessment found no change in residual impacts on relevant receptors.</p> <p>Insufficient information. Species presence and abundance data is not available to inform CRM for Great Eastern Offshore Wind project and may differ to the Star of the South Offshore Wind Farm due to differences in seabird microhabitat use. Therefore, the cumulative impact assessment is necessarily qualitative, and a risk ranking cannot be determined in the absence of data to accurately inform an assessment. For all seabird species, an impact approximately up to double that of the Star of the South project is coarsely assumed for the two projects, although the numbers of the coastally foraging black-faced cormorant would be lower in the Great Eastern Offshore Wind project compared with Star of the South, based on known foraging behaviour and water depths and tracking data. However, site-specific data and design information for the Great Eastern Offshore Wind project is needed to accurately assess the likely impacts from the combined projects. This will not be available until the Great Eastern Offshore Wind EIS is published. While cumulative impacts are possible, it is likely that collisions from the two projects combined would be orders of magnitude less than natural losses and deaths from other sources.</p>

Corner Inlet Ramsar Site evaluation: In summary, with reference to the ecological character values (critical components, processes and services) of the Corner Inlet Ramsar Site screened in for assessment, it can be concluded that there is negligible to minor potential for cumulative impacts to the values of the Ramsar site.

Note 1: there are no cumulative impact pathways predicted for Corner Inlet Ramsar Site seagrass, saltmarsh, mangrove or intertidal mudflat values

Note 2: based on CRM for species likely to occur in Corner Inlet

Beagle Australian Marine Park

The cumulative impact assessment for the Beagle Australian Marine Park is provided in Table 9-3.

Table 9-3 Assessment of cumulative impacts on the Beagle Australian Marine Park

Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual consequence	Assessment of cumulative impacts for MPA
Underwater noise from vessels transiting through the Beagle Australian Marine Park (construction)	Threatened marine mammal species with overlapping BIAs (pygmy blue whales, southern right whales, white shark) Fur seal foraging	Negligible	Negligible. The potential for a cumulative impact is considered to be negligible; effects from other projects would be unlikely to combine or accumulate being small scale, localised, temporary and subject to adequate conditions to avoid adverse effects. Noting that the initial contribution from the Star of the South Offshore Wind Farm to impacts on this receptor group are negligible, no cumulative impact can be conceptualised.
Transiting vessel presence: light, physical disturbance (construction and operation)	Threatened species (with overlapping BIAs) Fur seal foraging	Negligible	Negligible. During all project phases the final consequence of disturbance as a result of vessels transiting through the park between potential construction feeder ports and the Star of the South OPA is predicted to be Negligible. Therefore, no further assessment of cumulative impacts is required.

Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual consequence	Assessment of cumulative impacts for MPA
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Beagle Australian Marine Park evaluation: In summary, with reference to the values of the Beagle Australian Marine Park screened in for assessment, it can be concluded that there is negligible potential for cumulative impacts to the site.

Note 1: Fish and recreational fishing values are scoped out of the cumulative assessment as there are no SOTS project alone impact pathways, and therefore no cumulative impact pathways.

9.2.2 State and Territory Protected Areas

The cumulative impact assessment for the Victorian and Tasmanian MPAs is provided in Table 9-4.

