STAR OF THE SOUTH OFFSHORE WIND FARM

Technical Report O: Infrastructure and co-existence with other users

Technical Report O:
Infrastructure and
Other Users
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Tables

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EXECUTIVE SUMMARY

Overview

Star of the South 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. 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* (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 this report are the:

- Commonwealth and Victorian marine environment within the Star of the South project area
- Petroleum exploration and production users
- Aviation users and operators
- Underwater power cable operators
- Research scientists
- Non-project vessels.

It was determined that the proposed action will be assessed by 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

The project area and surrounds supports various industry and other users. These include:

- A large petroleum industry including exploration and production activities. There are numerous operating petroleum platforms within the Gippsland Basin with associated pipelines.
- A submarine power cable, the Basslink Interconnector, that crosses the offshore project area.
- Vessels associated with the petroleum industry that travel from coastal ports to the platforms regularly, traversing the offshore project area for seismic surveys and routine maintenance and operations occur regularly within the region.
- The waters of the project area are used by Defence training vessels.
- Complex air routes including a Restricted Area associated with the RAAF Base East Sale and Yarram Aerodrome.
- Aviation activities including crew transfer via helicopter occur between aerodromes and heliports and offshore petroleum installations and vessels.
- Scientific research in Corner Inlet, which is used as a site for scientific research programs by several institutions. Research is also undertaken in the wider Gippsland region by divers.

It is noted that commercial shipping, commercial and recreational fishing, and business and tourism are discussed in other technical reports.

Impact assessment findings

An assessment of potential impacts associated with the project was completed, considering the existing environment within the study area and associated construction, operation and decommissioning activities. The assessment found the following potential impacts during construction activities:

- Underwater noise impact to divers
- Underwater noise impact to data quality
- Displacement or interaction with non-project vessels during construction and commissioning
- Interference with submarine power cables
- Displacement or interaction with aircraft.

Impacts to receptors from construction activities were assessed at a Negligible to Minor consequence. Construction noise resulting in petroleum maintenance or research divers diving in areas receiving underwater noise at a level above the human health assessment threshold for sound exposure (145 dB re 1 µPa (SPL) derived from Parvin 2005) was assessed a Negligible impact with the application of initial mitigations, including implementation of noise abatement systems during pile driving activities for monopile and jacket pile foundations and application of the DMAC 12 ‘Safe Diving Distance from Seismic Surveying Operations’ principles.

Displacement or interaction with non-project vessels associated with petroleum exploration were assessed to be Negligible through the application of initial mitigations including standard Australian and international maritime legislation.

Underwater noise impact to petroleum exploration and offshore wind survey data quality (for example geophysical data quality) due to underwater noise emissions during construction piling were assessed to be Negligible through the application of standard industry mitigations, for example simultaneous operations (SIMOPS) planning and line management plans.

Construction activities, for example installation of inter-array cables, was assessed to have a Minor impact to submarine power cables due to interference following the application of industry standard mitigations of co-existence agreements and the application of cable crossing infrastructure.

Impacts to aviation if turbines or construction equipment infringe the civil LSALT, Grid LSALT and PANS-OPS surface of Yarram Aerodrome would occur throughout the project life immediate to the OWFA. Without mitigation, these impact could be of Severe consequence. Key mitigations including raising the Grid LSALT, modifying Yarram Approach PANS-OPS surface and raising the LSALT of Defence areas. These mitigations would be further developed in consultation with CASA, Airservices Australia, airfield operators and Defence. The changes are expected to be inconsequential to current operations and reduce potential impacts to Minor. Aviation lighting would be used throughout the construction and commissioning stages.

The assessment found the following potential impacts during operations activities:

- Displacement or interaction with non-project vessels
- Interference with submarine power cables
- Displacement or interaction with aircraft
- Turbine blade interference with radar, communications and meteorological equipment.

Impacts to receptors from operations activities were assessed at a Negligible to Minor consequence. Displacement or interaction with non-project vessels associated with petroleum exploration were assessed to be Negligible through the application of initial mitigations including standard Australian and international maritime legislation.

Operational maintenance activities, for example maintenance of inter-array cables, was assessed to have a Minor impact to submarine power cables due to interference following the application of industry standard mitigations of co-existence agreements and the application of cable crossing infrastructure.

Once the wind farm is operational, radar signals can be reflected by wind turbines due to their size and rotation of turbine blades, which is often greater compared to the size of radars’ targets. This causes interference with radar images by presenting ‘clutter’ in radar images. Potential impacts to weather radar, and civil and military aviation radar were assessed as ‘moderate’. The project will continue to consult with

radar operators as the detailed design is progressed to determine whether interference modelling is needed and whether any mitigation is appropriate.

Decommissioning risks are considered to be broadly similar to that as discussed in the construction impact assessment section. Decommissioning will be progressively planned and budgeted for in accordance with Section 116 of the OEI Act, for the maintenance and removal of all property. It is acknowledged that there are uncertainties associated with full removal, with future activities subject to a Management Plan approved by the Regulator.

Cumulative impact assessment

Thirteen potential cumulative impact projects were identified within the Zone of Influence of the project. Based on the screening process, one potential project, the Great Eastern Offshore Wind Farm Project by Corio Generation, was short-listed for an assessment. Great Eastern is of a very similar type and scale to Star of the South and expected to have similar impacts to the same receptors.

Cumulatively, simultaneous piling activities could increase the extent of the area impacted by underwater noise within the region, result in overlapping ensonified areas, and reduce the time between noise generating activities, when other activities could occur. As it would for individual projects, the coordination and management of diving or survey activities during piling will rely on communication and engagement with proponents, and development of SIMOPS Plans, where necessary.

The Basslink Interconnector route traverses the eastern part of the proposed OWFA and the Great Eastern Offshore Windfarm area. Standard operating procedures to manage SIMOPs between the projects will minimise disruption and the potential cumulative impact to submarine power cable operators is considered to be Minor.

Cumulatively, there is an increased extent of the potential impact on airspace. The offshore wind turbines potentially infringe an approach PANS-OPS surface of Yarram Airport, the Grid Lowest Safe Altitude (LSALT) and RAAF Training Areas' LSALT. Any amendment of these administrative controls for one offshore windfarm would likely also address potential impacts from other offshore windfarms. This was assessed as a moderate impact, being of a medium to large scale and long-term, but reversible at the end of operation.

Cumulatively, there is also an increased extent of the potential impact on existing Defence and weather radar. Star of the South will continue consultation with stakeholders once the final turbine layout determined and prior to construction commencing, to determine if mitigations would be required.

There is also a cumulative increase in the extent of potential displacement of industry vessels and increased interaction with non-project vessels during construction or operation activities. However, these impacts are expected to be minor, due to the separation of project work areas and the ability to navigate freely in the areas between.

Conclusion

Potential impacts to offshore infrastructure and other users due to the project would be avoided, minimised or managed through the mitigation measures recommended in this technical report.

In relation to the evaluation objectives set out in the Star of the South EIS Guidelines and EES Scoping Requirements, it is considered that the project would not have significant impacts on infrastructure and other users with the application of the recommended mitigations.

ACRONYMS AND ABBREVIATIONS

Term	Definition
AC	Alternating current
AIA	Aviation Impact Assessment
AMSA	Australian Maritime Safety Authority
ASA	Airservices Australia
BoM	Bureau of Meteorology
CASA	Civil Aviation Safety Authority
CMATS	Civil Military Air Traffic Management System
CNS	Communication, Navigation and Surveillance
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
DAWE	Commonwealth Department of Agriculture, Water and Environment
DAWR	Department of Agriculture, Water and Resources
DBBC	Double big bubble curtain
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEECA	Victorian Department of Energy, Environment and Climate Action
Defence	Australian Department of Defence
DELWP	Department of Environment, Land, Water and Planning
DISER	Commonwealth Department of Industry, Science, Energy and Resources
DJSIR	Victorian Department of Jobs, Skills, Industry and Regions
DMAC	Diving Medical Advisory Committee
DoE	Department of the Environment
DOEE	Department of the Environment and Energy
DSE	Department of Sustainability and Environment
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EE Act	*Environment Effects Act 1978*
EES	Environmental Effects Statement
EEZ	Exclusive economic zone
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP Act	*Environment Protection Act 2017* (VIC)
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Environmentally sustainable development
FRDC	Fisheries Research and Development Corporation
GED	general environmental duty
HDD	Horizontal directional drilling
HQJOC	Defence's Headquarters, Joint Operations Centre
IMOS	Integrated Marine Observing System
ISO	International Organization for Standardization
JASCO	Jasco Applied Sciences
JRCC	AMSA's Joint Rescue Coordination Centre
LSALT	Lowest safe altitude
MARPOL	The International Convention for the Prevention of Pollution from Ships

Term	Definition
MDS	Maximum design scenario(s)
MNES	Matter of National Environmental Significance
MSV	Maritime Safety Victoria
NASF	National airports safeguarding framework
NATPLAN	National Plan for Maritime Emergencies
NEM	National Electricity Market
NM	Nautical mile
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
NSW	New South Wales
OECA	Offshore export cable area
OEI Act	*Offshore Electricity Infrastructure Act 2021*
OLS	Obstacle Limitation Surface
OPA	Offshore project area, including both the offshore wind farm area and offshore export cable area
OPGGS(E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023
OSS	Offshore substation
OWFA	Offshore wind farm area
PANS-OPS	Procedures for Air Navigation Services – Aircraft OPerationS
PAWSA	Ports and Waterways Safety Assessment
PDE	project design envelope
PSR	Primary Surveillance Radar
RAAF AIS	Royal Australian Air Force Aeronautical Information Service
RNAV	Area navigation
ROV	Remotely operated vehicle
SAR	Search and rescue
SIMOPS	Simultaneous operations
SOLAS	International Convention for the Safety of Life at Sea 1974
STV	Safe Transport Victoria
VIC	Victoria
WTG	Wind turbine generator

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)
As low as reasonably (ALARP)	The point at which there are no other practicable measures that could reasonably be taken to further reduce environmental risks
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 and ALARP levels.
HLS	Helicopter land site.
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).
Local offshore infrastructure	Structures, equipment and systems installed in the Gippsland marine environment, including pipelines, rigs and platforms associated with petroleum exploration and

Term	Definition
	production, offshore wind turbines, and subsea communication and electricity transmission cables.
Magnitude	A combination of geographical extent, duration and severity of an impact. • 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.
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	The offshore export cable area contains offshore export cable corridors, within which the offshore export cables connecting the offshore wind farm to the onshore transmission system would be installed.
Offshore project area	The maximum offshore geographical extent that would be used for the development of the project, including permanent structures and areas used for construction and operation works. This area comprises both the offshore export cable area and the Offshore Wind Farm Area
Offshore wind farm area	The area covered by the Feasibility licence granted to Star of the South for site investigations comprising an area of 586 km^2, located approximately 30 kilometres from the central Gippsland Coast, south of Yarram and Port Albert
Primary approval	The primary approvals are the key state and Commonwealth approvals that address the acceptability of the project from a planning and environmental perspective and must be obtained before the project can proceed. They include: • Environmental Planning and Biodiversity Conservation Act approval (Cth) • Marine and Coastal Act approval (State) • Planning Scheme Amendment (State)
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. In close proximity to the project includes Corner Inlet Ramsar Site and Western Port Ramsar Site.
Receptor	The physical or biological resource or user group that could be impacted by the project, both positively or negatively.
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.
Restricted airspace	A designated area within the airspace where air traffic is restricted or prohibited due to safety or security concerns, often used by the military for training exercises, and access to this area usually requires prior authorisation and coordination with relevant authorities.

Term	Definition
Risk	The effect of an accident occurring and can be both positive or negative. 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).
Sensitive receptor	An environmental and socioeconomic feature (receptor) that could be subject to negative or positive impacts from the project
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	Belt of water 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.
Study area	All locations that may potentially be impacted by Project activities.
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
Scoping requirements	The Scoping Requirements for Star of the South Offshore Wind Farm Environment Effects Statement
The guidelines	The Guidelines for the Content of an Environmental Impact Statement for Star of the South Offshore Wind Farm 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 infrastructure and co-existence with other users (offshore) to inform the preparation of the EIS and EES required for the project. Infrastructure and other users covered within the scope of this report are:

- Aviation
- Radar and communications systems
- Petroleum exploration and production
- Scientific research
- Submarine power cables
- Non-project vessels associated with local offshore infrastructure.

Traditional owners, commercial and recreational fishing vessels, shipping and navigation, business and tourism are covered within separate technical reports.

This technical report:

- Presents the existing environmental baseline established from desktop studies and consultation.
- Presents the potential environmental impacts on infrastructure and co-existence with other users including the petroleum industry, research, submarine power cables and other marine users arising from the project during the construction, operation and decommissioning phases.
- Identifies any assumptions and limitations encountered in undertaking this assessment.
- Recommends any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIS/EES process.

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 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. Specific project parameters that have informed this technical study are detailed in Section 7 of this report.

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 both offshore and onshore infrastructure. The offshore infrastructure extends from the shore crossing at Reeves Beach, to the offshore wind farm area. The offshore wind farm occupies a 586 square kilometre area, where the turbines and offshore substations are located, as shown in Figure 2-1.

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 shown in Figure 2-1.

Star of the South Wind Farm is a complex project subject to various design and engineering tasks, technology choices and market trends in the planning and development phase. The design and engineering options available are dependent on the specific conditions and environmental factors at the site. The detailed design of the project will be finalised following state and Commonwealth environmental assessment and approvals processes.

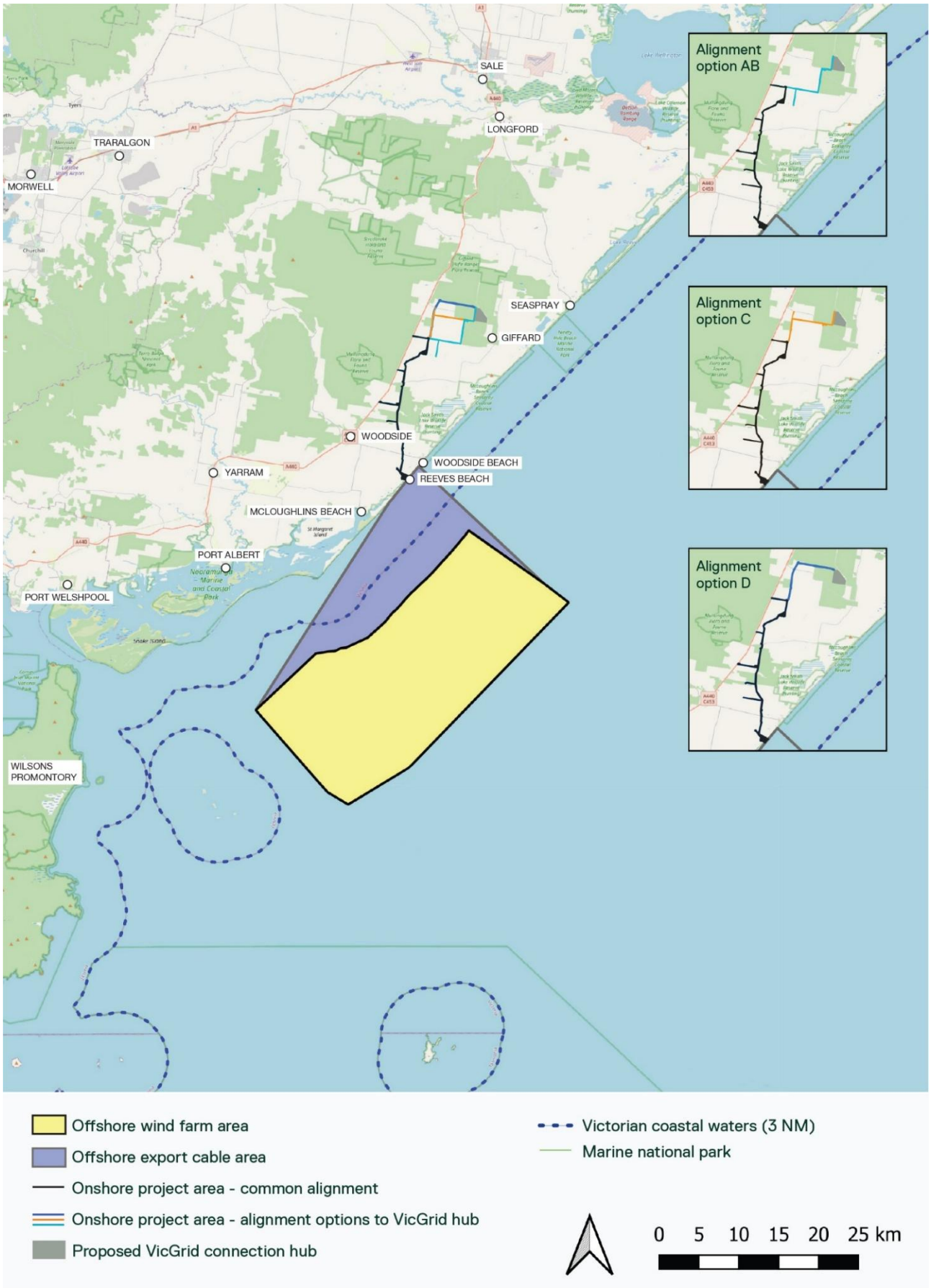


Figure 2-1 Project location

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. A description of how avoidance of impact has informed the design in relation to infrastructure and other users can be found in Section 5.6.

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.

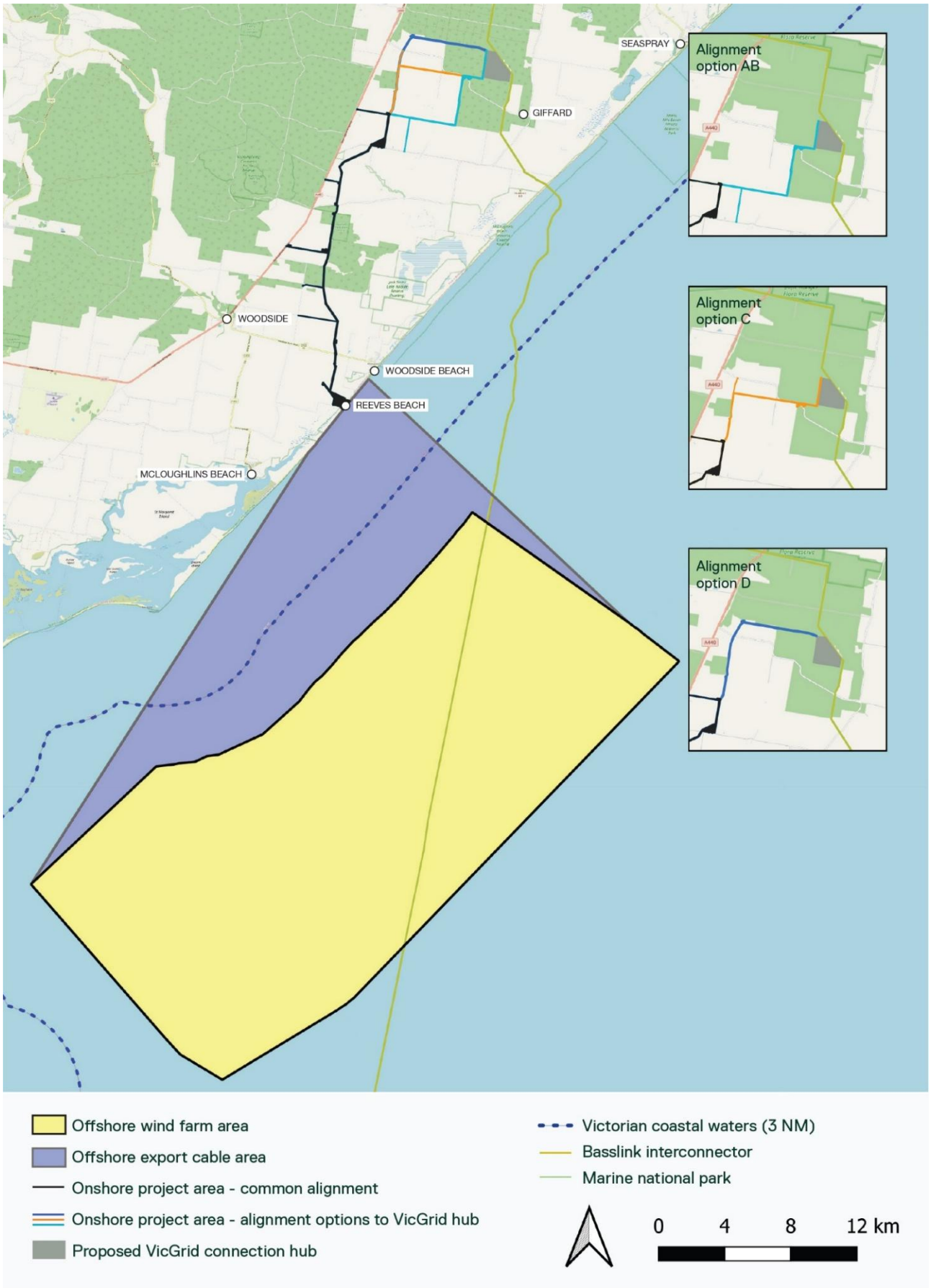


Figure 2-3 Project overview

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.