Table 9-4 Assessment of cumulative impacts on Victorian and Tasmanian MPAs

MPA	Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual impact / risk	Assessment of cumulative impacts for MPA
Corner Inlet Marine National Park (MNP) Corner Inlet Marine and Coastal Park	<ul style="list-style-type: none"> Underwater noise from transiting vessels Transiting vessel presence: light, physical disturbance (construction and operation) Changes to coastal processes (operation) Bird collision risk with WTG impacting waterbirds within Corner Inlet Ramsar site (operation) 	Seagrass	<ul style="list-style-type: none"> Changes to coastal processes (operation) - Negligible 	<ul style="list-style-type: none"> Changes to coastal processes (operation) - Negligible <p>The lack of detail for the Great Eastern Offshore Wind project prohibits detailed assessment of potential cumulative impacts of changes in hydrodynamics and coastal processes on soft sediment habitats with seagrass. Technical Report A: Coastal Processes and Sediment Transport qualitatively assessed that there are likely cumulative impacts during operations on winds, waves and coastal sediment transport processes in the lee of the two wind farms. These cumulative effects may impact soft sediment with seagrass habitats. The nature of cumulative impacts is similar to impacts from Star of the South alone, but of greater magnitude. Nevertheless, the magnitude of likely cumulative impacts remains small relative to natural variation and the assessment found no change in residual impacts on relevant receptors.</p>
		Seabirds and shorebirds	<ul style="list-style-type: none"> Transiting vessel presence: light, noise, physical disturbance - Minor (construction) to Negligible (operations) Bird collision risk with WTG – Low 	<ul style="list-style-type: none"> Transiting vessel presence: light - Minor <p>Unmitigated, there is the potential for numerous individuals to be impacted because of light attraction and, potentially grounding on vessels, particularly during foggy conditions. However, with mitigations and management procedures in place, cumulative impacts to light-affected species are not predicted and the CIA residual consequence was considered Minor.</p> <ul style="list-style-type: none"> Bird collision risk with WTG – insufficient information <p>Species presence and abundance data is not available to inform CRM for Great Eastern Offshore Wind project and may differ to the Star of the South Offshore Wind Farm due to differences in seabird microhabitat use. Therefore, the cumulative impact assessment is necessarily qualitative, and a risk ranking cannot be determined in the absence of data to accurately inform an assessment. For all seabird species, an impact approximately up to double that of the Star of the South project is coarsely assumed for the two projects, although the numbers of the coastally foraging black-faced cormorant would be lower in the Great Eastern Offshore Wind project compared with Star of the South, based on known foraging behaviour and water depths and tracking data. However, site-specific data and design information for the Great Eastern Offshore Wind project is needed to accurately assess the likely impacts from the combined projects. This will not be available until the Great Eastern Offshore Wind EIS is published. While cumulative impacts are possible, it is likely that collisions from the two projects combined would</p>

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MPA	Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual impact / risk	Assessment of cumulative impacts for MPA
McLoughlins Beach – Seaspray Coastal Reserve	<ul style="list-style-type: none"> Changes to coastal processes (operation) 	<ul style="list-style-type: none"> Coast and dune system 	<ul style="list-style-type: none"> Changes to coastal processes (operation) - Minor 	<p>be orders of magnitude less than natural losses and deaths from other sources.</p> <ul style="list-style-type: none"> Changes to coastal processes (operation) – Minor There are likely cumulative impacts during operations on winds, waves and coastal sediment transport processes in the lee of the two wind farms. There is potential for overlapping impacts on coastal processes and sediment transport along the coastline from the Nooramunga to Ninety Mile Beach, including McLoughlins Beach – Seaspray Coastal Reserve. Nevertheless, the magnitude of likely cumulative impacts remains small relative to natural variation and the assessment found no change in residual impacts on relevant receptors.
Ninety Mile Beach Marine National Park	<ul style="list-style-type: none"> Changes to coastal processes (operation) 	<ul style="list-style-type: none"> Infauna (soft sediment) Epibenthic fauna (low profile rocky reef) 	<ul style="list-style-type: none"> Changes to coastal processes (operation) – Negligible to Minor 	<ul style="list-style-type: none"> Changes to coastal processes (operation) – Negligible to Minor The lack of detail for the Great Eastern Offshore Wind project prohibits detailed assessment of potential cumulative impacts of changes in hydrodynamics and coastal processes on benthic habitats and associated infauna and epibenthic fauna. Technical Report A: Coastal Processes and Sediment Transport qualitatively assessed that there are likely cumulative impacts during operations on winds, waves and coastal sediment transport processes in the lee of the two wind farms. Effects on coastal processes and sediment transport from each project on the coastline from the Nooramunga to Ninety Mile Beach will overlap. The nature of cumulative impacts is similar to impacts from Star of the South alone, but of greater magnitude. Nevertheless, the magnitude of likely cumulative impacts remains small relative to natural variation and the assessment found no change in residual impacts on relevant receptors.
Nooramunga Marine and Coastal Park	<ul style="list-style-type: none"> Vessel presence: light, noise, physical disturbance (construction and operation) Changes to coastal processes (operation) 	<ul style="list-style-type: none"> Seagrasses Sand barrier islands 	<ul style="list-style-type: none"> Changes to coastal processes (operation) - Minor 	<ul style="list-style-type: none"> Changes to coastal processes (operation) – Minor There are likely cumulative impacts during operations on winds, waves and coastal sediment transport processes in the lee of the two wind farms. There is potential for overlapping impacts on coastal processes and sediment transport along the coastline from the Nooramunga to Ninety Mile Beach. Nevertheless, the magnitude of likely cumulative impacts remains small relative to natural variation and the assessment found no change in residual impacts on relevant receptors.