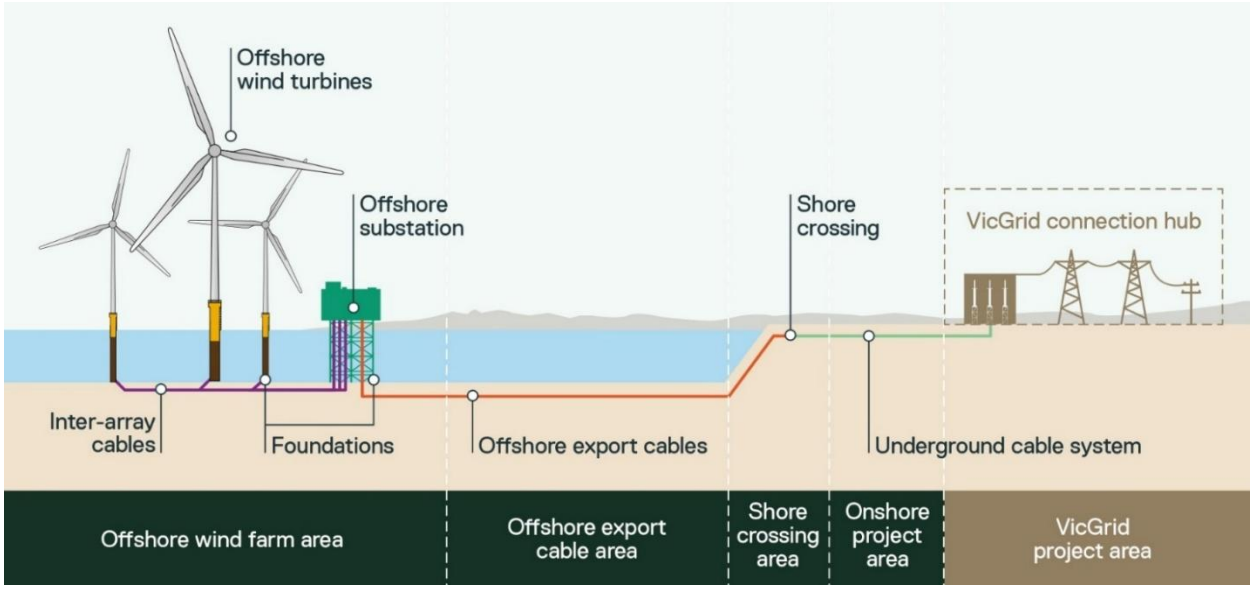


Figure 2-4 Project components

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 timing

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 duration

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.

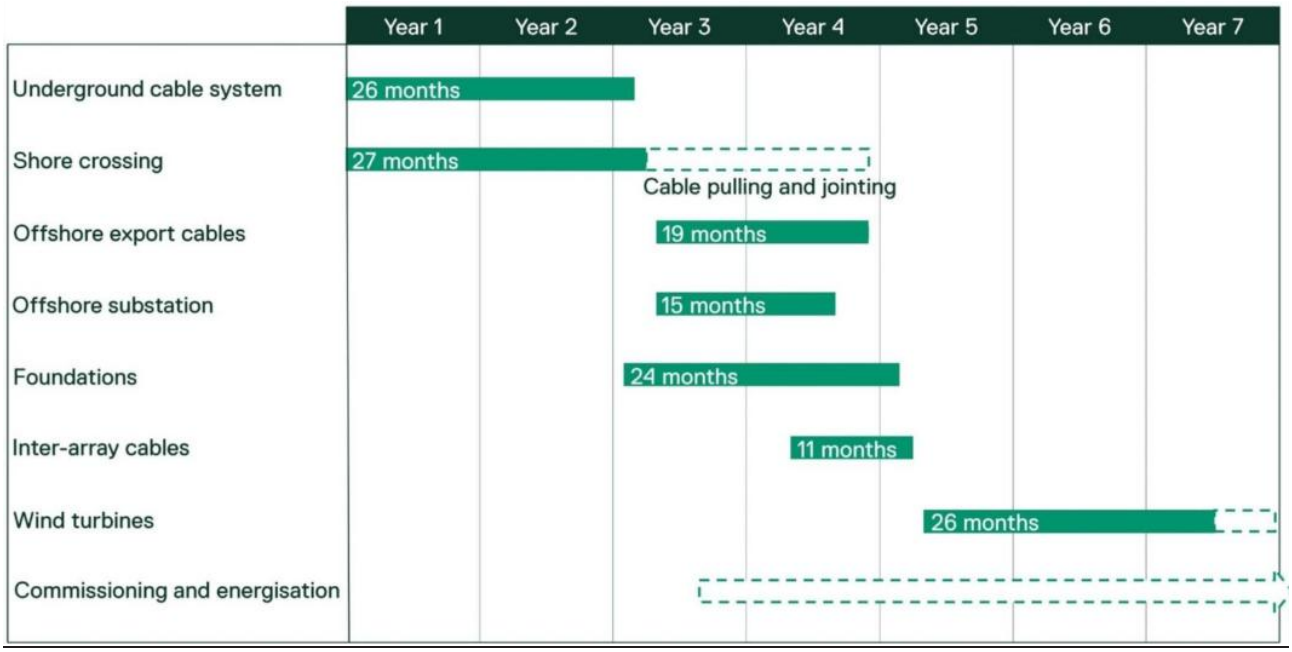


Figure 2-6 Indicative construction schedule

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 infrastructure and other users, 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 advices 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 of the 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 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 assessment of impacts to infrastructure and other users 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
A description of the general environment of the proposal site and the surrounding areas that may be affected by the action, in both the short and long term.	Section 6
Detail of the commercial use of the Gippsland Basin and Bass Strait	Section 6
Details of existing anthropogenic uses of the Gippsland Basin and Bass Strait	Section 6
A description of the Commonwealth Marine environment relevant to the action including the social, economic and cultural aspects of the environment	Section 6
Characterise the extent, intensity and duration of impacts of the action on existing users of the marine environment	Sections 7.4 to 11
The extent, intensity and duration of impacts of the action on existing users of the marine environment (e.g., commercial and recreational fishers, marine tourism, shipping and navigation, commercial and defence aircraft)	Sections 7.4 to 11
Potential impacts which may arise through the transportation, storage and use of dangerous goods (if any), fuels and chemicals, such as accidental spills	See Section 5.2
Potential impacts from underwater disturbance (noise)	Sections 7.4 to 11
Identify and address cumulative impacts	Section 11
The EIS must include a consolidated list of measures proposed to be undertaken to prevent, minimise, mitigate or compensate for the relevant impacts of the action	Section 13
An assessment of the expected or predicted effectiveness and achievability of each proposed avoidance or mitigation measure including timeframes for achieving effectiveness.	Section 13

Requirement	Section addressed
An evaluation of whether residual impacts (following the application of mitigation measures) are consistent with the defined acceptable levels of impact relevant to the action.	Sections 7.4 to 11
Description of the environmental outcomes the measures are expected to achieve including details of any baseline data, environmental indicators and proposed monitoring to demonstrate progress towards achieving these outcomes.	Sections 7.4 to 11
A description of the measures proposed to be undertaken by the proponent that have been proposed by state or local governments.	Section 13
Describe how the adaptive management strategies will be implemented to ensure MNES are effectively protected over the life of the project.	Section 13.2

The whole of the environment within the Commonwealth Marine Area is considered a Matter of National Environmental Significance (MNES), as a result the EIS presents 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 Chapter 24 – EIS summary and conclusions of the EIS for the whole of project assessment across the Commonwealth jurisdiction.

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') 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 objectives are relevant to infrastructure and co-existence with other users (offshore):

- To avoid and minimise adverse effects on land use, social fabric of the community, local infrastructure, and local businesses and tourism during construction, operation and decommissioning of the project.
- To avoid, or minimise where avoidance is not possible, adverse effects on community amenity and health and safety, with regard to noise, vibration, dust, the transport network, fire risk management and electromagnetic radiation.

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 for Infrastructure and co-existence with other users

Aspect	Scoping requirement	Section addressed
Key issues	Potential disruption to existing and/or proposed land uses, with associated economic and social effects.	Sections 7.4 to 11
	Potential for adverse effects resulting from project-related noise or vibration at sensitive receptors during construction and operation.	
	Managing [marine] traffic disruptions for residents, businesses and travellers during the construction of the project.	
Priorities for characterising the existing environment	Describe the Offshore Wind Farm Area and its environs in terms of land use (existing and proposed), residences, zoning and overlays and public infrastructure that support current and strategic patterns of economic and social activity.	Section 6
	Describe the local community and social setting, including businesses and industry within the area.	
	Describe the existing, approved and committed transport network in and around the project, including proposed construction transport route options, in terms of capacity, condition, accessibility and potentially sensitive users.	

Aspect	Scoping requirement	Section addressed
	Identify sensitive receptors that could be affected by noise, dust or electromagnetic radiation from project construction or operation.	
Assessment of likely effects	Identify potential long and short-term effects of the project on existing and potential land uses and public infrastructure.	Sections 7.4 to 11
	Assess the potential effects of the project on noise and vibration amenity at sensitive receptors during construction and operation, including thorough consideration of relevant EPA publications.	
	Assess the potential effects of construction activities on the transport network, including safety, amenity and accessibility impacts.	Section 7.4
	Assess the potential cumulative impacts with other existing and proposed developments in the region	Section 11
Design and mitigation measures	Outline measures to minimise potential adverse effects of the project and enhance benefits to the community and local businesses and industry.	Section 13
	Describe and evaluate both potential and proposed design responses and/or other mitigation measures (for example, staging/scheduling of works) which could minimise noise and vibration during construction and operation.	
	Predictions of residual effects of the project assuming implementation of proposed environmental management measures	Sections 7.4 to 11
Approach to manage performance	Describe proposed measures to mitigate, offset or manage social, land use and economic outcomes for communities living, and businesses operating, within the Offshore Wind Farm Area and its environs as well as proposed measures to enhance beneficial outcomes.	Section 13

3.2 Legislation, policy, guidelines and standards

The legislation, policy, guidelines and standards relevant to this assessment are summarised in Table 3-3.

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

Document title	Summary	Relevance to project
Commonwealth Government		
Airports Act 1996	The purpose of this Act is to establish a system for the regulation of airports and promote the sound development and operation of airports in Australia.	Constructing a building or other structure that protrudes into a prescribed airspace is defined as a 'controlled activity'. A person must not carry out a controlled activity in relation to a prescribed airspace. A person must give notification to the operator of an airport regarding carrying out a controlled activity in a prescribed airspace. Part 4 – Notification and approval of controlled activities (Airports (Protection of Airspace) Regulations 1996) outlines the application and submission process for intruding in a prescribed airspace.
Australian Maritime Safety Authority Act 1990	The objectives of this Act are to: • Promote maritime safety; and • Protect the marine environment from: – pollution from ships; and – other environmental damage caused by shipping; and • Provide for a national search and rescue service; and • Promote the efficient provision of services by the Authority.	In Commonwealth waters the Australian Maritime Safety Authority (AMSA) is the Statutory Agency for vessels and must be notified of all incidents involving a vessel.
Defence Act 1903	Regulates the Naval and Military Defence aspects of protecting the Commonwealth and the several States. This Act applies to, and in relation to, the Navy, Army and Air Force.	Section 117AD – Regulations in relation to Defence aviation areas. A declaration of an area may specify height restrictions that apply in relation to buildings, structures and

Document title	Summary	Relevance to project
		objects (including trees and other natural obstacles) within the area. The regulations may prescribe matters in relation to the following: (a) the regulation or prohibition of the construction or use of buildings, structures or objects within Defence aviation areas; (b) the regulation or prohibition of the bringing of objects into, or having objects within, Defence aviation areas; (c) the removal (in whole or in part), marking, lighting, screening, modification or relocation of buildings, structures or objects (including trees or other natural obstacles) within Defence aviation areas.
Environment Protection and Biodiversity Conservation Act 1999 (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.
Navigation Act 2012	Regulates international ship and seafarer safety, shipping aspects of protecting the marine environment and the actions of seafarers in Australian waters. It gives effect to the relevant international conventions (MARPOL 73/78, COLREGS 1972) relating to maritime issues to which Australia is a signatory. The Act also has subordinate legislation contained in Regulations and Marine Orders.	Several Marine Orders are enacted under this Act relating to offshore activities, including: • Marine Order 21: Safety and emergency arrangements • Marine Order 27: Safety of navigation and radio equipment • Marine order 28: Operations standards and procedures • Marine Order 30: Prevention of collisions • Marine Order 31: Vessel surveys and certification • Marine order 57: Helicopter operations • Marine Order 58: Safe management of vessels • Marine order 70: Seafarer certification.
Offshore Electricity Infrastructure Act 2021 (Cth)	The OEI Act regulates offshore infrastructure used to generate electricity including wind farms, and infrastructure used for transmitting or storing electricity or energy offshore. The Act provides a framework for the construction, operation, maintenance and decommissioning of offshore electricity projects. 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: • Commercial use (with a feasibility license being a pre-requisite for scoping activities) • Research/ demonstration • Transmission and infrastructure.	The OEI Act sets out the licensing and regulatory framework for the construction, installation, operation, maintenance and decommissioning of the project.
Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (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.

Document title	Summary	Relevance to project
Sea Installations Act 1987 (Cth)	Ensures that installations are operated with regards to the safety of people, ships and aircraft near them and applies appropriate laws relevant to installations in the sea	Provides protection of people, ships and aircraft in the vicinity of offshore infrastructure associated with the proposed development.
Victorian Government		
Environment Effects Act 1978 (VIC)	Requires certain public works to have an environmental impact assessment carried out before proceeding. It was amended by the *Environment Effects (Amendment) Act 2005*.	Determined that an Environment Effects Statement (EES) be prepared for the project.
Environment Protection Act 2017 (VIC)	The EP Act aims to protect Victoria's air, water and land by adopting a 'general environmental duty' which imposes a broad obligation on entities and individuals to take proactive steps to understand and minimise risks of harm to human health and the environment from pollution or waste. The Victorian Environment Protection Authority (EPA) administers the EP Act and subordinate legislation.	The EP Act regulates discharges to land, surface water and groundwater by a system of development and operating licences. Any discharge into a waterway or groundwater during the construction or operation of the project must be in accordance with the requirements of the EP Act. The general environmental duty (GED) requires all reasonably practicable steps be taken to minimise impacts from the construction and operation of the project. Principles of environment protection and duties relating to environment protection are relevant to potential impacts from oil spills described in Sections 9 and 10.
Environment Protection Regulations 2021 *(VIC)*	The Regulations further the purposes of, and give effect to, the Environment Protection Act 2017 through various prescriptions, provisions and obligations	Regulates the discharge or deposit of waste from vessels used in the project, within Victorian waters
Marine and Coastal Act 2018 (VIC)	Protection and enhancement of the Victorian marine and coastal environment between the outer limit of Victorian coastal waters (3 NM) and 200 metres inland of the high-water mark of the sea.	Establishes the following principles that are relevant to the project: • 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 available environmental, social and economic information • That management of impacts incorporate the precautionary principle. • That risk management and regulatory approaches be proportionate to the risk involved.
Marine Safety Act 2010 (VIC)	Provides for safe marine operations in Victoria through a range of measures including the regulation and management of navigation, safety duties and vessels.	Establishes the regulatory framework through which potential impacts associated with vessels activities within the OECC are managed.
Ministerial guidelines for assessment of environmental effects under the *EE Act 1978*	Supplements the requirements of the EE Act by providing detail about the administration of the EES process.	Referred to in the Scoping Requirements for Star of the South Offshore Wind Farm Environment Effects Statement, e.g. for definition of Ecologically sustainable development (ESD).
National Parks Act 1975 (VIC)	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.
Pollution of Waters by Oils and Noxious	The purpose of this Act is to make certain provisions for the protection of the sea and certain waters from pollution by oil	Sets pollution prevention and discharge management requirements for vessels used in the project, within Victorian waters

Document title	Summary	Relevance to project
Substances Act 1986 (VIC)	and other noxious substances and to implement the MARPOL Convention.	
Pollution of Waters by Oil and Noxious Substances Regulations 2022 (VIC)	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
Guidelines		
CASR Part 139 Manual of Standards – Aerodromes, Chapter 11	Sets out the general requirements for navigation aid sites and air traffic service facilities, including the clearance area for planned and existing facilities.	This guideline needs to be considered by proponents of tall structures. In particular, Chapter 7 sets out obstacle restrictions and Chapter 19 describes protection of Communication, Navigation and Surveillance (CNS) facilities which has been considered in the Aviation Impact Assessment (AIA), Appendix C.
National airports safeguarding framework (NASF) Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation 2012.	Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers.	When WTGs over 150 m above ground level are to be built within 30 km of a certified or registered aerodrome, the proponent should notify the Civil Aviation Safety Authority (CASA) and Airservices Australia. If the wind farm is within 30 km of a military aerodrome, Defence should be notified. Where a WTG 150 m or taller in height is proposed away from aerodromes, the proponent should conduct an aeronautical risk assessment.
NASF Guideline F; Managing the risk of intrusions into the protected airspace of airports	This document provides guidance to decision makers and airport operators to address potential intrusions into protected airport airspaces.	The content in this guideline is also covered by NASF Guideline D in the context of this project.
NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)	The guideline provides land use planning information to enable protection of CNS facilities which support the systems and processes in place by Airservices Australia (Airservices), the Department of Defence (Defence) or other agencies under contract with the Australian Government, to safely manage the flow of aircraft into, out of and across Australian airspace.	The guideline has to be considered when conducting and AIA for the project.
Department of Transport and Planning (Vic), Planning Guidelines for Development of Wind Energy Facilities, 2023.	The guidelines provide guidance to proponents to the policy and planning process for wind farms in Victoria.	The guidelines indicate consultation guidance for key stakeholders and key issues that should be considered in the development of the Project.
Ministerial guidelines for assessment of environmental effects under the EE Act 1978	Supplement the requirements of the EE Act by providing detail about the administration of the EES process.	Referred to in the Scoping Requirements for Star of the South Offshore Wind Farm Environment Effects Statement, for example for definition of Environmentally Sustainable Development.
AMSA's Policy on Offshore Renewable Energy Infrastructure (AMSA, 2024a)	Explains how to address navigation risks around offshore renewable energy infrastructure, addressing lighting and marking and requirements when nearby search and rescue and other emergency response operators.	Identifies guidelines related to lighting and marking, expectations for consultation with AMSA, recommends measures for safe navigation and to allow effectives SAR or emergency response and identifies information which should be provided to AMSA to assist them in assessing the proposal.