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MPA	Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual impact / risk	Assessment of cumulative impacts for MPA
		<ul style="list-style-type: none"> Waterbird abundance and breeding Threatened birds 	<ul style="list-style-type: none"> Transiting vessel presence: light, underwater noise, physical disturbance (construction and operation) – Minor Bird collision risk with WTG – Low 	<ul style="list-style-type: none"> Vessel presence: light - Minor Unmitigated, there is the potential for numerous individuals to be impacted because of light attraction and, potentially grounding on vessels, particularly during foggy conditions. However, with mitigations and management procedures in place, cumulative impacts to light-affected species are not predicted and the CIA residual consequence was considered Minor. Bird collision risk with WTG – insufficient information Species presence and abundance data is not available to inform CRM for Great Eastern Offshore Wind project and may differ to the Star of the South Offshore Wind Farm due to differences in seabird microhabitat use. Therefore, the cumulative impact assessment is necessarily qualitative, and a risk ranking cannot be determined in the absence of data to accurately inform an assessment. For all seabird species, an impact approximately up to double that of the Star of the South project is coarsely assumed for the two projects, although the numbers of the coastally foraging black-faced cormorant would be lower in the Great Eastern Offshore Wind project compared with Star of the South, based on known foraging behaviour and water depths and tracking data. However, site-specific data and design information for the Great Eastern Offshore Wind project is needed to accurately assess the likely impacts from the combined projects. This will not be available until the Great Eastern Offshore Wind EIS is published. While cumulative impacts are possible, it is likely that collisions from the two projects combined would be orders of magnitude less than natural losses and deaths from other sources.
<p>Wilsons Promontory Marine National Park</p> <p>Wilsons Promontory Marine Reserve</p>	<ul style="list-style-type: none"> Changes to coastal processes (operation) 	<ul style="list-style-type: none"> Benthic habitats 	<ul style="list-style-type: none"> Changes to coastal processes (operation) - Negligible 	<ul style="list-style-type: none"> Changes to coastal processes (operation) - Negligible The lack of detail for the Great Eastern Offshore Wind project prohibits detailed assessment of potential cumulative impacts of changes in hydrodynamics and coastal processes on benthic habitats of these MPAs. Technical Report A: Coastal Processes and Sediment Transport qualitatively assessed that there are likely cumulative impacts during operations on winds, waves and coastal sediment transport processes in the lee of the two wind farms. These cumulative effects may impact soft sediment with seagrass habitats. The nature of cumulative impacts is similar to impacts from Star of the South alone, but of greater magnitude. Nevertheless, the magnitude of likely cumulative impacts remains small relative to natural variation and the assessment found no change in residual impacts on relevant receptors.

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MPA	Potential cumulative impact pathways	Relevant MPA values ¹	Project alone residual impact / risk	Assessment of cumulative impacts for MPA
Kent Group Tasmania Marine Nature Reserve	<ul style="list-style-type: none"> Underwater noise from transiting vessels Transiting vessel presence: light, physical disturbance (construction and operation) 	<ul style="list-style-type: none"> Pygmy blue whales Southern right whales Fish 	<ul style="list-style-type: none"> Underwater noise from transiting vessels – Negligible 	<ul style="list-style-type: none"> Underwater noise from transiting vessels – Negligible <p>The potential for a cumulative impact is considered to be negligible; effects from other projects would be unlikely to combine or accumulate being small scale, localised, temporary and subject to adequate conditions to avoid adverse effects. Noting that the initial contribution from the Star of the South Offshore Wind Farm to impacts on this receptor group are negligible, no cumulative impact is predicted to marine fauna from transiting vessels for the SOTS project and other projects.</p>
		<ul style="list-style-type: none"> Threatened birds 	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) - Negligible 	<ul style="list-style-type: none"> Transiting vessel presence: light, physical disturbance (construction and operation) – Negligible <p>During all project phases the final consequence of vessel light emissions from Star of the South project vessels is predicted to be Negligible for all seabirds receptor groups. Therefore, no further assessment of cumulative impacts is required.</p>

¹ MPA values that are an identified receptor of the potential cumulative impact pathways, as per Sections 6 & 7

10 SUMMARY OF MITIGATION, MONITORING AND ADAPTIVE MANAGEMENT MEASURES

10.1 Mitigation and management

The mitigation measures that are proposed to avoid, mitigate or manage impacts associated with the project are summarised in Table 10-1.