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 and have been derived from:

- 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 under the Environment Effect Act 1978* (DTP 2023) and in section 3A of the EPBC Act.
- Recovery and conservation management plans for threatened species and environments.
- Relevant standards and guidelines see Section (3.2)
- Stakeholder feedback (see Section 4)
- Industry best practice.

Assessment criteria will be developed in accordance with the General Environmental Duty requirements of the *Environment Protection Act 2017 (Vic)*.

Assessment criteria are 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 assessment of impacts to infrastructure and other users have largely been guided by Legislative requirements, Star of the South internal policies, social acceptance criteria and industry best practice, for example advice given by the Diving Medical Advisory Committee (DMAC).

Table 3-4 Assessment criteria for infrastructure and other users

Receptor	Source of assessment criteria	Assessment criteria	Potential impacts/ risks
Petroleum exploration and production Research and recreational divers Submarine power cables	DMAC	A divers noise exposure from construction noise due to the project would not: • Interfere with diver communications; • Exceed acceptable noise exposure levels be; • Induce discomfort; or • Place the diver at risk in any other way.	Maintenance divers associated with the petroleum or submarine power cable industries, or research divers, are within an area that may receive sound levels above the human health assessment threshold for divers.
	Legislative requirements	• Development is consistent with the principles of ecological sustainability • Planning and management decisions are based on the best available environmental, social and economic information. • Management of impacts incorporates the precautionary principle. • Interference with other activities is not greater than is reasonably necessary for the completion of the project	
Petroleum exploration and production	Star of the South internal context	• Activities and equipment are limited to within the project area • Parameters do not exceed those described in the maximum design scenario • Stakeholders have sufficient time and opportunity to comment on the project including raising of objections or claims	Displacement or interaction with other users of the project area resulting in financial loss to the users.
	Legislative requirements	• Project vessel activities are compliant with maritime law relating to navigation and safety • Development is consistent with the principles of ecological sustainability	

Receptor	Source of assessment criteria	Assessment criteria	Potential impacts/ risks
		• Planning and management decisions are based on the best available environmental, social and economic information. • Management of impacts incorporates the precautionary principle	
	Social acceptance	• Existing infrastructure users of the project area are not disadvantaged by the development of the project.	
Petroleum and offshore wind exploration	Social acceptance	• Existing infrastructure users of the project area are not disadvantaged by the development of the project.	Underwater noise from construction activities resulting in a reduction of data quality used for petroleum exploration purposes (for example seismic surveys)
	Legislative requirements	• Development is consistent with the principles of ecological sustainability • Planning and management decisions are based on the best available environmental, social and economic information. • Management of impacts incorporates the precautionary principle.	
Submarine power cables	Social acceptance	• Existing infrastructure users of the project area are not disadvantaged by the development of the project.	Seabed construction activities, including cable laying activities resulting in interference or damage to submarine power cables
	Legislative requirements	• Development is consistent with the principles of ecological sustainability • Planning and management decisions are based on the best available environmental, social and economic information. • Management of impacts incorporates the precautionary principle.	
Non-project vessels	Star of the South internal context	• Activities and equipment are limited to within the Offshore project area (OPA) • Parameters do not exceed those described in the maximum design scenario • Stakeholders have sufficient time and opportunity to comment on the Project including raising of objections or claims	Displacement or interaction with other users of the OPA resulting in financial loss to the users.
	Legislative requirements	• Project vessel activities are compliant with maritime law relating to navigation and safety • Development is consistent with the principles of ecological sustainability • Planning and management decisions are based on the best available environmental, social and economic information. • Management of impacts incorporates the precautionary principle	
	Guidelines	• Notification and communication of safety or protection zones with existing marine users and relevant government agencies is made in accordance with the OIR Safety and Protection Zones Guideline 2024. •	
	Social acceptance	• Existing infrastructure users of the Project area are not disadvantaged by the development of the Project.	
Aircraft	Legislative requirements	• Project aircraft activities are compliant with aviation law relating to navigation and safety	Displacement or interaction with aircraft

Receptor	Source of assessment criteria	Assessment criteria	Potential impacts/ risks
		• Stakeholders are given sufficient time and information regarding the development in accordance with the Airports (Protection of Airspace) Regulations 1996.	
	Guidelines	• When WTGs over 150 m above ground level are to be built within 30 km of a certified or registered aerodrome, the proponent should notify CASA and Airservices Australia. If the wind farm is within 30 km of a military aerodrome, Defence should be notified. • Where a WTG 150 m or taller in height is proposed away from aerodromes, the proponent should conduct an aeronautical risk assessment. • Notifications are made in accordance with the criteria set out in NASF Guideline D.	
Radar and communications	Guidelines	• If WTGs are proposed to be developed within the Building Restricted Area of a CNS facility, details are referred to Airservices Australia or Defence to allow them to assess the impact.	Interruption to civil aviation communication, military aviation communication, weather radar or Search and rescue operations due to radar interference or loss

4 CONSULTATION AND ENGAGEMENT

Star of the South has undertaken extensive engagement with a broad range of stakeholders and communities throughout the project's development phase and preparation of the EIS/EES to communicate project information; obtain, understand and discuss feedback; and identify potential issues and opportunities for consideration in the EIS/EES. A summary of this engagement is documented in EIS Attachment II - Consultation report and EES Attachment II - Consultation report.

Consultation specific to infrastructure and co-existence with other users has also been undertaken with identified stakeholders to inform this report. A summary of this engagement is provided below.

Engagement activities

Key activities undertaken between 2019 and 2025 to engage with identified stakeholders include:

- Letters to more than 12 stakeholders requesting information and feedback on the project, including oil and gas operators, marine survey organisations and aviation services
- Direct stakeholder engagement, including phone calls, emails, meetings, presentations and workshops
- Ports and Waterways Safety Assessment (PAWSA) workshops to seek feedback on maritime uses (refer to *Technical report P - Shipping and navigation*)
- Sharing information about the project via the project's website, social media and monthly e-news
- Presence at community events and pop-up stalls across Gippsland
- Community information sessions.

Stakeholders

Key stakeholders identified and engaged on this report include:

- 3D Oil Limited
- Emperor Energy Limited
- Air Services Australia
- APA / Basslink
- Australian Maritime Safety Authority (AMSA) Joint Rescue Coordination Centre (JRCC)
- Beach Energy
- Bureau of Meteorology (BoM)
- CarbonNet
- Carnarvon Hibiscus
- Civil Aviation Safety Authority (CASA)
- Coast Guard – Port Albert, Port Welshpool
- Cooper Energy Pty Ltd
- CSIRO
- Department of Defence
- Integrated Marine Observing System
- ESSO Australia Resources
- Latrobe Regional Airport
- Liberty Petroleum Corporation
- Recreational users including community, yacht clubs, diving clubs, fishers and boaters.
- Royal Australian Air Force Aeronautical Information Service

- SGH Energy
- West Sale Airport
- Yarram Aero Club Inc
- Yarram Aerodrome

Table 4-1lists specific feedback and how this feedback has been applied to the assessment of impacts on infrastructure and other users.

Table 4-1 Summary of consultation issues raised relevant to infrastructure and co-existence with other users

Stakeholder/partner and type of response	Issues raised	Response to issues raised and/or where considered within this report or associated appendices.
Community - various	Interest in the type and extent of aviation lighting on turbines. Ability for helicopters to navigate the wind farm for search and rescue operations.	Assessed in Sections 8.5 and 9.3
Australian Maritime Safety Authority (AMSA)	Potential for project infrastructure to create risks to safe search and rescue operations within the wind farm area. AMSA to discuss indicative wind farm layout with the AMSA Joint Rescue Coordination Centre for further feedback.	Star of the South shared indicative layout and draft guiding principles for turbine layout, lighting and marking. The project will continue discussions with AMSA and JRCC.
	AMSA would be required to take a risk-based approach if the project considers any offshore infrastructure lighting and marking outside of the IALA Guidance G1162.	Star of the South will continue discussions with AMSA and CASA on required lighting and marking. See Section 7.1.2 and Technical Report P: Shipping and Navigation
APA (Basslink)	Disruption to BassLink assets during project construction and operations. This includes undersea cables, access routes, turbines and associated works.	The development of an exclusion zone for the project in agreement with Basslink operators. Cable burial risk assessment would consider Basslink assets. Develop a Co-Existence Agreement with Basslink. Ongoing engagement with asset owner. See Sections 8.4 and 9.2
	Request for agreement on measures to minimise potential impacts to as low as reasonably practicable prior to any construction activities taking place in proximity to Basslink.	Development of a Co-Existence Agreement prior to construction. Ongoing engagement with asset owner.
	Request for an agreed buffer either side of the Interconnector during any project activities.	Development of a Co-Existence Agreement prior to construction. Ongoing engagement with asset owner.
	Agreed requirements to ensure integrity and operational capacity, including repair access of Basslink.	Development of a Co-Existence Agreement prior to construction. Ongoing engagement with asset owner.
	Potential risks with the project's inter-array cables crossing the BassLink Interconnector. The number of crossings and how those crossings are undertaken must not interfere with access to the Interconnector.	Project design was updated - bundle inter-array cables within the licence area to minimise the number of crossings (see EIS Chapter 4). Ongoing engagement with asset owner.
	Impacts to BassLink Interconnector repair times due to presence of wind farm assets.	The development of an exclusion zone for the project in agreement with Basslink. Project design was updated - bundle inter-array cables within the licence area to minimise the number of crossings (see EIS Chapter 4). Ongoing engagement with asset owner.

Stakeholder/partner and type of response	Issues raised	Response to issues raised and/or where considered within this report or associated appendices.
	Risk of impact to the BassLink Interconnector if shore crossing location is co-located at McGaurans Beach. Potential for cables to cross in shallow water.	Project design was updated - the proposed shore crossing is located at Reeves Beach to avoid the requirement of a near-shore crossing of the Basslink Interconnector's export cable at McGaurans Beach (see Section 2).
Bureau of Meteorology	Decreased ability for the BoM Bairnsdale radar to detect weather events in the vicinity of Wilsons's Promontory due to the presence of turbines.	Star of the South to continue engagement with BoM and share final turbine layout design, to determine if specialist modelling is required. See Section 9.3.
CarbonNet	Positioning of project infrastructure to limit conflict and allow co-existence of assets.	The project will identify opportunities to co-locate and/or identify no-go areas around some infrastructure through the implementation of a Co-existence Agreement prior to construction.
	Potential impacts or disruptions to either project without prior planning during construction and operations.	The project will develop an MoU around activities in the overlap area and activities outside that area that may impact the other party. The MoU will outline communication and information sharing, and provisions around working towards a Co-existence agreement prior to construction.
CASA	Consideration of lighting strength required for the project. A radar detection lighting system would be welcomed.	The project will continue engagement with CASA regarding final lighting concept for the turbines.
	Potential impacts to oil and gas operators, as helicopters would fly between offshore oil fields in Gippsland and Sale/other areas.	Esso and Cooper Energy have been contacted regarding their petroleum production platforms in the Gippsland. There has been no response at this time. Helicopters have been included in the AIA (Appendix C).
	The project will need to take into consideration guidance notes including Department of Infrastructure "National Airports Safeguarding Framework principles and guidelines, Guideline D - Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation.	Guideline D is referred to in the development of a lighting plan for the windfarm and in the development of the AIA (Appendix C).
Department of Defence	Restricted airspace between 1,700 and 7,000 ft above the Star of the South area.	An Aviation Impact Assessment undertaken by Aviation Projects found that there is infringement in Training areas D and V. AIA version provided to Defence for comment and initial feedback. See Sections 8.5 and 9.3. Star of the South to provide final turbine layout prior to construction.
	Radar degradation due to the wind farm presence, and potential impacts on detections and traffic control.	Radar degradation has been assessed in the impact assessment for the Project (within this report).
	Request for Aviation Impact Assessment following award of feasibility licence.	Star of the South provided Aviation Impact Assessment draft for comment. The project will share the final turbine layout prior to construction.
	Request for turbine aviation lighting to be compatible with night vision devices.	Assessed in Sections 8.5 and 9.3.
Esso	Interaction with decommissioning campaign	Engagement ongoing
Yarram Aerodrome (Wellington Shire Council)	Impact to existing PANS-OPS surfaces. Requested further detail to understand if the surfaces can be amended without impacting operations.	The project will continue to engage with Yarram Aerodrome on a proposed redesign of the RNAV area of the PANS-OPS surfaces (if required) so that the turbines do not infringe it prior to construction.

Stakeholder/partner and type of response	Issues raised	Response to issues raised and/or where considered within this report or associated appendices.
		Star of the South provided Aviation Impact Assessment draft for comment.

5 ASSESSMENT METHOD

5.1 Overview of method

This section describes the method that was used to assess the potential impacts and risks of the project from events arising from the development of the Project.

The approach used in assessment has been guided by the evaluation framework that applies to the project comprising the regulatory framework (that is, applicable legislation, policy, guidelines and standards) as well as the scoping requirements set by the Victorian Minister for Planning EES scoping requirements, and the Commonwealth EIS assessment guidelines. The process generally aligns with guidance issued by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) for the Environmental Assessment of major offshore infrastructure (Reference: *Offshore project proposal content requirements, 10/08/20202)* in lieu of Government guidance specific to the environmental assessment of offshore renewable energy infrastructure (not available at the time of report preparation).

Figure 5-1 provides an overview of the assessment method.

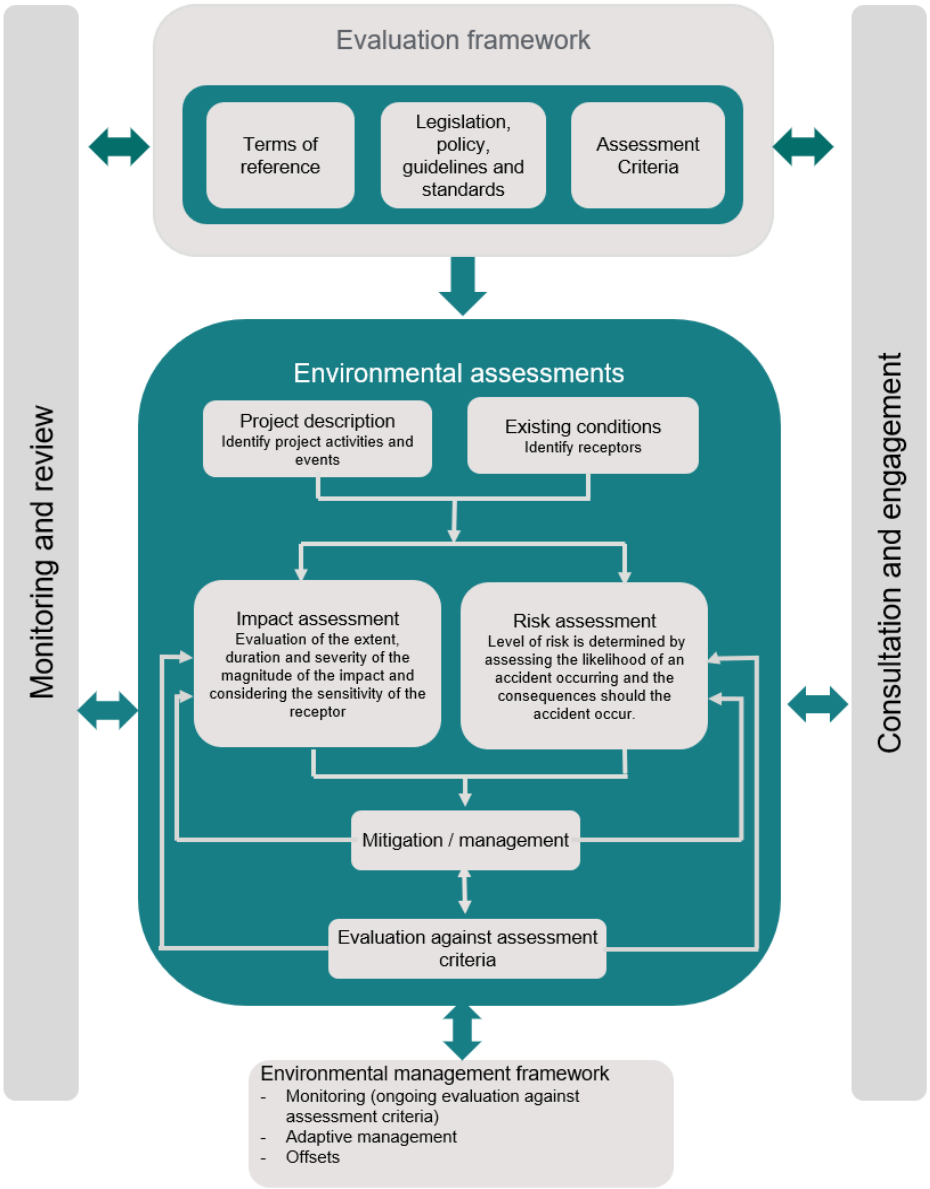


Figure 5-1 Overview of assessment framework

The environmental assessment in relation to infrastructure and other users was undertaken according to the following steps:

- **Existing conditions:** Characterisation of existing (baseline) environmental conditions and identification of sensitive assets, values and uses that may be affected by construction, operation and/or decommissioning of the Project.
- **Project description:** Review of the key project components and proposed construction, operation and decommissioning activities to identify potential project interactions with sensitive receptors (i.e. events). This includes identification of the maximum design scenario for the purposes of impact and risk assessment, taking into account the parameter range within the project design envelope as outlined 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 and selection of the parameter value with potentially greatest impact or risk.
- **Impact assessment:** is an evaluation of the consequences of a proposed activity. The evaluation considers the magnitude (duration and extent), sensitivity, and significance of the affected receptors. The assessment includes consideration of the mitigation hierarchy of avoidance, mitigation and management. The impact assessment methodology is described in Section 5.4.
- **Risk assessment**: is the evaluation of accidents and is expressed in terms of the likelihood and consequence of the accident occurring. The risk assessment methodology is described in Section 5.5.
- **Avoid, minimise, management and adaptive management:** identification of mitigation measures and management to avoid or reduce (minimise) impacts or risks that do not meet the assessment criteria identified in Section 3.3, and potentially constitute significant environmental impacts or risks.
- **Evaluation against assessment criteria:** following an initial impact or risk assessment, evaluation of predicted residual impacts or risks against assessment criteria set out in Section 3.3. If the impact or risk assessment indicated that the environmental assessment criteria are not met, then changes to the project design are made or further mitigation measures and management are introduced. Residual impacts are then described as those impacts following the implementation of all mitigation measures committed to by the project, taking into account the expected effectiveness of these measures.
- **Monitoring and review:** as the project is developed, continual checking and revision to project description, impact/risk assessment and mitigation measures is required and will continue to ensure the assessment remains up-to-date. If the project design envelope changes or legislation changes occur then these changes will be considered and re-assessed as required.
- **Consultation and engagement:** feedback from community, stakeholders and regulators is needed to ensure the process addresses concerns and meets expectations. Stakeholder consultation and engagement will continue throughout the life of the project.

For impacts that might arise from (expected events) the likelihood of the event is certain, therefore only an evaluation of consequence to the environment is required. For risks (unexpected/ accidental events) an evaluation of both likelihood and consequences needs to be considered as part of the risk assessment. The evaluation of the consequence for both impacts and risks takes into consideration a number of factors including the extent, duration and severity of the impact, the confidence in predictions, the effectiveness of mitigation measures to reduce consequences as well as the characteristics of the receptor.