Table 10-1 Mitigation measures

ID	Mitigation title	Mitigation description	Project phase
VES-M01	Vessel Operations Framework	<p>To ensure vessel safety and to reduce the risk of accidents (such as vessel collision and fuel spills) the project will develop, implement and maintain a vessel operations framework to be approved by the regulator, in accordance with International and Australian maritime legislation, including:</p> <ul style="list-style-type: none"> The Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) (implemented in Australia by Marine Order 30 (Prevention of collisions) 2016), the International Convention for the Safety of Life at Sea (SOLAS) as part of the <i>Navigation Act 2012</i> (lights and signals to be used by a vessel and to reduce potential vessel collisions), the International Convention for the Prevention of Pollution from Ships (MARPOL) (regulations aimed at preventing both accidental pollution and pollution from routine vessel operations) implemented through the <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> (Commonwealth), the <i>Navigation Act 2012</i> (Commonwealth) and the <i>Pollution of Waters by Oil and Noxious Substances Act 1986</i> (Victoria). <p>All project vessels will ensure that they are operated in accordance with this framework (as required by vessel size and class) during every project stage (construction, operation and decommissioning) within both Commonwealth and State Waters (including at Port, transiting to and from the offshore project area and within the offshore project area).</p> <p>Star of the South will ensure that prior to procuring project vessels, all vessels have a record of inspections and compliance.</p>	Construction Operations Decommissioning
VES-M03	Marine coordination centre	<p>To minimise risk of third-party vessel interactions, a Marine Coordination Centre (MCC) will manage movements of project vessels to and within the Offshore Project Area (OPA). The marine coordination centre will also monitor third party vessels and aircraft around the project area.</p> <p>The marine coordination centre will operate 24/7 in the construction phase and in the operations phase it will be staffed during working hours and operate 24/7 during large scale maintenance campaigns such as blade replacement.</p>	Construction Operations Decommissioning
VES-M04	Vessel movement controls	<p>To reduce the likelihood of interactions with third party vessels or an accidental hydrocarbon release from a vessel collision occurring within the marine environment the following measures will be applied:</p> <ul style="list-style-type: none"> All construction, operations and decommissioning activities will occur within the designated OPA Project vessels will use defined shipping routes between construction feeder ports and the OPA, as well as within Corner Inlet. Vessel routes will be further defined in consultation with relevant stakeholders. Deviation from recommended routes can occur for safety or environmental reasons. All project vessels that require dynamic positioning (DP) will comply with the DP Certification scheme. 	Construction Operations Decommissioning
VES-M05	Vessel biosecurity controls	<p>Project vessels and subsea equipment will be compliant with relevant biosecurity legislation and guidelines, including:</p> <ul style="list-style-type: none"> Prior to commencing project activities, all installation and support vessels will have a project-approved Ballast Water Management Plan and a Ballast Water Management Certificate. Reporting and management of ballast water will be in accordance with The Biosecurity Act 2015 and the Ballast Water Management Convention's Guidelines for Ballast Water Management and Development of Ballast Water Management Plans. An Invasive Marine Species (IMS) Risk Assessment Procedure (IMS- RAP) will be undertaken in accordance with the International Maritime Organisation Guidelines for the Management of Ships Biofouling for all vessels undertaking project activities, and the vessel will be confirmed to be a low biosecurity risk before approval to enter the Offshore Project Area (OPA) and Corner Inlet. Biosecurity clearance prior to entering Australian Waters for foreign vessels: <ul style="list-style-type: none"> Vessels that are intending to discharge internationally sourced ballast water within Australian waters must submit a Ballast Water Report through Maritime Arrivals Reporting System (MARS) at least 12 hours prior to arrival to gain biosecurity clearance. Ballast tank sediment must be disposed of in an area outside 200 nautical miles from the nearest land, and in at least a depth of 200 metres, or at an approved land-based reception facility. Management of anti-fouling and in-water cleaning in accordance with the Australian anti-fouling and in-water cleaning guidelines 	Construction Operations Decommissioning
VES-M06	Vessel collision - marine mammals	<p>All project vessels will implement the following requirements during all project phases (construction, operation and decommissioning) as prescribed by the EPBC Regulations 2000 Part 8 and Victorian State Wildlife (Marine Mammal) Regulations 2019 to minimise the risk of collision with a whale or dolphin:</p> <ul style="list-style-type: none"> Implementation of 'no approach' and 'caution' zones for whales, dolphins and seals: <ul style="list-style-type: none"> No approach zone (whales): within 100 metres of a whale, and within 300 metres to the front and rear of a whale No approach zone (dolphins): within 50 metres of a dolphin, and 150 metres in front and to the rear of a dolphin No approach zone (seals): within 30 metres of a seal, if the seal is on land or a haul out; or within 5 metres if the seal is on water infrastructure within state waters Caution zone (whales): within 300 metres of a whale Caution zone (dolphins): within 150 metres of a dolphin. Vessels must not enter the 'no approach zone' and must not wait in front of the direction of travel when a calf is present. 	Construction Operations Decommissioning

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ID	Mitigation title	Mitigation description	Project phase
VES-M08	Routine discharges & accidental discharges	<p>Routine discharges</p> <p>No routine discharges within 500 m of the boundaries of State or Australian marine parks, the southern right whale reproduction BIA / HCTS (between May and September), or if a marine mammal or turtle is within 500 metres of the vessel.</p> <p>No routine waste discharges from vessels within State Waters.</p> <p>Accidental Discharges</p> <p>In the event of an accidental discharge from a vessel, the discharge will be reported and monitored, including recording of any marine mammals and turtles that encounter the discharge.</p>	Construction Operations Decommissioning
SNV-M07	Vessel Passage Plan	<p>During all phases of the project, a Vessel Passage Plan (VPP) will be produced by the vessel 'master for navigation' for relevant vessels entering Corner Inlet, in consultation with the Gippsland Ports Harbour Master as per requirements set out in the Port Information Handbook for the Port of Corner Inlet and Port Albert. The VPP is required on the first entry to the Port of Corner Inlet for relevant vessel classes, or if the vessel has not entered for a period exceeding six months. The vessel master must submit to the Harbour Master (or their delegate) a formal passage plan, to be lodged with the Notification of Arrival/Departure and Application for Berth form.</p> <p>The VPP, provides active management of vessels to reduce the choke points and provision of safe separation distances limiting impacts to third-party vessels and port congestion.</p> <p>The VPP will include requirements as set out in the Port Information Handbook for the Port of Corner Inlet and Port Albert.</p>	Construction Operations Decommissioning
SPL-M01	Refuelling and resupply limitations	<p>To minimise the likelihood of vessel collision and hydrocarbon release, project vessels (during all phases of the project) will comply with all statutory requirements, including MARPOL (Marine Order 97). This includes the following refuelling measures</p> <ul style="list-style-type: none"> • Wherever possible, routine refuelling of project vessels will occur in port; • Should refuelling be required at sea, refuelling will not occur within shipping lanes or areas of high traffic to minimise the likelihood of vessel collision and fuel spill. • Vessel fuel must only contain a maximum sulfur content of 0.50 per cent m/m in compliance with MARPOL and Marine Order 97. • Materials and equipment that have the potential to spill onto the deck or into the marine environment will be stored within a contained area. • Spill response kits will be available and routinely checked to ensure adequate stock is maintained • Bunkering and bulk liquids will be transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release to sea during transfer. The procedures include standards for: <ul style="list-style-type: none"> – Certified equipment with confirmed integrity (e.g. hose and valves). – Transfer process (e.g. safety, communication, monitoring, inventory, emergency shut down procedures, procedural documents, and spill incident details) 	Construction Operations Decommissioning
SPL-M02	Spill Response Plan	<p>Develop, implement and maintain a Spill Response Plan (SRP) for accidental hydrocarbon release from project activities within the marine environment, including prevention, response and management during all project phases to minimise risk to sensitive marine receptors. The SRP describes first strike management measures (initial response measures) for vessel spills until the Australian Maritime Safety Authority (AMSA) takes over the response as the designated Control Agency for vessel spills. If a spill was to occur the SRP would be activated and will include the following:</p> <ul style="list-style-type: none"> • Initial response measures • Notification and reporting requirements • Determine if oil spill modelling and/or tracking buoys are required • Monitoring of the spill such as water quality monitoring • Response tactics to be implemented, such as subsea or surface dispersants, mechanical dispersion, containment and recovery and in-situ burning, depending on the nature and scale of the spill • Determine if shoreline protection and deflection and shoreline clean up are needed. • Monitoring and assessment of ecological impacts 	Construction Operations Decommissioning
SPL-M03	Maintenance of offshore substation transformers	<p>To reduce the risk of potential hydrocarbon spill from offshore substation transformers in the marine environment, the following measures will be undertaken during the operation phase:</p> <ul style="list-style-type: none"> • Offshore substation transformers will be maintained in accordance with manufacturer's requirements. • All offshore transformers will be banded appropriate to the oil capacity to reduce the risk of hydrocarbon release to the environment. • Regular inspection of items that have a potential hydrocarbon spill risk 	Operations
SUM-M003	Preventing fuel and chemical spills	<p>The CEMP will be implemented and include measures and procedures for the appropriate storage, handling and transportation of chemicals and fuels, including:</p> <ul style="list-style-type: none"> • Store bulk fuel in self-banded tanks in accordance with relevant Australian standards (AS1940-2017 and AS1692-2006) • Refuelling or maintenance of equipment, machinery and vehicles will be conducted at least 50 m or as far away as is reasonably practical from any waterway with appropriate measures to contain spills • Store hazardous materials in ventilated, self-banded and secured containers in accordance with the Occupational Health and Safety Act 2004 (OHS Act) and Occupational Health and Safety Regulations 2007 (OHS Regulations) • Store dangerous goods in accordance with the Dangerous Goods (Storage and Handling) Regulations 2012 and the code of practice for the storage and handling of dangerous goods • Undertake routine and scheduled maintenance of vehicles and plant/machinery/equipment to minimise the potential for leaks/spills to occur • Supply spill kits and firefighting equipment with the chemicals required by legislation • Maintain dangerous goods and hazardous materials register and current SDSs. 	Construction