For example, the ‘project activity’ is construction piling, the ‘event’ is underwater noise emitted into the water column and the ‘consequence’ may be injury or disturbance to marine mammals. Underwater noise is an expected event as the emission of underwater noise is part of construction and cannot be completely avoided as part of the activity. Underwater noise would be detectable across a spatial extent. Marine fauna encountering the underwater noise is expected due to their known presence in the activity area. An example of an unexpected event is where the ‘project activity’ is vessel presence, the ‘event’ is ‘collision with marine fauna’ and the ‘consequence’ would be injury or disturbance to marine mammals. This event is unexpected and unlikely to occur but it is still a possibility.

5.2 Study area

The study area is defined as all locations that may potentially be impacted by project activities and are of relevance to Infrastructure and Other Users.

The primary study area for infrastructure and other users consists of the offshore project area (OPA) (Figure 5-2), for the following receptors:

- Petroleum exploration and production

- Research
- Submarine power cables
- Aircraft and radar coverage
- Vessels.

Wider study areas were defined to assess impact from the project that would occur outside the project area. These study areas are:

- The ‘aviation area’ (Section 5.2.1)
- The ‘communication area’ (Section 5.2.2)
- The ‘ensonified area’ to assess underwater noise impact to petroleum and submarine cable maintenance divers, and research divers (Section 5.2.3)
- The ‘transiting vessel area’ to assess impact to vessels from project vessels transiting between port and the OPA (Section 5.2.4).

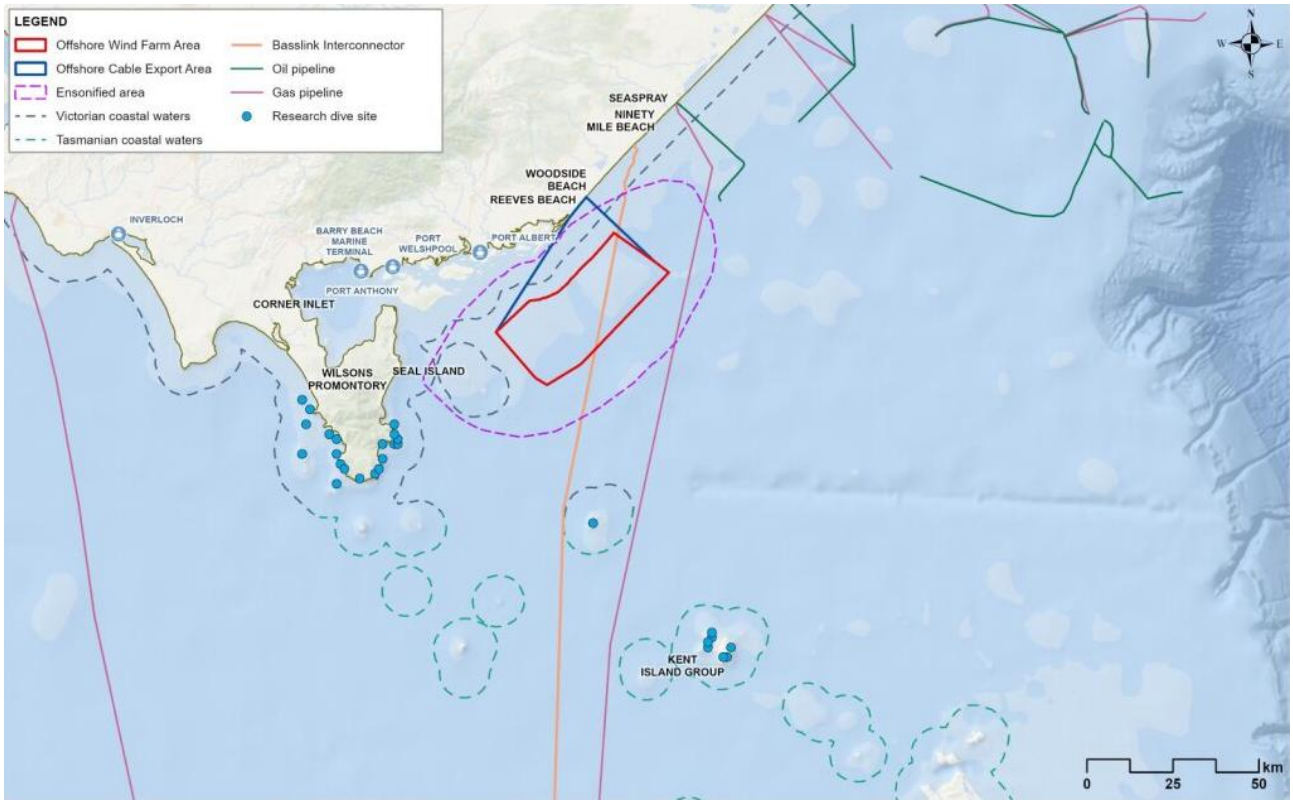


Figure 5-2 The study area as relevant to infrastructure and other users (offshore)

5.2.1 Aviation area

The aviation area is a 30 kilometre buffer on the OWFA based on the NASF Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation 2012. When WTGs over 150 metres above ground level are to be built within 30 km of a certified or registered aerodrome, the proponent should notify CASA and Airservices Australia. If the wind farm is within 30 km of a military aerodrome, Defence should be notified.

5.2.2 Communication area

The communication area is a buffer area of 15 km around the OWFA, based on the NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS) largest area of interest relevant to communication, navigation and meteorological equipment.

5.2.3 Ensonified area

The ensonified area (Figure 5-2) is indicative of the area where underwater noise from piling operations with noise abatement may be above the human health threshold at any point during construction. The ensonified area covers Victorian coastal waters and Commonwealth waters. The ensonified area was estimated from project-specific underwater noise modelling undertaken by JASCO Applied Sciences (JASCO). Modelling of monopile impact pilling activities was undertaken at four representative locations. These results have then been applied to all locations of the same depth category in the indicative layout. The exposure criteria relevant to receptors in this scope are for human health (see Section 8.1 for further detail on the threshold).

For modelling methods, scenario descriptions and results please refer to the Attachment I – Underwater Noise Modelling.

The ensonified area is relevant to the following receptors:

- Petroleum exploration and production
- Research
- Submarine power cables.

5.2.4 Transiting vessels area

The sea surface area through which construction and operation vessels transit from ports used during construction and operations (see Section 2) to the project area, relevant to the following receptors:

- Petroleum exploration and production
- Vessels.

5.3 Methods to determine the existing environment

A comprehensive assessment was undertaken to understand the existing environment of the study area to inform the environmental impact assessment for the works. This assessment incorporated a desktop review of all publicly available information sources including:

- GIS layers for gas pipelines, submarine power cables, offshore petroleum permit areas, wells and platforms
- Seismic and geophysical surveys which have been accepted or are under assessment by NOPSEMA and under the EPBC Act referral system.
- A search of the National Offshore Petroleum Titles Administrator’s National Electronic Approvals Tracking System
- A search of the Commonwealth Department of Defence, Defence Restricted areas (maritime) web-based mapping service.
- Project-specific Aviation Impact Assessment (AIA, Appendix C).

Consultation was undertaken with key agencies as described in Section 4. No site-specific surveys were undertaken to inform the impact assessment for this scope as information available from the desktop search was considered sufficient to inform the impact assessment.

5.4 Impact assessment method

An impact is where a project activity or activities in any of the project phases (construction, operation or decommissioning) results in a change in the existing environment. Impacts can be positive or negative, direct or indirect and are described within this report following the application of mitigation measures (residual impact).

Whether an impact results in a consequence to receptors depends on the sensitivity of receptors and the magnitude of the impact.

- **Sensitivity:** the ability of a of a receptor to tolerate and/or adapt to damage from an external factor and the time taken for its subsequent recovery if it is harmed
- **Magnitude:** the severity, extent and duration of an impact.

In addition to sensitivity and magnitude, the following factors are also considered when defining consequence:

- Assessment criteria
- The principles of ecologically sustainable development as defined in the *Ministerial guidelines for assessment of environmental effects under the Environment Effect Act 1978* (DTP 2023) and in section 3A of the EPBC Act
- Stakeholder input and feedback
- The likely effectiveness of measures to avoid, minimise and manage impacts
- Assumptions and uncertainties associated with the assessment.

The methods used to define sensitivity, magnitude and consequence are explained in the following sections.

The impact assessments have considered the potential for combined impacts generated by the project on the one receptor but resulting from different project events. For example, during operations, there may be impact to aviation through displacement from the project area and impact to communications systems. This is discussed in Section 9.3 and 9.4.

In addition to inter-related impacts, impacts to the same receptor that may arise from other projects at the same time as those from Star of the South (i.e., 'cumulatively') have been assessed. The approach to cumulative impact assessment is outlined in Section 5.7.

For the purposes of the impact assessment a project design envelope (PDE) approach was adopted. The PDE comprises ranges for certain design parameters (for example, an upper and lower limit for WTG heights). This allows for flexibility in the eventual design solution for the project that is necessary within an evolving industry where technology is rapidly changing, while providing confidence that the final design will not exceed the maximum design scenario(s) (MDS). The MDS(s) consist of a defined set of project parameters from within the PDE that could result in the greatest potential impact to an identified sensitive receptor or receptor group. As the MDS is defined based on specific impacts, the MDS(s) assessed will vary between impacts identified for the specialist topics and between assessment topics. See Section 7 for the MDS(s) considered for this assessment.

5.4.1 Assigning a sensitivity level

To assign a sensitivity level, the existing environment is described and receptors are identified as the first step. For example, a receptor (or group of similar receptors) in the marine environment could include whales and on land residential areas or native vegetation.

A sensitivity level of high, medium or low is assigned to the receptors based on specific criteria developed by the specialist undertaking the assessment.

A sensitivity level is assigned to the receptors that have been identified in the baseline characterisation presented in Section 6. The sensitivity of each of the receptors has been determined to be either high, medium or low according to the descriptions relevant to infrastructure and other users presented in Table 5-1. Assigning receptor sensitivity includes consideration of the ease of which industry standard mitigation can be applied to the situation. For example, where a standard industry mitigation can be implemented with low complexity as part of usual operations, low sensitivity is applied. Where a complex, project-specific solution would be required for the receptor to operate, a high sensitivity is applied.

Table 5-1 Receptor sensitivity

Sensitivity (to impact)	Description
High	Adaptation requires project-specific solutions to be developed at a high complexity level.
Medium	Ability to adapt operations with a complex level of standard operational planning required.

Sensitivity (to impact)	Description
Low	Ability to adapt operations with no additional operational planning, or industry standard planning required.

5.4.2 Assigning a magnitude level

The magnitude of the event on the receptor includes consideration of the following factors:

- Extent – site, local, regional or widespread
- Duration – short, medium or long term (also considering frequency and permanence)
- Severity – degree of change from existing condition.

The magnitude of a specific impact is classified based on clear criteria related to the extent duration and severity of the event determined by the specialist undertaking the assessment and are defined relevant to infrastructure and other users in Table 5-2. A magnitude description is then assigned for the maximum credible consequence by considering how the extent, duration and severity of the impact may result in consequences to the receptors with consideration of the initial mitigations and management measures that are required for project activities according to the levels presented in Table 5-3. Initial mitigations and management measures include standard industry best practice and requirements outlines in Government guidance and international maritime law e.g. lighting for navigational safety.

Table 5-2 Magnitude criteria

Terms		Description
Extent	Medium scale	Within the OPA
	Large scale	Within 10 km (immediate) of the OPA
	Regional	Within the Central Gippsland region
Duration	Short-term	Days to weeks
	Medium-term	Less than 5 years
	Long-term	Greater than 5 years
Severity	Unlikely to be detectable	Changes are within expected variability
	Reversible	Changes are reversible once the activity has ceased
	Permanent	Irreversible change, substantial change to the value

Table 5-3 Magnitude description

Magnitude	Description
Negligible	The impact is localised and short-term or is unlikely to be detectable. OR The impact is medium scale and short-or medium-term and is unlikely to be detectable.
Low	The impact is localised and long-term and is unlikely to be detectable. OR The impact is medium scale and long-term and is unlikely to be detectable. OR The impact is large scale and short- to medium-term and unlikely to be detectable.
Medium	The impact is medium scale and long-term and reversible. OR The impact is large scale and medium-term and is reversible.
High	The impact is medium scale and long-term and permanent.
Very high	The impact is permanent, or it is regional and long-term.

5.4.3 Assigning a consequence level

Consequence is 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. The consequence level is assigned based on the receptor sensitivity level and magnitude level using the matrix in Table 5-4.

Consequences are assigned based on the maximum credible impact for each pathway. Where uncertainty exists, additional mitigations, monitoring and/or adaptive management will be adopted to ensure the level of impact meets the defined assessment criteria. The approach to adaptive management has been described in Section 5.6.4.

Table 5-4 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)

A summary consequence level description is provided in the table below.

Table 5-5 Consequence level description

Consequence	Infrastructure and other users consequence level descriptor
Severe (A)	Impacts to infrastructure and others users that are: • Permanent, regional and long-term and adaptation by infrastructure operators or other users requires project-specific solutions to be developed at a high complexity level, OR • Permanent, regional and long-term and infrastructure operators or other users have an ability to adapt operations with a complex level of standard operational planning required, OR • Medium scale and long-term and permanent and adaptation by infrastructure operators or other users requires project-specific solutions to be developed at a high complexity level.
Major (B)	Impacts to infrastructure and others users that are: • Permanent, or it is regional and long-term and infrastructure operators or other users have an ability to adapt operations with no operational planning, or industry standard planning required, OR • Medium scale and long-term and permanent and infrastructure operators or other users have an ability to adapt operations with a complex level of standard operational planning required, OR • Medium scale and long-term and reversible or large scale and medium-term and is reversible and adaptation by infrastructure operators or other users requires project-specific solutions to be developed at a high complexity level.
Moderate (C)	Impacts to infrastructure and others users that are: • Medium scale and long-term and permanent and infrastructure operators or other users have an ability to adapt operations with no operational planning, or industry standard planning required, OR • Medium scale and long-term and reversible or large scale and medium-term and infrastructure operators or other users have an ability to adapt operations with a complex level of standard operational planning required, OR • Localised and long-term and is unlikely to be detectable or medium scale and long-term and is unlikely to be detectable or large scale and short- to medium-term and unlikely to be detectable and adaptation by infrastructure operators or other users requires project-specific solutions to be developed at a high complexity level.
Minor (D)	Impacts to infrastructure and others users that are: • Medium scale and long-term and reversible. or large scale and medium-term and is reversible and infrastructure operators or other users have an ability to adapt operations with no operational planning, or industry standard planning required, OR • Localised and long-term and is unlikely to be detectable or medium scale and long-term and is unlikely to be detectable or large scale and short- to medium-term and unlikely to be detectable and infrastructure operators or other users have an ability to adapt operations with a complex level of standard operational planning required, OR • Localised and short-term or is unlikely to be detectable or medium scale and short-or medium-term and is unlikely to be detectable and infrastructure operators or other users have an ability to adapt operations with no operational planning, or industry standard planning required.
Negligible (E)	Impacts to infrastructure and others users that are:

Consequence	Infrastructure and other users consequence level descriptor
	• Localised and long-term and is unlikely to be detectable or medium scale and long-term and is unlikely to be detectable or large scale and short- to medium-term and unlikely to be detectable and infrastructure operators or other users have an ability to adapt operations with no operational planning, or industry standard planning required, OR • Localised and short-term or is unlikely to be detectable or medium scale and short-or medium-term and is unlikely to be detectable and infrastructure operators or other users have an ability to adapt operations with no operational planning, or industry standard planning required, OR • Localised and short-term or is unlikely to be detectable or medium scale and short-or medium-term and is unlikely to be detectable and infrastructure operators or other users have an ability to adapt operations with a complex level of standard operational planning required.

5.4.4 Residual impacts

While there are clear steps in the assessment process, it may not always follow a linear progression. Typically, assessment requires multiple iterations of impact evaluation considering the assessment criteria and application of mitigation measures as the technical studies progress and additional information becomes available to ensure that the predicted residual impacts are within allowable limits. The completed impact assessments are based on the include both the initial and final mitigation measures that will be implemented, and therefore describe the predicted residual impacts together with any areas of uncertainty in the impact assessments. The residual impacts constitute the predicted consequences following the implementation of the mitigation measures and also taking into account the expected effectiveness of these measures.

5.5 Risk assessment method

A risk is arises when project activity or activities could result in an unexpected (accidental) event in any of the project phases (construction, operation or decommissioning) that causes a change to the existing environment.

The level of risk is determined by combining the likelihood of an accident occurring and the consequences should the accident occur. The assignment of consequence level follows the process outlined above.

The following steps were undertaken to identify, analyse and evaluate risks:

- Develop a risk matrix based on the likelihood of an accident occurring and the consequences, should the accident occur
- Identify controls and requirements to mitigate identified risks
- Assign likelihood and consequence ratings for each risk to determine risk ratings considering design, proposed activities and mitigation.

5.5.1 Assigning a likelihood level

Likelihood is the probability of an unexpected (accidental) event occurring. The likelihood criteria range from ‘rare’ where the event may occur only in exceptional circumstances to ‘almost certain’ where the event is expected to occur in most circumstances.

Likelihoods are assigned with consideration of mitigation and management measures according to the levels presented in Table 5-6.

Table 5-6 Guide to likelihood levels

Level	Description
Rare	The event may occur only in exceptional circumstances
Unlikely	The event could occur but is not expected
Possible	The event could occur
Likely	The event will probably occur in most circumstances
Almost certain	The event is expected to occur in most circumstances

5.5.2 Risk matrix

Risk ratings are assigned by combining the likelihood of an event occurring (using Table 5-6) and the consequence of that event occurring (using Table 5-4).

A risk rating is then determined by these factors using the risk matrix, presented in Table 5-7.

The level of detail of the assessment undertaken for each risk pathway is proportionate to the identified level of risk (i.e. risk ranking).

Table 5-7 Risk matrix

Likelihood rating	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

5.5.3 Residual risk

The residual risk assessment assigns a risk level based on implementation of both initial and final mitigation measures. An evaluation against the assessment criteria is undertaken on the residual risk rating, describing any areas of uncertainty in the assessment (as discussed above in Section 5.4.4) and the expected effectiveness of mitigation measures. Where uncertainty remains high, additional mitigation measures and adaptive management may be adopted.

5.6 Avoidance, mitigation and management

It is recognised that there are opportunities to avoid and minimise/mitigate environmental impacts and risks during the many stages of project development. During project inception and early design development stages of the project, decisions on the location of the project, its design and construction techniques have enabled impacts and risks to be significantly avoided and mitigated in accordance with the hierarchy presented in Figure 5-3.

Avoidance and minimisation of social and environmental impacts are central to the decision-making for the project and as such, the project would continue to be refined in response to technical requirements and potential environmental and social impacts identified during the development phase. This has culminated in the preparation of a project description which is found in EIS Chapter 4 – Project description and EES Chapter 4 – Victorian works project description. A description of how avoidance of impact has informed the design in relation to infrastructure and other users can be found in Section 5.6.1.

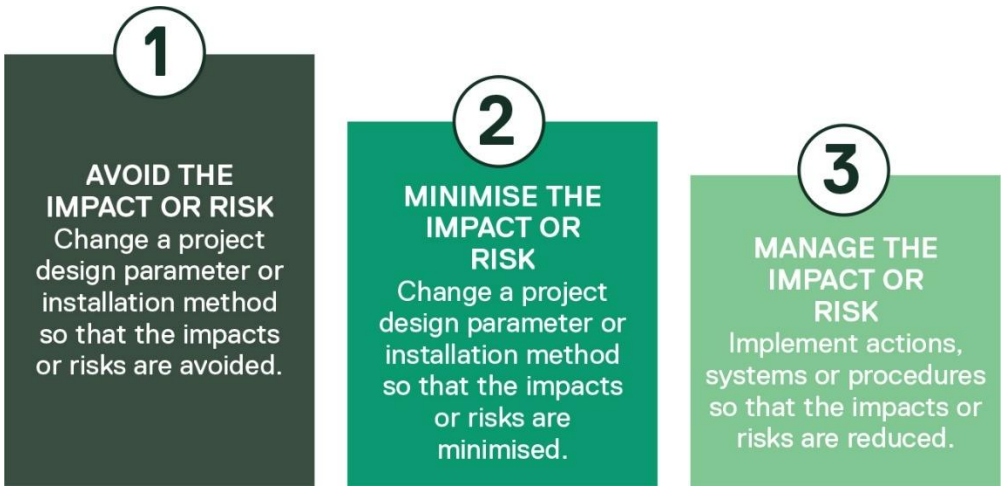


Figure 5-3 Mitigation hierarchy

The assessments describe the impacts and risks with all the mitigation measures implemented i.e. with both initial and final mitigations. Initial mitigation measures are defined as the standard suite of mitigation measures that will be implemented by the project such as measures required under legislation, national or international standards and standard measures implemented on similar projects. Final mitigation measures are any additional mitigation measures adopted to address the findings of impact/risk assessments to further reduce impacts and risks or manage areas of uncertainty. The completed registers of the impact and risk assessments for this technical report are presented in Appendix A, and show the reduction in consequence that occurs between the initial rating and final rating due to the application of final mitigation measures.

5.6.1 Avoid

During the initial site selection process, impacts were avoided through consideration of a range of factors in project siting including shipping lanes, Marine Protected Areas and Ramsar wetlands.

The following measures have been adopted in relation to the design, construction and operation of the project to avoidance impacts to infrastructure and other users:

- Site selection of the OWFA to avoid close proximity to the main east west shipping channel due south. The shipping channels have since been removed from the Gippsland Declared Area.
- Reduction of the maximum number of WTGs from 400 (as described in the Commonwealth EPBC Act referral and Victorian EE Act referral in April 2020) to 147, resulting from a removal of the smallest turbines in the PDE, resulting in lower density and more space between WTGs.
- Reduction in the number of export cables from 13 to 8.
- Project design was updated - the proposed shore crossing is located at Reeves Beach to avoid the requirement of a near-shore crossing of The Basslink Interconnector's export cable at McGaurans Beach.

These measures are documented in EIS Chapter 3 – Project development and EES Chapter 3 - Victorian works project development.

5.6.2 Minimise

Adopt measures that reduce the extent, severity and/or persistence of impacts that cannot be completely avoided in the step above.

The assessments describe the impacts and risks with all the mitigation measures implemented i.e. with both initial and final mitigations. Initial mitigation measures are defined as the standard suite of mitigation measures that will be implemented by the project such as measures required under legislation, national or international standards and standard measures implemented on similar projects. Final mitigation measures are any additional mitigation measures adopted to address the findings of impact/risk assessments to further reduce impacts and risks. The completed registers of the impact and risk assessments for this technical report are presented in Appendix A and show the reduction in consequence that occurs between the initial rating and final rating due to the application of final mitigation measures.

The following measures have been adopted in relation to the design, construction and operation of the project to minimise impacts to infrastructure and other users:

- Increase in the minimum WTG spacing from 660 metres to 1062 metres to allow vessels to navigate through the wind farm in line with the World Association for Waterborne Transport Infrastructure (PIANC) guidelines (PIANC, 2018) (following engagement with maritime stakeholders during PAWSA workshops – refer Technical Report P: Shipping and Navigation). This increases space between WTGs and reduces risk of habitat fragmentation (especially when considered with the reduced number of WTGs).
- Grid based layout to support co-existence with other users. Spatial planning of array and export cables that minimises the number of crossings of the Basslink Interconnector.

5.6.3 Management

Once avoidance and minimisation measures have been exhausted, the next step is management of the residual impacts and risks. In the case of risks, the mitigation measures can be applied prior to the event

occurring and/or after the event. The residual impacts and risks are evaluated against the assessment criteria to ensure impacts and risk are not significant.

5.6.4 Monitoring and adaptive management

The EIS scoping guidelines for the project require adaptive management measures to be identified to address uncertainty and manage risk. The guidelines go on to describe examples of areas of uncertainty as follows:

"…..limitations of predictions or assumptions, knowledge gaps in scientific understanding and baselines status of the environment, and the timing, effectiveness, or capacity to implement, maintain, operate and enforce management measures."

The project has developed adaptive management strategies relevant to infrastructure and other users to address areas of uncertainty in predictions of residual impacts, and to ensure that management measures remain effective and can be adapted over the life of the project in response to new information. Sound source verification will be used to validate the noise source modelling. In the event that the noise levels are larger than originally expected adaptive management will be implemented including implementation of further

Monitoring during construction and operational phases of the project via stakeholder engagement will be undertaken to identify any areas of concern raised by infrastructure and other users, and to adaptive management measures, as appropriate, to ensure residual impacts/risks remain at or below levels predicted within the approved EIS/EES.

5.7 Cumulative impact assessment

Cumulative impacts 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. It is noted that industries that are already operational and any potential pressures that may be exerted on infrastructure and other users are considered as part of the baseline environment, and the cumulative impact assessment focuses on proposed or future actions.

A staged approach to cumulative impact assessment has been adopted. This approach is split into four stages:

- Stage 1 Identifying projects or actions with the potential for cumulative impacts
- 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 cumulative impact assessment 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.

The cumulative impact assessment has followed a staged approach (as shown in Figure 5-4) and described in detail in EIS Chapter 6 - Assessment Framework and EES Chapter 6 - Assessment Framework).

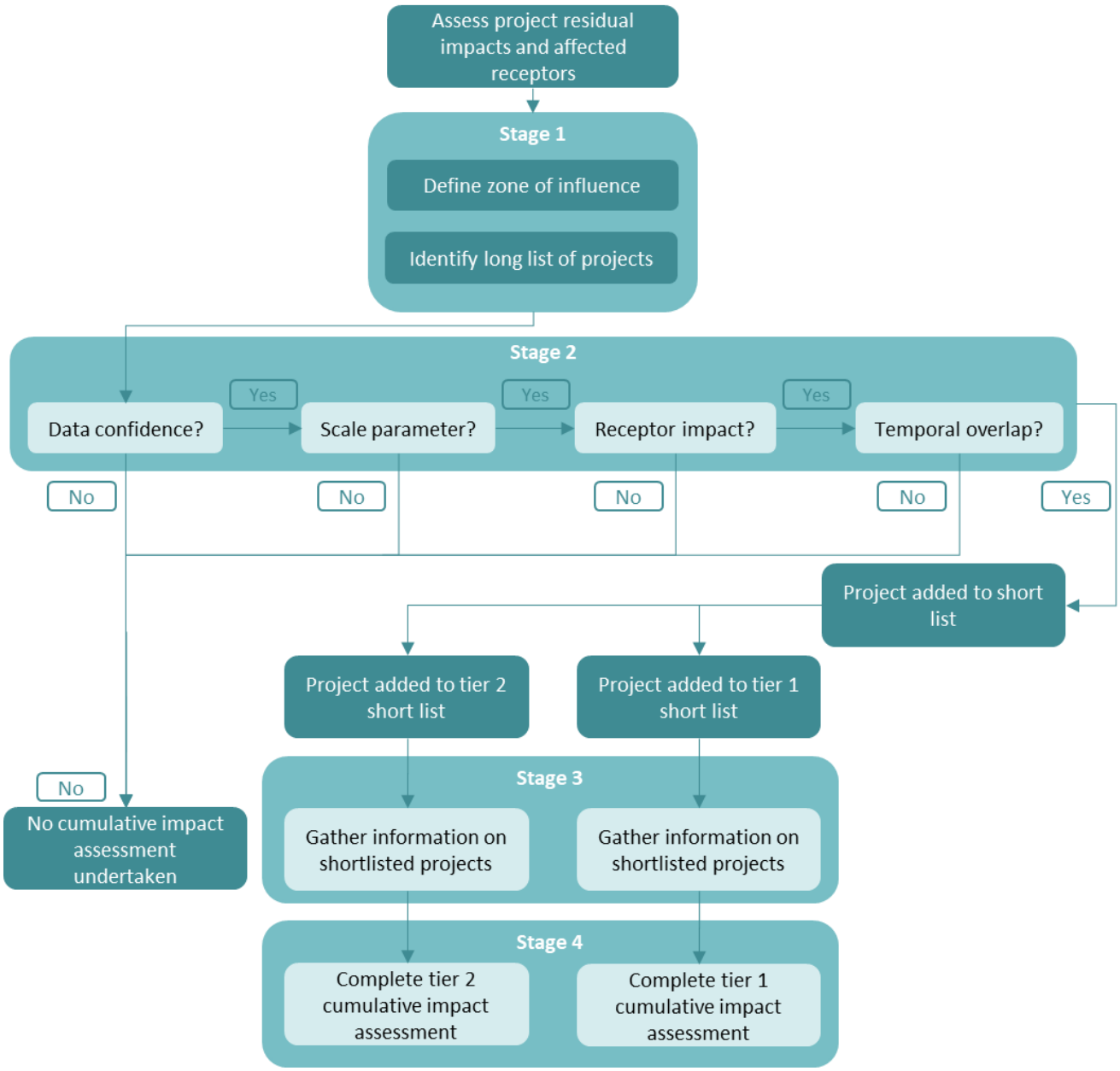


Figure 5-4 Cumulative impact assessment process

5.8 Limitations, uncertainties and assumptions

The following limitations, uncertainties and assumptions apply to this assessment:

- The PAWSA workshop approach specifically excludes consideration of port, facility and vessel security, in order to prevent discussion of sensitive topics that should be treated as classified information.
- The shipping baseline is based on AMSA's vessel and identification and tracking data, which tracks vessels with active AIS transponders. As per IMO Resolution A.1106(29) (IMO 2015), many vessels are either not required to be fitted with an AIS (warships, naval auxiliaries and governmental vessels) or may be exempt (leisure craft and fishing boats). Equally, even vessels with an AIS fitted might have the equipment switched off (for fishing vessels, vessel monitoring system units are required to be active only when operating in a fishery). Vessels mandated to carry AIS as per the International Convention for the Safety of Life at Sea 1974 (SOLAS) (IMO, 1974) requirements include ships of 300 gross tonnage engaged on international voyages, cargo ships of 500 gross tonnage on domestic voyages or passenger ships (all sizes). Whilst the baseline is therefore skewed towards commercial vessels, it represents the

best available information on the subject and is considered acceptable for the purposes of this technical report.

- In the absence of AIS data, information on small vessel usage in and around the project area was obtained from a combination of aerial surveys, boat ramp surveys, consultation and Marine Traffic observations. The consensus from all available sources is that nearshore, small vessel traffic is dominated by recreational fishing vessels. As AIS data is mostly for commercial vessels, the additional data for smaller recreational vessels has been used in the assessment of impacts to recreational users. Confidence in the baseline data for these users is high, following consultation with recreational fishing stakeholders, boat clubs and the Boating Industry of Australia, all validating that the OWFA is not a highly utilised area of Bass Strait.
- AIS data from AMSA was used for simulations and to understand the existing vessel activity in the area. Although 2021 data was used primarily (a year of the Covid19 pandemic restrictions), a review of multiple years of data was undertaken to determine the representativeness. By way of comparison, 2019 AIS vessel data sets (pre-Covid19) were analysed to see if there was any difference from the 2021 AIS vessel data. All three areas – the Port of Hastings, the OPA and Corner Inlet were reviewed. While the number of vessels varied monthly by area, the overall quantum of vessels was consistent over the two years, with only minor differences given the available navigational space in the area under review. Based on the weekly averages for the two years, in 2021, vessels calling at Port Hastings went up by two, vessels transiting the Star of the South project area went down by one, and those at Corner Inlet went down by two. On this basis, no real difference was observed between years and 2021 was used as the base year for determining the volume of vessels reported.
- The impact assessment described in this report is based on the best available and up-to-date information. It has been based on an MDS, in particular noting that the locations of structures will not be finalised until post-approval. The layout assessed here is considered the worst case, therefore this approach ensures that whatever is constructed will fall within the MDS parameters already assessed.
- Whilst consultation has taken place with the Department of Defence, confidential information cannot be presented in this public impact assessment.

5.9 Linkages to other technical reports

This report has interdependencies with the following reports:

- Technical Report N: Commercial and recreational fisheries
- Technical Report P: Shipping and Navigation
- Technical Report R: Social
- Technical Report Y: Planning.

The specialists undertaking this assessment worked collaboratively to evaluate these potential impacts and design suitable mitigation measures to be adopted by the project.

This report also has linkages with the following technical attachments:

- Attachment I - Underwater Noise Modelling
- Attachment II – Oil spill modelling.

6 EXISTING ENVIRONMENT

6.1 Regional overview

The project area is within the Gippsland Basin, a hub of marine resource activity. Numerous offshore permit areas associated with telecommunications and petroleum exploration and production are found within the Gippsland Basin. Existing offshore infrastructure within the Gippsland Basin is nearly wholly related to petroleum exploration and production and includes numerous petroleum wells for exploration, appraisal and development.

6.2 Conservation values and sensitivities

The OWFA is within the Commonwealth marine environment, a MNES, which is designated 3- 200 nautical miles from the Australian coastline. The Commonwealth marine environment includes the socioeconomic values of that area. The socioeconomic values of the Commonwealth marine environment relevant to this scope are described further in the sections below.

6.3 Aviation

This section presents the existing aviation environment above the OWFA. An AIA was conducted for the OWFA in 2024 by Aviation Projects. The full AIA can be found in Appendix C.

Aerodromes situated on the coastline within the vicinity of the Project fall into one of two categories, ‘military’ aerodromes operated by the Department of Defence and ‘civil’ operated by Airservices Australia (ASA). There are three aerodromes within 60 kilometres of the OWFA boundary (Table 6-1, Figure 6-1). Air traffic services are discussed in Section 6.4.

Yarram Registered Aerodrome is a civil aerodrome approximately 13 kilometres from the cable route and 20 kilometres from OWFA operated by the Wellington Shire Council. Yarram is home to an Aeronautical Club (Yarram Aero Club Inc.) which hosts air shows. Typical users of Yarram Airport are light civil flights associated with the Yarram Aero Club and helicopters including the Helicopter Emergency Medical Service and other heavy rotary wing aircraft. The Yarram Aerodrome has a registered airspace that overlaps the OWFA (see Section 6.3.3).

West Sale is a civil aerodrome approximately 17 kilometres to the west of RAAF Base East Sale and 59 kilometres from the OWFA. The aerodrome facilitates local training flights, air ambulance transport, refuelling and instrument approach training. It is encompassed within the military restricted airspace of RAAF Base East Sale (for detail on RAAF Base East Sale see Section 6.3.4). The registered airspace of RAAF Base East Sale overlaps the OWFA.

There are several maintained airstrips within 100 km of the OWFA, including those managed by private operators for scenic flights and by various government departments for emergencies (for example, Victorian Department of Energy, Environment and Climate Action (DEECA) firefighting airstrip on Wilsons Promontory) however these do not have declared airspaces. Operators from these airstrips may use the airspace over the proposed OWFA.

The petroleum platforms in Gippsland Basin require regular helicopter crew transfers that occur from Longford heliport, associated with the Longford Gas plant, approximately 45 kilometres north of the OWFA. Helicopter traffic is frequent between the Longford Heliport for the exclusive use of offshore rigs operated by Esso.

Table 6-1 Aerodromes in the vicinity of the OWFA

Aerodrome	Type	CASA Status	Distance to aerodrome OWFA	Distance to airspace from OWFA
Yarram Registered Aerodrome	Civil	Certified	20 km	Overlaps the PAN-OPS area
West Sale Aerodrome	Civil	Certified	58 km	OWFA overlaps restricted airspace (incorporated in RAAF Base East Sale airspace)

Aerodrome	Type	CASA Status	Distance to aerodrome OWFA	Distance to airspace from OWFA
RAAF Base East Sale	Military	Certified	59 km	OWFA overlaps restricted airspace

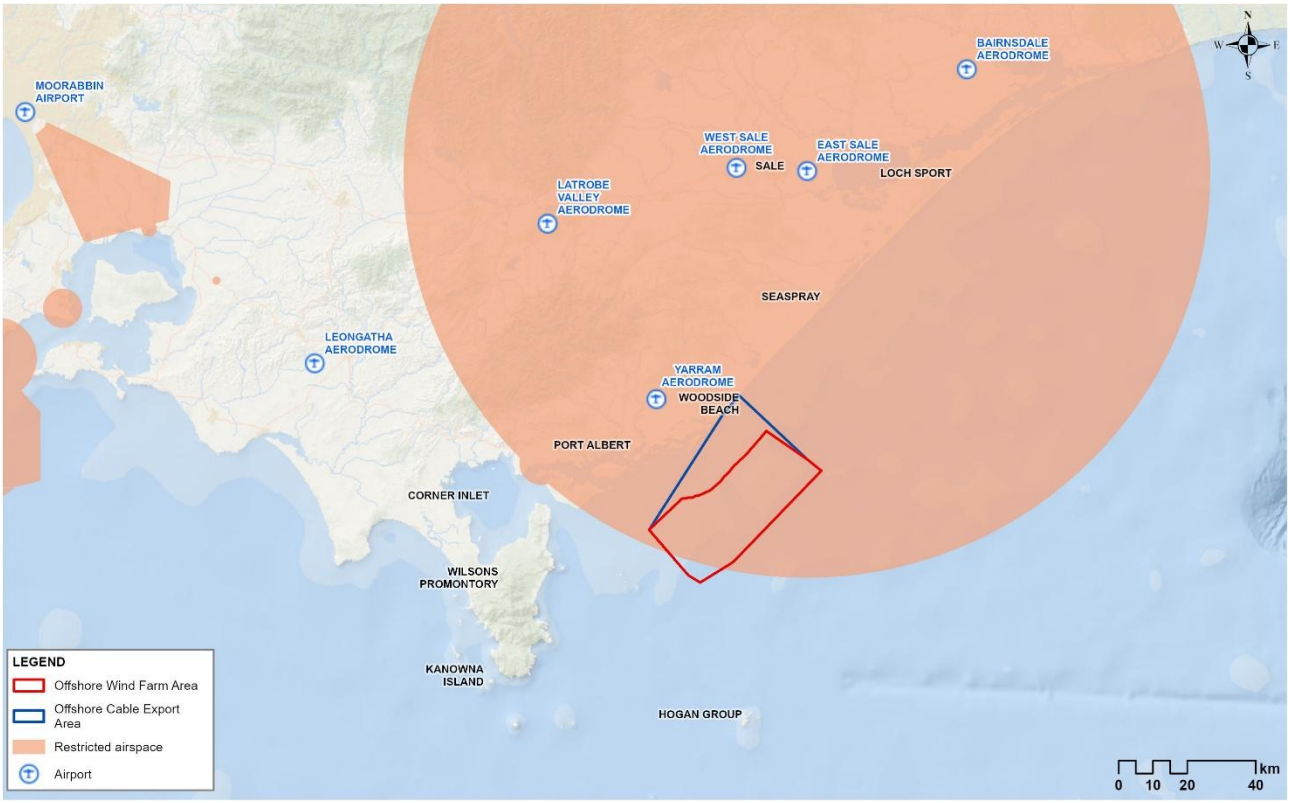


Figure 6-1 Aerodromes within the vicinity of the OWFA

6.3.1 Grid LSALT

The Grid LSALT exists so that pilots can fly without visual reference to the ground or water and allows for pilots with technical problems to descend to a low level that has a predetermine safety margin over obstacles. A Grid lowest safe altitude (LSALT) shows the lowest safe altitude to fly within a certain grid area. It is determined by applying a 1,000 ft margin to the highest obstacle in that grid and rounding up to the nearest 100 ft.