ID	Mitigation title	Mitigation description	Project phase
SUM-M005	Preventing pollution from trenchless waterway crossings	<p>The proposed drilling profile design and the work method statement shall be submitted to the WGCMA and approved prior to the commencement of trenchless waterway crossings.</p> <ul style="list-style-type: none"> • Risk of frac-out should be assessed in accordance with industry best practice guidelines to determine likelihood of occurrence (e.g. modelling). • Drilling profiles should be adjusted where the risk of frac-out is considered likely. • Drilling fluid properties should be monitored during trenchless crossing operations to reduce the risk of frac-outs (e.g. mud weight, viscosity, pressure). • Drilling equipment and configuration should be appropriate for the proposed trenchless crossing operation to prevent frac-out. • Pollution prevention strategies should be in accordance with EPA Publication 1834: Civil Construction, Building and Demolition Guide, IECA Best Practice Erosion and Sediment Control Appendix P; Land Based Pipeline Construction Guidelines and EPA Publication 1896: Working within or adjacent to waterways. • Sediment control devices such as silt fences should be used to remove suspended solids and dissipate flow where required. • Earth bunds/or and drainage channels should be placed around the upper edges of drill sites and work areas to divert natural runoff around and away from the site and prevent mixing with drilling compound runoff. • Sump pits should be constructed at the bottom of the drill site. The sump pit will be positioned to capture runoff from the drilling compound. Materials collected in the sump pit will be assessed and managed in accordance with industry best practice guidelines for trenchless crossing operations. • An earth bund or silt fence will be placed around the sump pit to contain any spillage. • All facilities utilised in the surface mud handling (mixing, cleaning and pumping) during trenchless crossing activities should be bunded. 	Construction
OFF-M02	Marine debris minimisation	<p>During all phases of the project, all activities will be undertaken in accordance with the management actions provided in the Commonwealth "Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and ocean (2018)" to limit impacts of marine debris on sensitive marine receptors. The project will take practicable actions to avoid and minimise the loss of marine debris from offshore installations and project vessels. Appropriate training will be communicated during crew induction (OFF-M04). In the event of debris lost, if practicable, Star of the South will retrieve the debris. Reporting and monitoring will be undertaken according to the Environmental Management Framework.</p>	Construction Operations Decommissioning
OFF-M04	Low Toxicity Marine drilling fluids	<p>During the construction period, only water-based drilling fluids (such as those containing xanthan gum and bentonite, or low toxicity alternatives) will be used for marine drilling activities, including trenchless installation of the shore crossing (at Reeves Beach) and drilling monopiles in the Offshore Windfarm Area (OWA) in the event of pile refusal. Low toxicity fluids will limit potential environmental harm, including impacts to sensitive marine receptors associated with decreased water quality.</p>	Construction
OFF-M05	Shore crossing Methodology	<p>The project will commit to trenchless installation methods at the Reeves Beach shore crossing during the construction phase to minimise impacts to beach and dune shorebird habitat. Trenchless installation will be within the bounds of the project design envelope and include the following measures to avoid and minimise impacts to biodiversity values:</p> <ul style="list-style-type: none"> • A suitably trained ecologist will check the beach for signs of nesting habitat for Hooded Plover. Should any nests be found, signage and designated no-go areas will be established to ensure impacts are avoided. • All construction equipment will be removed following the completion of construction and the ground conditions restored to agreed rehabilitation standards. 	Construction
LIT-M01	Infrastructure Light Management	<p>Wind farm and vessel lighting during all phases of the project will comply with National Light Pollution Guidelines for Wildlife (DCCEEW, 2023), to limit the effects of artificial lighting on wildlife, where these do not conflict with safety (i.e. needed for safe work, navigation and aviation).</p> <p>This includes:</p> <ul style="list-style-type: none"> • the minimisation of light spill; • avoidance of long wavelength light sources; • avoidance of blue, violet or ultra-violet wavelengths; and • lighting in each maintenance area will be kept to the minimum requirement for safe passage when personnel are not required to be working in the area. <p>Construction lighting and marking requirements will be included in the Marine Operations Framework, including vessel lighting and temporary lighting and marking on structures within the Offshore Wind Farm Area (OWFA).</p> <p>For the operation phase, an operational lighting and marking plan will be developed in consultation with relevant regulators, such as the Civil Aviation Authority and the Australian Maritime Safety Authority. The plan sets out the design and operation of lighting within the Offshore Wind Farm Area, including on turbines and substations for both aviation and navigational safety requirements.</p> <p>During good weather while in operations, lighting on turbines and substations will be reduced where practicable as agreed with relevant regulators, including the Civil Aviation Safety Authority (CASA) and the Australian Maritime Safety Authority (AMSA). The specific requirements for lighting will be set out in the Operations Lighting and Marking Plan, in agreement with relevant authorities.</p>	Construction Operations Decommissioning
LIT-M02	Vessel Artificial Light management	<p>Routine monitoring on vessels will be undertaken to measure and detect the impacts of lighting and determine the extent of seabird fallout on vessels. If pre-defined trigger values for birds being attracted to vessels at night resulting in fallout are reached this will initiate review of the impact assessment and additional adaptive management depending on the species affected.</p>	Construction Operations Decommissioning
SNV-M03	Minimum Wind Turbine Generator Air Gap	<p>The project is committed to a minimum airgap (lowest blade tip clearance) of 35 metres above lowest astronomical tide for wind turbine generators to minimise collision risk to ornithology receptors and to minimise the risk of interaction with recreation vessel masts.</p>	Operations