The two grid areas that overlap the OWFA are the Grid West of 147° with a Grid LSALT height of 3,900 ft (1188.72 m) and Grid East of 147° with a Grid LSALT height of 1900 ft (579.12m). The LSALT protection surface is 2900ft (883.92 m) and 900ft (274.32 m) for West and East respectively. The grid LSALT over the OWFA is shown in Figure 6-2. The proposed WTG height of 350 m (LAT) intrudes within the Grid East of 147° LSALT protection surface height.

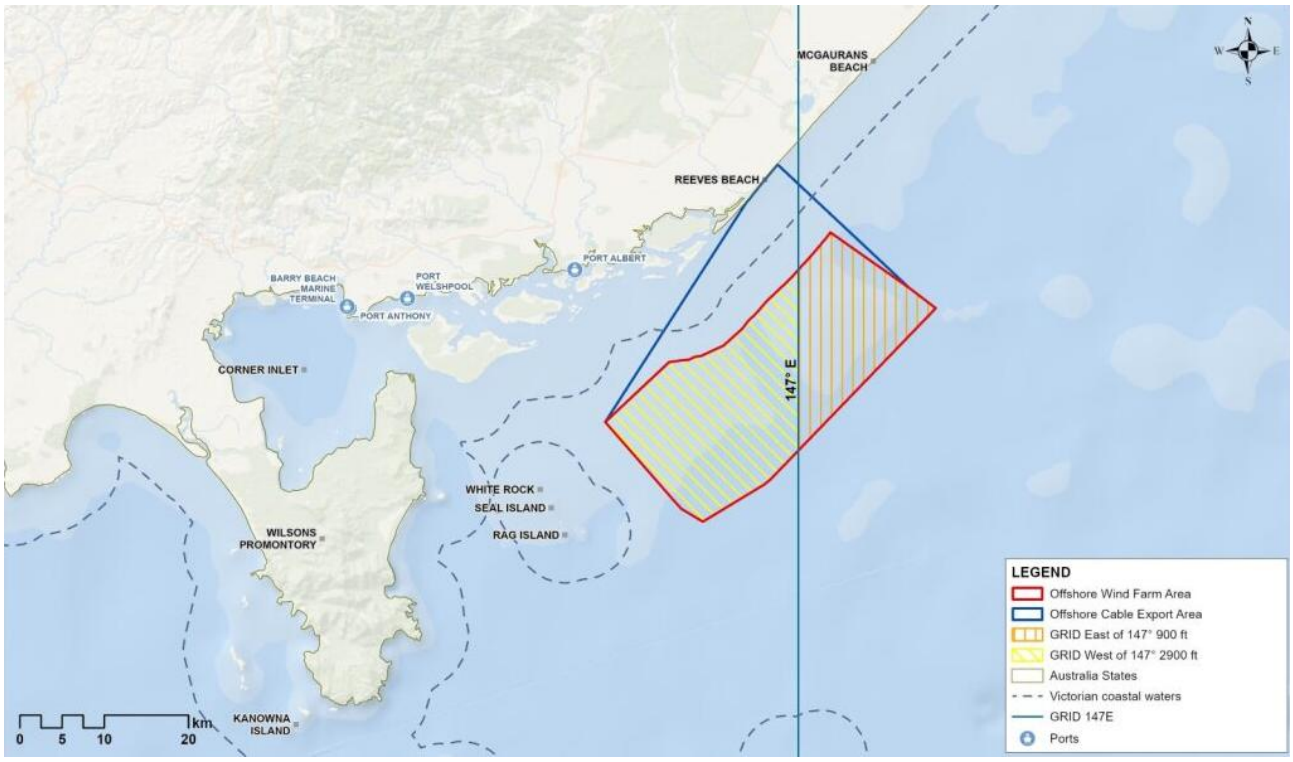


Figure 6-2 Grid LSALT over the OWFA

6.3.2 OLS

Military, Certified and Registered aerodromes have a declared obstacle limitation surface (OLS) surrounding them to protect their airspace. CASA, ASA and Defence require that consultation is undertaken regarding any WTG installation within 30 kilometres of an aerodrome or within the OLS. The wind farm does not penetrate any OLS.

6.3.3 PANS-OPS

Certified aerodromes have a flight protection (PANS-OPS) area declared around them. There is one Certified aerodrome within 30 kilometres of the OWFA, the Yarram Aerodrome (Figure 6-1).

Aviation Projects conducted a PANS-OPS analysis as part of the AIA (Appendix C). The minimum altitude within the initial segment of the Yarram RNP RWY 27 approach procedure is shown as 1800 ft AMSL. A protection buffer of 984 ft must be applied above the WTGs in the Project area.

6.3.4 Defence aviation

The OPA is situated in the South-western Military Controlled Airspace of the RAAF Base East Sale, (Figure 6-1; RAAF 2018). This airspace is over both state and Commonwealth waters (RAAF 2018).

East Sale is primarily used for training. Operations at RAAF Base East Sale include “basic and instructor training for pilots, initial officer training, and training for air combat officers, air traffic controllers and Royal Australian Navy observers” (RAAF 2018). The majority of military flying training is conducted within RAAF Base East Sale restricted military airspace. Search and rescue helicopter training and aerobatic display training is also undertaken from RAAF Base East Sale.

The airspace is separated into 16 training areas, each area with a defined LSALT enforced under the *Defence Act 1903* (Table 6-2). The OWFA is beneath training areas D, E, V and W (Figure 6-3).

Table 6-2 LSALT of the military training areas over the OWFA

Area code	Height of LSALT	WTGs infringe the LSALT?
D	2,400 ft / 1,400 ft (426.72 m)	No
E	3,900 ft / 2,900 ft (883.92 m)	No
V	1,700 ft / 700 ft (213.3 m)	Yes
W	3,900 ft / 2,900 ft (883.92 m)	No

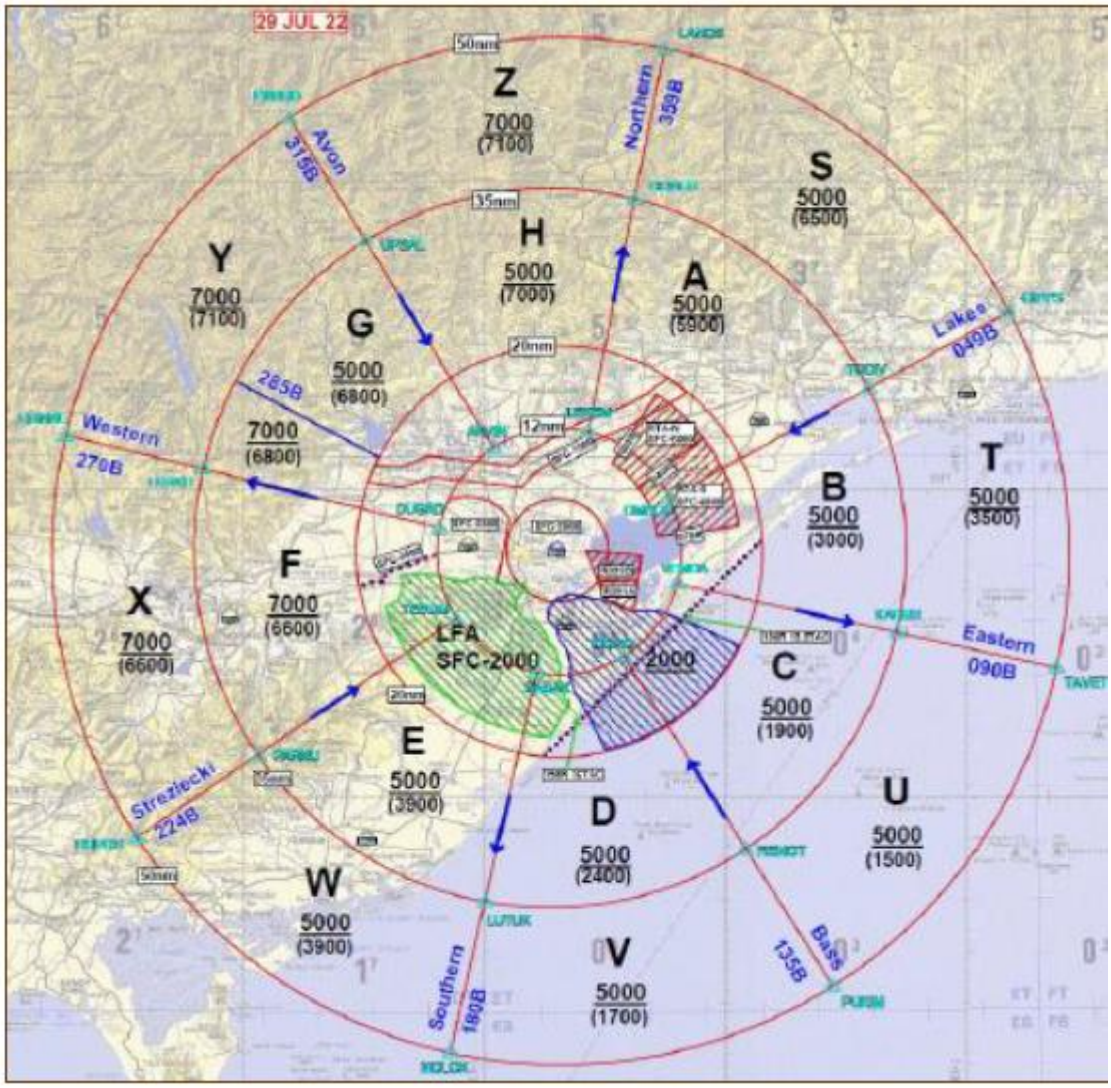


Figure 6-3 RAAF Base East Sale Training areas (Aviation Projects). Areas where WTGs infringe the LSALT are highlighted in blue.

A transit lane and visual flight rules route are established for civil aircraft to transit through the Defence airspace to the northeast of the OWFA over Victorian coastal waters, primarily used by helicopters conducting crew transfers related to the petroleum industry below 4,000 ft. The Defence airspace extends from 4,000 ft to 42,000 ft.

6.3.5 Search and rescue

Search and rescue (SAR) operations is a key issue for offshore wind farms internationally. The growth and expansion of the offshore wind industry within active sea-spaces means that the probability of SAR operations occurring within or close to a wind farm is likely to increase (Maritime & Coastguard Agency 2021). Note that SAR does not include emergency or disaster management.

In Bass Strait, SAR is governed by a range of parties, including: AMSA's Joint Rescue Coordination Centre (JRCC) which coo-ordinates marine and aviation search and rescue, Defence's Headquarters, Joint Operations Centre (HQJOC), Safe Transport Victoria, the Australian Volunteer Coast Guard and the Victorian Marine Police. In a response situation, the best-placed authority manages the situation until the responsible authority takes over.

Reporting of marine incidents is required under the *Marine Safety Act 2010*, and is undertaken by Victorian Water Police, Safe Transport Victoria (STV) and AMSA. In Victorian coastal waters, STV are responsible for marine safety with compliance and enforcement activities carried out by several agencies including Victorian Water Police and Port Managers and waterway managers (Parks Victoria and Gippsland Ports). In Commonwealth waters, AMSA is responsible for maritime safety under the *Marine Safety (Domestic Commercial Vessel) National Law Act 2012*.

Marine incidents are reported to AMSA and are published. Historically, the majority of incidents occurring in Gippsland or Bass Strait are inshore or within inland waters, such as the Gippsland Lakes (Figure 6-4; Figure 6-5). There are a large number of disablements occurring within Corner Inlet and Western Port Ramsar Site. In order to understand the number of incidents that occur in the Bass Strait waters close to the OPA, a request was made to Safe Transport Victoria, (previously Transport Safety Victoria), in July 2022. A total of ten incidents occurred in the three-year period between July 2019 and June 2022, all of which involved recreational vessels. No serious incidents – fatalities or serious injuries were recorded in the OPA. No data was available on if incident response include aerial support.

Vessel-based search and rescue operations are described and assessed in Technical Report P: Shipping and Navigation. This report addresses aerial search and rescue operations, and communication during search and rescue operations.

The aerial and CNS equipment used by the JRCC includes:

- Cospas–Sarsat search and rescue satellite system, including satellites and ground receiving stations in Queensland and Western Australia.
- Aircraft based out of Melbourne (Essendon), Perth and Cairns
- CHC Helicopters Australia provides support to local flying units with two search and rescue A139 helicopters in the lowest usable level of airspace.

When on an operational mission, search and rescue aircraft are not constrained by the normal rules of the air and operate in accordance with their Aircraft Operator Certificate. This allows them total flexibility to manoeuvre using the pilot's best judgement.

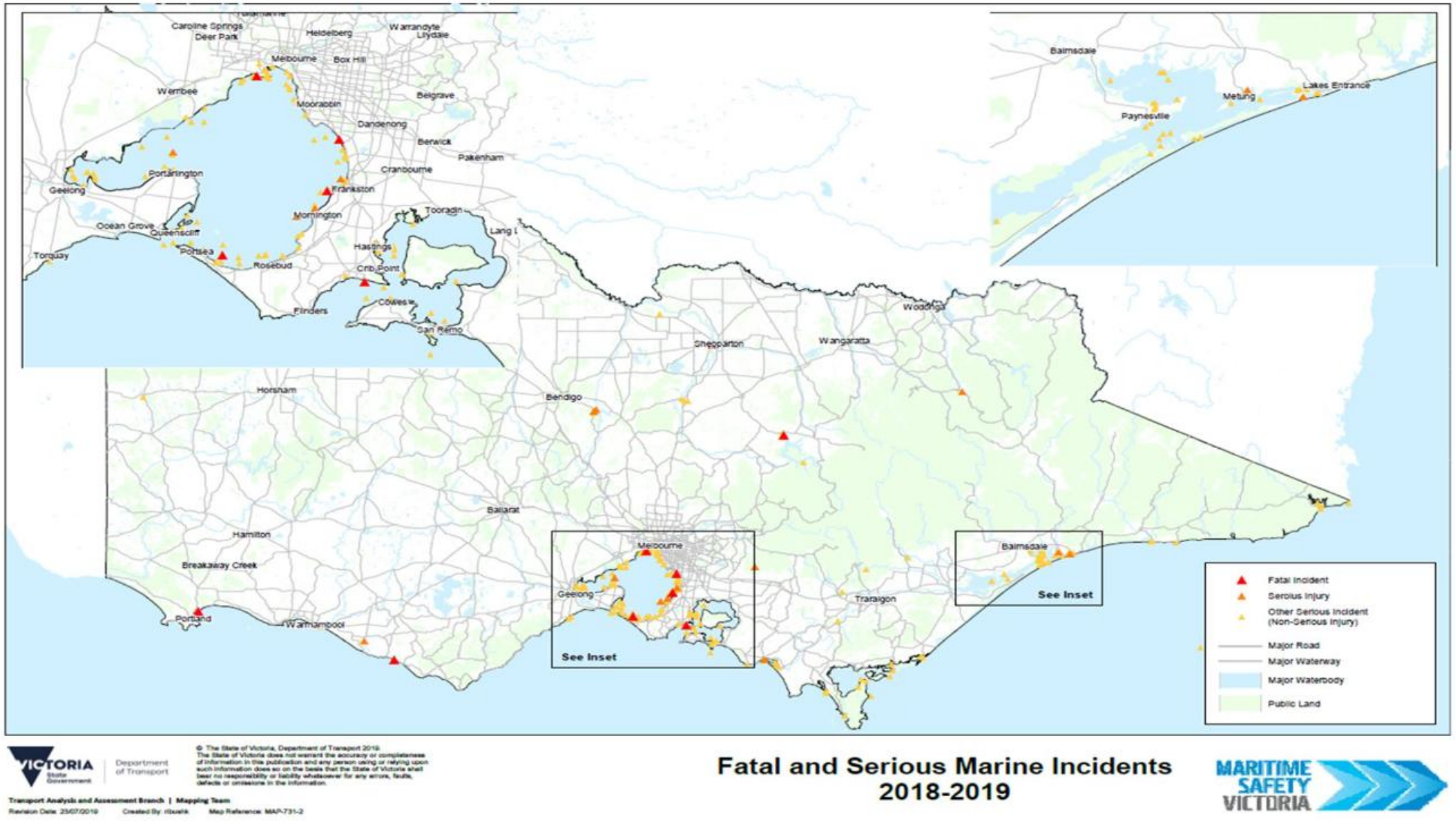


Figure 6-4 Fatal and serious marine incidents 2018 – 2019 (MSV, 2019)

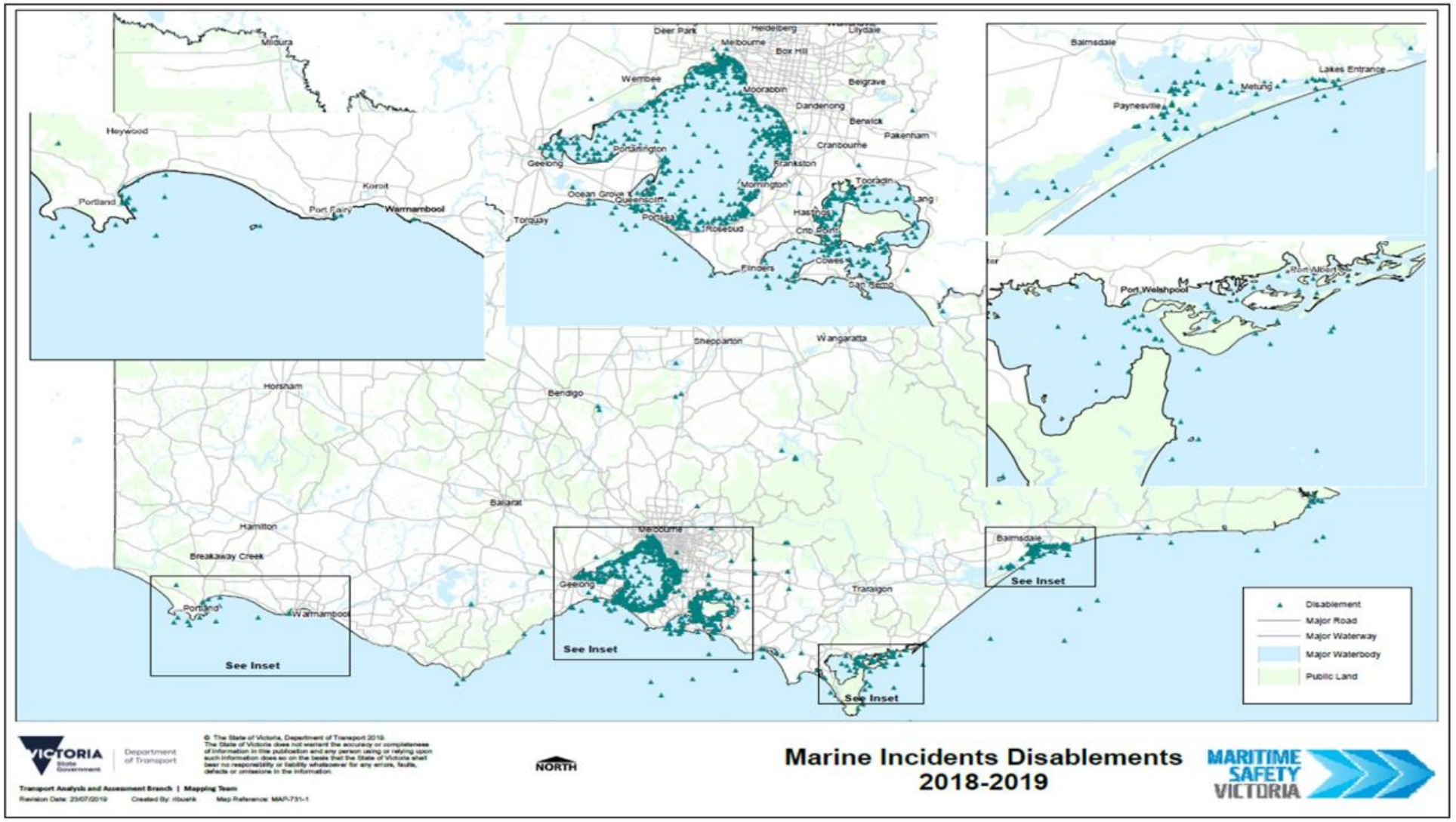


Figure 6-5 Marine incidents disablements 2018-2019 (MSV, 2019)

6.4 Radar and communications

Due to their size and construction WTGs may cause interference to air traffic control communications, navigation and weather surveillance facilities. Military and civil aviation rely on communications, navigation and surveillance infrastructure to support airspace and air traffic management. This equipment includes:

- Civil aviation communications and radar
- Military aviation communications and radar
- Search and rescue communications and radar
- Weather radar.

6.4.1 Aviation radar

Australia currently has two providers of air traffic services —AirServices Australia and the Department of Defence (Defence), however they are looking to integrate this system with a Civil Military Air Traffic Management System (CMATS) through the OneSKY Australia Program, with services commencing from 2026. Defence is responsible for controlling all of the aircraft operating within military-administered airspace, which includes services to all civilian aircraft in that airspace and Airservices Australia is responsible for all other air traffic services.

The airspace of the OWFA is covered by three air traffic services sites, shown on Figure 6-6. This includes the:

- RAAF Base East Sale which has a Primary Surveillance Radar (PSR) with a range of 120 nautical miles (220 kilometres), due to be replaced with modern radar technology with the ability to filter out the impact of wind farms on the radar.
- Mount Tassie Automatic Dependant Surveillance Broadcast station. At ground level the station has 20 nautical miles of coverage, at high level coverage can exceed 250 nautical miles.
- Gellibrand Hill radar. The PSR has a range of 60 nautical miles whilst the secondary surveillance radar has a range of 256 nautical miles.

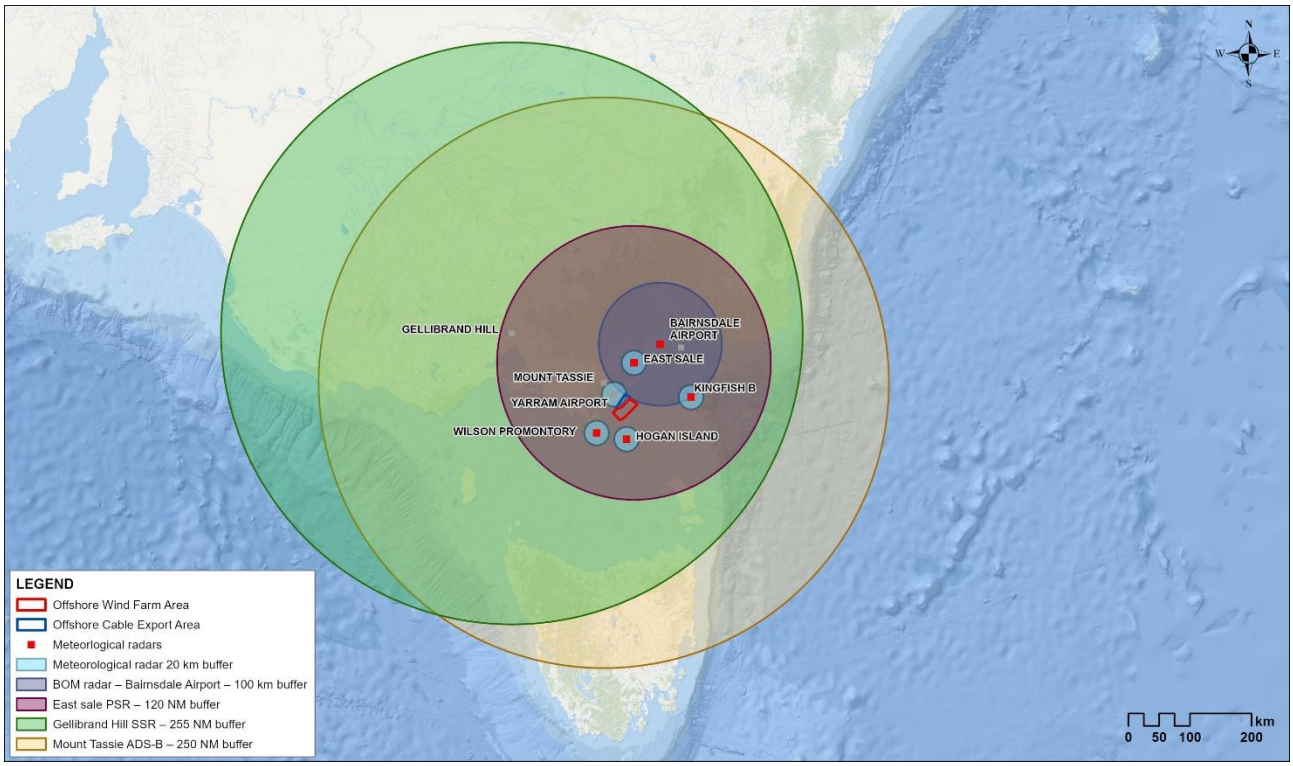


Figure 6-6 Civil and Defence surveillance radar and meteorological radar installations

6.4.1.1 Civil radar

There are eight other civil facilities surrounding the OPA that fall within the area of interest described under NASF Guideline G: Protecting Aviation Facilities –CS. These are listed in the table below.

Table 6-3 Aerodromes within the NASG Guideline G area of interest

Aerodrome	Distance from OWFA	Status	CNS facilities at Aerodrome?	Within the Guideline G zone for present CNS facilities?
Latrobe Valley Airport (YLTV)	65.73 km	Certified	Yes	No
RAAF Base East Sale (YMES)	58.82 km	Certified	Yes	No
West Sale Airport (YWSL)	58.41 km	Certified	Yes	No
Yarram Airport (YYRM)	19.74 km	Certified	Yes	No
Drouin Airport (YDRN)	105.29 km	Verified	No	No
Inverloch Airport	90.22 km	Verified	No	No
Leongatha Airport (YLEG)	84.89 km	Verified	No	No
Mt Tassie CNS Facility	66.39 km	N/A	Yes	No

6.4.1.2 Defence radar

The distance to RAAF Base East Sale from the OWFA is 58 km (Table 6-1).

Preliminary advice from Defence Land Planning & Regulation from consultation undertaken on 14 March 2025 indicates that the project's offshore wind turbines were unlikely to impact the operational integrity of the ATC surveillance radar located near RAAF Base East Sale.

Ongoing consultation will be undertaken with Defence Land Planning & Regulation, with the provision of a final layout provided for consideration prior to construction commencing.

6.4.2 Search and rescue

The radar and communications equipment used by the JRCC includes Cospas–Sarsat search and rescue satellite system, including satellites and ground receiving stations in Queensland and Western Australia.

6.4.3 Weather radar

The Bureau of Meteorology operates network stations across Australia and uses radar instruments for measuring wind speeds in the upper atmosphere (known as "wind finding" radar) and determining rain and storm activity (known as "weather watch" radar) (BoM, 2018).

The Gippsland area has 19 weather stations (BoM 2021). The closest weather stations are located at Yarram Airport, East Sale, Wilsons Promontory, Hogan Island and Kingfish B, 20, 58, 43, 36 and 91 kilometres away respectively (Figure 6-6).

6.5 Petroleum exploration and production

Multiple petroleum wells for exploration, appraisal and development are found in the Gippsland Basin, primarily operated by Esso Australia Resources, BHP Petroleum, OMV Australia and ExxonMobil in both Commonwealth and Victorian coastal waters. Two abandoned exploration wells are located within the OWFA.

Vessel-based activities related to petroleum exploration and production, including seismic surveys and routine maintenance and operations occur regularly within the region.

Petroleum titles for production, exploration, retention, pipelines, and Greenhouse Gas Assessment in Commonwealth and Victorian coastal waters, and their associated activities, are described in the sections below.

6.5.1 Commonwealth waters

Petroleum and greenhouse gas titles in Commonwealth waters are managed by the National Offshore Petroleum Title Administrator (NOPTA).

One petroleum licence, a Greenhouse Gas Assessment Permit, overlaps the Commonwealth waters of the project area (Table 6-4, Figure 6-7) which is described in Section 6.5.1.1.

Numerous petroleum titles for exploration, production and pipelines, occur in Commonwealth waters of the wider ensonified area and Gippsland Basin (Table 6-5, Figure 6-7) and are described in Sections 6.5.1.2 and 6.5.1.3.

Table 6-4 Commonwealth petroleum permits that overlap the project area

Title Operator	Permit Type	Permit
The Crown in right of Victoria	Greenhouse Gas Assessment Permit	G-5-AP

Table 6-5 Commonwealth petroleum permits within or near to the ensonified area

Title Operator	Permit Type	Permit
Esso Australia Resources Pty Ltd	Production Licence	VIC/L17
Esso Australia Resources Pty Ltd	Production Licence	VIC/L15
3D Energi Limited	Exploration Permit	VIC/P74
Tasmanian Gas Pipeline Pty Ltd	Pipeline licence	VIC/PL1-COMM
Tasmanian Gas Pipeline Pty Ltd	Pipeline licence	VIC/PL30
Esso Australia Resources Pty Ltd	Pipeline licence	VIC/PL21

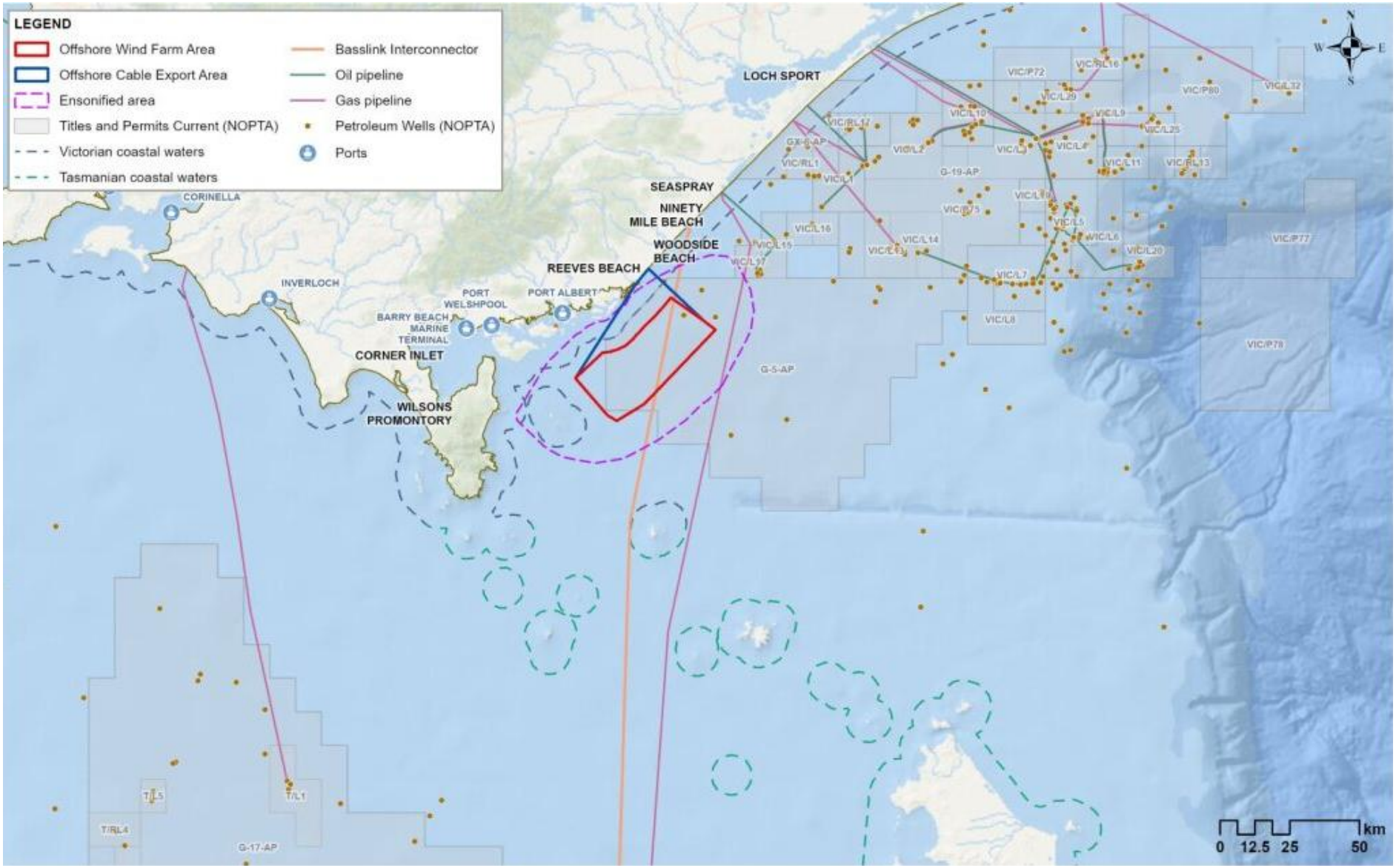


Figure 6-7 Commonwealth petroleum titles, platforms and pipelines within the Gippsland region

6.5.1.1 Greenhouse gas assessment

Greenhouse Gas Assessment Permits in Commonwealth waters are provided for under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and were released in 2009 and 2014.

Two Commonwealth Greenhouse Gas Assessment Permits have been declared in Commonwealth waters of the Gippsland Basin and were awarded to The Crown in right of Victoria. One overlaps the project area (Table 6-4). The permit for The Crown in right of Victoria are being managed by the CarbonNet project, which is investigating the potential for establishing a commercial scale carbon capture and storage network in Gippsland. CarbonNet's preferred storage formation ('Pelican') is located outside of the proposed OWFA, up to 13 km offshore of Golden Beach. Another potential injection site to the south of Pelican, overlapping the north of the OWFA, which could be developed in the future if the capacity of Pelican is reached.

The Work Program for permit G-5-AP, which details work obligations up to August 2026, does not include physical works in the area (NEATS 2023).

In the future, seismic surveys may be conducted to confirm the potential for carbon dioxide storage in the formation and then time-lapse surveys are undertaken throughout the life of carbon sequestration activities to assess CO2 migration (Hoffman 2021). Time-lapse data may be obtained through additional 2D or 3D seismic surveys or permanent monitoring devices in wellbores, along injection pipelines, or the seabed (Hoffman 2021).

6.5.1.2 Petroleum exploration

There are currently no proposed petroleum exploration seismic surveys that overlap with the project area (NOPSEMA 2022 and DJPR 2022).

Esso plans to conduct geophysical and geotechnical investigations over their title blocks, including those within or near to the ensonified area for the project, VIC/L17 and VIC/L15. These works are expected to occur over a five-year period once an environment plan is in force for the activity (Esso 2024).

Historically there has been up to one vessel-based petroleum exploration activity undertaken in Commonwealth waters of the Gippsland Basin per year, with an activity lasting up to six months (Table 6-6) (NOPSEMA 2022). At least seven gas-condensate prospects have been identified throughout the Gippsland Basin which is likely to attract future petroleum exploration including seismic and exploration wells (Lepic 2021).

Table 6-6 Historical petroleum exploration activities in Commonwealth waters of the Gippsland Basin

Proponent	Activity	Location	Year(s)	Duration
Esso Australia Resources Pty Ltd	Gippsland Basin Geophysical and Geotechnical Investigations	Offshore of Ninety Mile Beach to Lakes Entrance, north-east of the project area	2021-2023	2 x 2-15 day periods
CGG Services (Australia) Pty Ltd	Gippsland Marine Seismic Survey	Offshore of Golden Beach to Lakes Entrance, north-east of the project area	2020	6 months
CarbonNet	VIC-GIP-002 Geophysical and Geotechnical Investigations	Offshore of Golden Beach, north-east of the project area	2018-2019	2 weeks
Esso Australia Resources Pty Ltd	Gippsland Basin Geophysical and Geotechnical Investigations	Offshore of Ninety Mile Beach to Lakes Entrance, north-east of the project area	2018-2019	2 x 2-15 day periods
Carnarvon Hibiscus Pty Ltd	West Seahorse Geophysical and Geotechnical Survey	Offshore of Golden Beach, north-east of the project area	2014	2 x 10-15 day periods

6.5.1.3 Petroleum production

There are no petroleum platforms located in Commonwealth waters of the project area.

There are however several operating offshore platforms outside the OPA within the Gippsland Basin (Table 6-7) with associated pipelines and subsea facilities. Petroleum production platforms require support vessels to transfer cargo and crew between platforms and from port (see Section 6.8) and underwater maintenance activities that require the use of divers.

Table 6-7 Petroleum production within the Gippsland Basin in Commonwealth waters

Organisation	Project	Associated infrastructure		
Esso Australia Pty Ltd	Gippsland Basin Joint Venture (Esso and BHP Billiton Petroleum (Bass Strait) Pty Ltd (BHP)) and the Kipper Unit Joint Venture (Esso, BHP, and MEPAU A Pty Ltd)	Platforms (19): • Barracouta • Whiting • Marlin A, B • West Tuna • Halibut • Fortescue • Cobia • Perch	• Mackerel • Kingfish A, B • West Kingfish • Tuna • Snapper • Flounder • Bream A, B • Dolphin	Subsea facilities (5): • Tarwhine • West barracouta • Seahorse • Blackback • Kipper Network of subsea pipelines including the Perch to Shore pipeline (VIC/PL21).
SGH Energy VICP54 Pty Ltd	Longtom Gas Operations	Subsea facilities: • Longtom-3 • Longtom-4 • Longtom-5 • Gemfish-1	Network of subsea pipelines.	
Cooper Energy Limited	Gippsland Offshore Development	Operating wells: • Sole-3 • Sole-4 Subsea pipelines to the Orbost Gas Plant.	Suspended or unproductive wells: • Sole-2 • Basker-2 • Basker-3 • Basker-5	• Basker-6 • Basker-7 • Manta 2A • Patricia-2 • Baleen-4 • Patricia-1
Tasmanian Gas Pipeline Pty Ltd	Tasmanian Gas Pipeline	Subsea gas pipeline		

Additional wells are proposed to be drilled with subsea tie-in to existing petroleum pipelines including at the Longtom platform to further the life of the gas field, although these too are outside the project area. The current and future proposed facilities in the Gippsland Basin are expected to operate over the next 10 to 20 years (DIIS 2017).

Several Esso platforms are being readied for decommissioning, known as the cessation of production stage, which can take several years to complete. Operating platforms may still be required to facilitate cessation activities, such as pigging, or facilitate operations on producing platforms (Esso 2021), meaning that maintenance and support activities would continue as usual on these platforms until decommissioning is complete, including diving operations as described in the section below. In addition, there is Cooper Energy infrastructure (Manta 2A, Basker-A and Basker-6) being prepared for decommissioning (Cooper Energy 2022).

Maintenance divers

Maintenance divers are typically linked to a support vessel by an umbilical or tether system and use an air helmet. Diving could include air diving, saturation diving or hard suit diving. Depending on operation length and water depth they may be diving from a bell with a dive support vessel nearby. Dive operations are an approved activity under all of the operations and maintenance environment plans in force and therefore could be undertaken at any time permitted under that environment plan. Maintenance activities described in currently accepted environment plans are generally for one week every two to three years.

6.5.2 Victorian waters

Petroleum and greenhouse gas titles in Victorian coastal waters are managed by the Victorian Department of Jobs, Skills, Industry and Regions (DJSIR). One exploration permit overlaps the Victorian coastal waters of the project area (Table 6-8, Figure 6-8).