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ID	Mitigation title	Mitigation description	Project phase
UWN-M03	Noise abatement system (NAS)	<p>Project will install a minimum spacing of wind turbine generators of 1,062 metres (set out in the final layout) to ensure that World Association for Waterborne Transport Infrastructure (PIANC) guidelines for safe navigation are met.</p> <p>The project will implement the best available NAS techniques at the point of construction that meets the noise level limit (refer UWN-M04) and is feasible for the site's water depths, metocean conditions, pile size and vessels, as detailed in the Construction Underwater Noise Management Framework. Currently the NAS includes a Double Big Bubble Curtain (DBBC), to ensure the efficacy of this NAS the SOTS project team will have a DBBC management procedure in place that will involve hose drilling, testing and flushing, visual assessments of bubbles, connection maintenance, compressor pressure monitoring, metocean monitoring and reporting to ensure that piling continues only while the DBBC is functional.</p>	Construction
UWN-M04	Noise level limit for pile driving activities and model validation	Piling activities will be managed to ensure that the noise level at set distances are equal to, or less than, those defined in the pre-construction modelling as per the Construction Underwater Noise Management Framework. Therefore demonstrating that the noise levels / zones of effect correspond appropriately to the precaution zone (as detailed in the Construction Underwater Noise Framework).	Construction
DEC-M01	Marine Decommissioning Management Plan	<p>A Marine Decommissioning Management Plan will be developed prior to decommissioning activities commencing to assess the impacts on the final agreed methodologies of removing offshore infrastructure. The plan will include:</p> <ul style="list-style-type: none"> • Details on marine infrastructure proposed to be removed or left in situ • Assess potential impacts of decommissioning activities for the removal or retention of infrastructure on protected matters • Specify how activities associated with decommissioning will be carried out in accordance with the project approval conditions • Describe measures to be implemented to avoid or reduce impacts arising from the removal of infrastructure (if required) • Consider management measures adopted in construction and apply where similar impacts could occur. 	Decommissioning

10.2 Monitoring and adaptive management

All monitoring that is planned addresses residual uncertainty in the assessment and supports effective adaptive management to ensure that project environmental outcomes are achieved, is summarised in Table 10-2.

Adaptive management may be required if monitoring identifies that residual impacts are occurring at levels greater than predicted and with potential to be inconsistent with the assessment criteria or exceed quantified allowable limits.

Table 10-2 Monitoring and adaptive management relevant to values of marine protected areas

Measure ID	Monitoring	Phase
MEMP-M03	Seabird Monitoring and Management Plan Seabird Monitoring and Management Plan (SMMP), including monitoring and adaptive management arrangements, will be developed and implemented prior to offshore construction. The SMMP will outline approaches and objectives of monitoring for the project key impacts and risks and approaches to management in the event that results indicate that additional measures are needed. Offsets will be developed as necessary and informed by strategies and actions outlined in National Species Recovery Plans and other plans of management.	Operation
MEMP-M05	Coastal Monitoring Precautionary monitoring of coastal change based on satellite imagery such as Geoscience Australia’s Digital Earth Australia database and/or the Victorian Coastal Monitoring Program (VCMP) database will commence 1 year prior to construction and will continue during the first 10 years of operation of the project to detect any changes to coastal landforms outside the range of natural variation (i.e. sediment accumulation and/or erosion). The Proponent will obtain and archive data from Digital Earth Australia and the Victorian Coastal Monitoring Program annually. Data will be analysed every three years for changes contrary to model predictions. As an adaptive management measure, should changes to the coastal system be identified (CPS-C01) as being due to the project (and not part of the natural variability or response to climate change), the Proponent will work with regulators to establish appropriate mitigation measures (or offsets).	Operation

11 CONCLUSION

The purpose of this technical report is to assess the potential impacts and risks to marine protected areas associated with the project to inform the preparation of the EIS/EES required for the project.

No construction activities are planned within marine protected areas. Project vessels will pass through some MPAs when transiting vessels to and from port facilities.

The assessment presented within this report has addressed those values of an MPA where potential impact and/or risk pathways have been identified in the relevant technical reports. Therefore, where a potential impact / risk has been identified for a receptor that is also a conservation value of importance for an MPA, then that impact / risk pathway has been assessed in this report. For example, potential impacts and risks associated with the presence of vessel operations within the OPA or transiting between ports and the OPA were considered relevant to the MPA assessment.

Conversely, underwater noise emissions from the installation of foundations (piling and drilling) was not considered a relevant impact pathway as this activity will be managed such that marine fauna impact thresholds are not exceeded beyond applied precautionary zones, including application of noise abatement systems (NAS) and monitoring (refer to EIS Attachment III - Construction underwater noise management framework).

The impacts for assessment considered relevant to the values of MPAs included:

- Vessel presence (within the OPA and transiting vessels) e.g. light, underwater noise, physical disturbance
- Changes to coastal processes.

Not all impacts were relevant to all the marine protected areas. For instance, vessel presence only applies to those marine protected areas that vessels may transit through and changes to coastal processes applies only to those marine protected areas along Victoria's coastline.

The risks for assessment considered relevant to the values of MPAs included:

- Introduction and establishment of IMS
- Accidental hydrocarbon spill from vessels or OSS during all phases of the project
- Contaminated surface water from shore crossing construction site
- Bird collision with turbines
- Vessel strike (with marine mammals).

Not all risks were relevant to all the marine protected areas. For instance, vessel strike only applies to those marine protected areas that vessels may transit through and the risk of impacts from a hydrocarbon spill from vessels or during operations is dependent on the volume released, weather conditions at the time of the spill and distance from the spill.

The impact and risk assessments found that identified impacts ranged from minor to negligible and risks from low to very low. The key findings of these assessments were that, with the mitigation and monitoring measures applied during the construction, operations and decommissioning of the Star of the South offshore windfarm, the impacts and risks meet the pre-defined assessment criteria for marine protected areas and are therefore considered acceptable.

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