Numerous petroleum titles occur in Victorian coastal waters of the wider ensonified area and Gippsland Basin (Table 6-9, Figure 6-8), which may use the Offshore Export Cable Area or be impacted by underwater noise associated with the project.

Table 6-8 Victorian petroleum permits that overlap the Offshore Export Cable Area

Title Operator	Permit Type	Permit
Petro Tech Pty Ltd	Exploration Permit	VIC/P44(V)

Table 6-9 Victorian petroleum permits within the wider Gippsland region

Title Operator	Permit Type	Permit
GB Energy (VIC) Pty Limited	Retention Lease	VIC/RL1(V)
Petro Tech Pty Ltd	Exploration Permit	VIC/P43(V)
The Crown in right of Victoria	Greenhouse Gas Assessment Permit	GGAP006386(V)
Tasmanian Gas Pipeline Pty Ltd	Pipeline licence	VIC/PL30(V)

6.5.2.1 Greenhouse gas assessment

Greenhouse Gas Assessment Permits in Victorian coastal waters are provided for under the Victorian *Offshore Petroleum and Greenhouse Gas Storage Act 2010* and were released in 2016.

One Greenhouse Gas Assessment Permit has been declared in Victorian coastal waters of the Gippsland Basin and was awarded to The Crown in right of Victoria (Table 6-9) and is being managed by the CarbonNet project as described in Section 6.5.1.1. Seismic surveys are conducted to confirm the potential for CO_2 storage as described in Section 6.5.1.2.

6.5.2.2 Petroleum exploration

There are no proposed petroleum exploration surveys that overlap with the project area in Victorian coastal waters (DJPR 2022).

Historically there has been up to one vessel-based petroleum exploration activity undertaken in Victorian coastal waters of the Gippsland Basin per year, with an activity lasting up to one month (Table 6-10). At least seven gas-condensate prospects have been identified throughout the Gippsland Basin which is likely to attract future exploration including seismic surveys and exploration wells (Lepic 2021).

Table 6-10 Future planned and historical petroleum exploration activities in Victorian coastal waters of the Gippsland Basin

Proponent	Activity	Location	Year	Duration
GB Energy	Golden Beach geophysical and geotechnical investigations	Offshore of Golden Beach	2019	15-17 days
The Crown in right of Victoria	Pelican 3D Marine Seismic Survey	Offshore of Golden Beach	2018	13-27 days

6.5.2.3 Petroleum production

There are no petroleum production platforms located in the Victorian coastal waters of the project area.

There are several operating offshore platforms within the Gippsland Basin in Commonwealth waters (see Section 6.5.1.3) with associated pipelines and subsea facilities that traverse Victorian coastal waters (Figure 6-8), including the Tasmanian Gas Pipeline. There are also wells in Victorian coastal waters with pipelines

that connect them to the mainland (Table 6-11). Maintenance of these subsea facilities and pipelines require the use of divers as described in Section 6.5.1.3.

Table 6-11 Petroleum production within the Gippsland Basin in Victorian coastal waters

Proponent	Activity	Associated infrastructure	
GB Energy (VIC) Pty Limited	Golden Beach Gas project	Subsea gas pipeline Shore crossing facility	Two offshore wells
Tasmanian Gas Pipeline Pty Ltd	Tasmanian Gas Pipeline operations	Subsea gas pipeline	

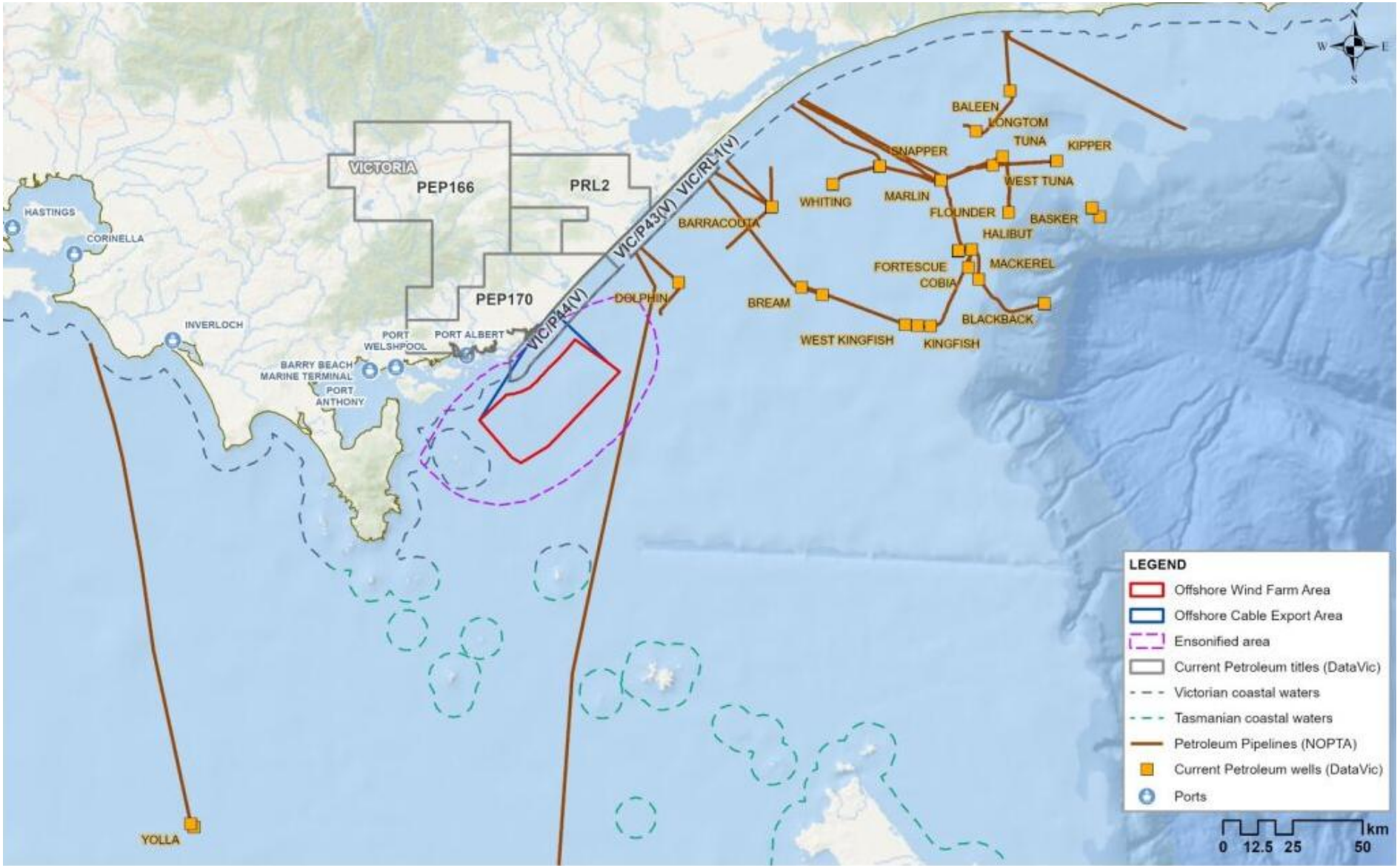


Figure 6-8 Victorian petroleum titles, platforms and pipelines within the Gippsland region

6.6 Research

There are no permanent scientific research stations not associated with offshore wind investigation within the project area. The closest permanent research station is in Corner Inlet, which is used as a site for scientific research by several institutions including:

- Arthur Rylah Institute for Environmental Research, the research arm of DEECA. Arthur Rylah is a centre for applied ecological research, with an emphasis on flora, fauna and biodiversity issues. Research themes include wetland health and ecology, threatened species, and mapping and measuring biodiversity (including wetland condition).
- CSIRO Marine and Atmospheric Research, based in Melbourne, Victoria whose research in the area has covered marine pests
- Universities and colleges including Deakin University, University of Melbourne and Victoria University.

There are other research studies conducted within the OPA, including:

- The Victorian Fisheries Authority and Fisheries Research and Development Corporation (FRDC) regularly conducts research to support fishery management within the coastal waters offshore of Victoria and within Corner Inlet
- The Marine Mammal Foundation conducts research and surveys of Victorian coastal dolphin species
- Integrated Marine Observing System (IMOS) Victorian Node supporting research from Deakin University, the University of Melbourne and Monash University.

ReefLife Survey, a long-term volunteer reef monitoring program using SCUBA, surveys 52 reef sites annually around Wilson Promontory and the Kent Group of Islands (Figure 6-9).

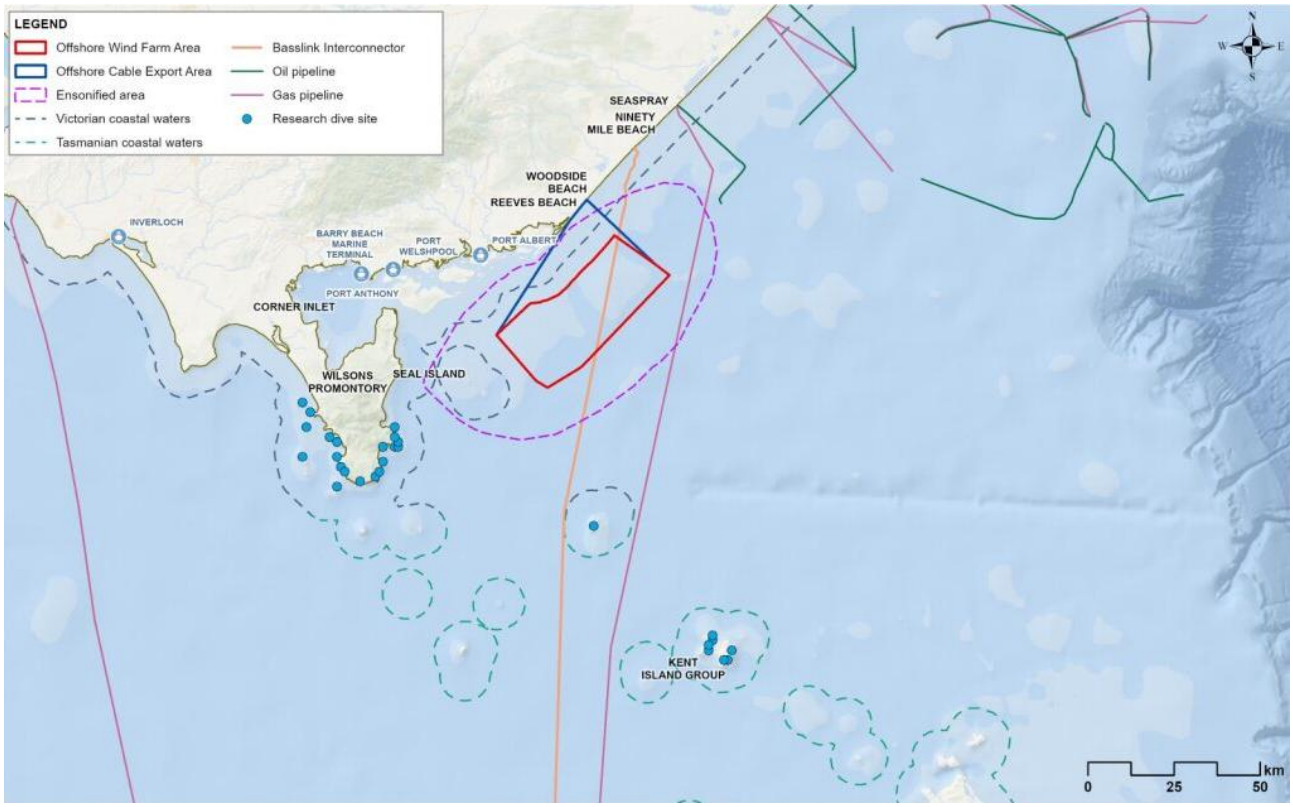


Figure 6-9 Research sites and submarine power and telecommunication cables within the study area

6.7 Submarine power cables

A submarine power cable, the Basslink Interconnector, traverses the eastern part of the OPA from its Victorian shore crossing at McGaurans Beach to its landfall in Tasmania (Figure 6-9). The Basslink Interconnector is a 370 km electricity connector between the power grids of Victoria and Tasmania that commenced operation in 2009. Additional capacity to carry communications traffic also operates along the route (Basslink Telecoms). Operations and maintenance associated with the Basslink Interconnector through the project area includes cable recovery and laying activities from a special-purpose vessel.

6.8 Vessels

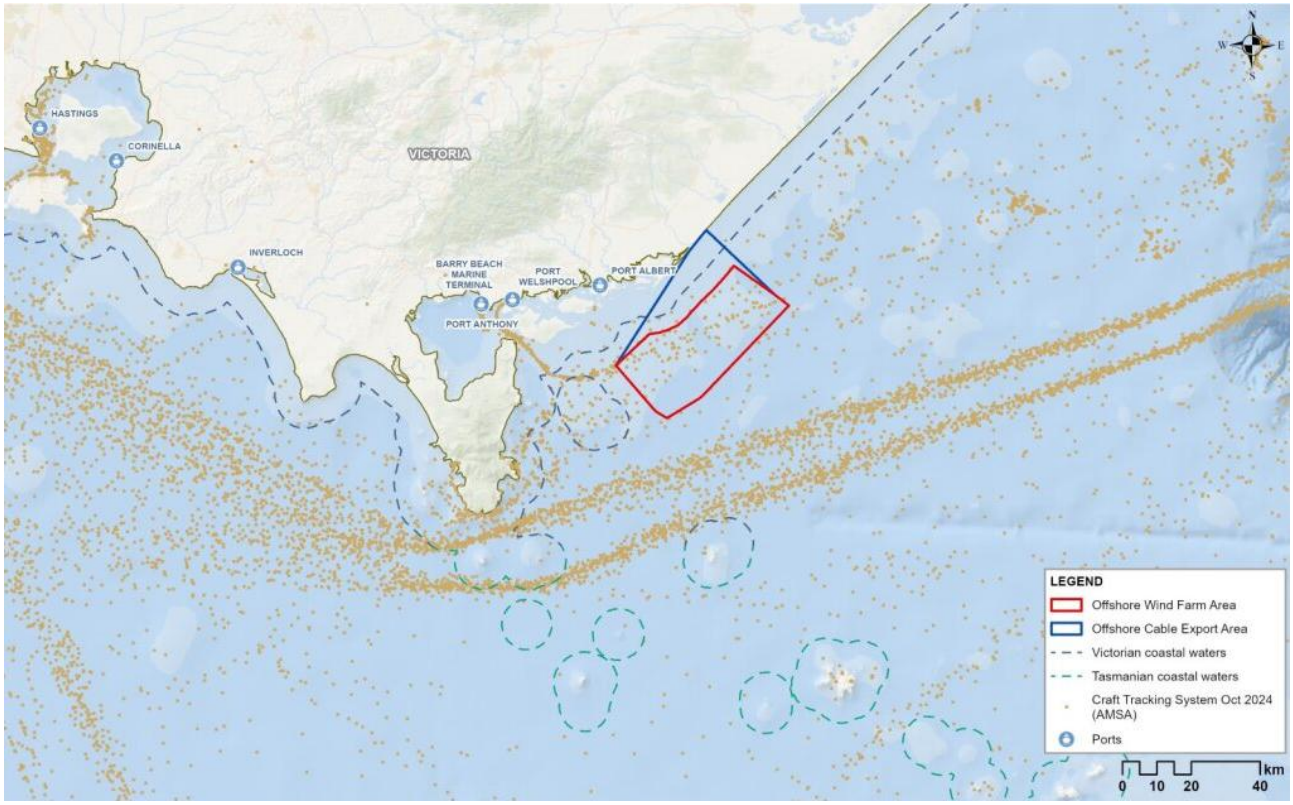
Vessel-based activities, including for petroleum exploration and production, Defence, search and rescue, and submarine power cable infrastructure maintenance occur regularly within the Gippsland Basin. Various types of vessel are used however a typical support vessel is up to 100 m (see Technical Report P: Shipping and navigation). These vessels typically traverse through the OWFA (see Figure 6-10).

Barry Beach Marine Terminal and Port Anthony experience a small amount of vessel traffic due to their small capacity and limited access to the ports via Corner Inlet.

Two traffic separation schemes have been implemented by the International Maritime Authority in the Bass Strait. The first is to the north-east of the project area in Commonwealth waters and consists of an eastbound and westbound shipping lane marked on nautical charts and an ‘area to be avoided’ around the petroleum infrastructure in the Gippsland Basin, designed to guide shipping traffic through the existing infrastructure in the area. The second traffic separation scheme is to the south of Wilsons Promontory.

There are no designated Defence maritime training areas within the project area, however Defence activities that may take place include the transit of naval vessels, training exercises, hydrographic surveys, surveillance and enforcement and search and rescue.

Note that the Shipping and Navigational risk related to vessel activity in the Gippsland Basin is addressed in a separate report (Technical report P: Shipping and navigation).



Note: this density map has been derived from AIS points for the year 2023. Each point represents an AIS vessel position.

Figure 6-10 Shipping routes and traffic density in proximity to the offshore project area (OPA) (AMSA, 2024)

7 KEY PARAMETERS FOR ASSESSMENT

7.1 Construction Project Parameters

Table 7-1 specifies the parameters of the maximum design scenarios that have been assessed for construction. These represent the project parameters from the project envelope that would have the greatest potential impact to an identified sensitive receptor or receptor group. See Section 5.4 for more information on how maximum design scenarios are applied in the impact assessments.

Table 7-1 Maximum design scenario – construction

Impact/ Risk ID	Impact/ Risk	Maximum design scenario	Justification
IOU-I01	Underwater noise impact to petroleum, submarine power cable and research divers	Monopiles: • Up to 147 WTG monopiles • Up to 11.8 m pile diameter • Up to 4,000 kJ peak pile hammer energy • Up to 41.95 m pile penetration depth • Up to 588 days of piling over 50 months • Maximum 1 pile installed per day • No concurrent piling • 4 years and 11 months (59 months) of construction	Driving monopiles produces the largest ensonified area for impulsive noise sources associated with the project.
IOU-I02	Underwater noise impact to petroleum exploration		
IOU-I03	Displacement or interaction with non-project vessels	• Up to 147 wind turbine generators (WTGs) • Up to 5 offshore substations (OSS) • Up to 418 km of inter array cables • Up to 40 km of interlink cables • Up to 8 export cables totalling up to 286 km • 500 m safety zone applied around each turbine under construction, with up to six present in the OWFA at any one time • During construction statutory safety zones will be implemented as well as demarcation of construction areas and the use of escort vessels. If the cable is 'wet stored', restrictions to anchoring and some fishing activities would apply until the cable is buried to avoid damage to the cable and/ or other vessels. The location of demarcation areas will be communicated regularly, including through NTMs and other communication tools such as SMS updates, social media and the project website. • Vessels typically included: – WTG construction vessels and support vessels, – Inter-array cables installation vessels and support vessels – Substation installation and support vessels – Export cable installation and support vessels • 4 years and 11 months (59 months) of construction • Maritime safety lighting and markings on turbines and offshore substations	The maximum amount of infrastructure, installation vessels and associated safety zones leading to the maximum amount of restricted access to the marine area for the longest period of time.
IOU-I04	Interference with submarine power cables	• Up to 418 km of inter-array cables • Up to 40 km of interlink cables • Up to 8 export cables, totalling up to 286 km	The maximum amount of infrastructure and associated safety zones leading to the maximum amount of

Impact/ Risk ID	Impact/ Risk	Maximum design scenario	Justification
		• During construction statutory safety zones will be implemented as well as demarcation of construction areas and the use of escort vessels.. If the cable is 'wet stored' restrictions to anchoring and some fishing activities would apply until the cable is buried to avoid damage to the cable and/ or other vessels. The location of demarcation areas will be communicated regularly, including through NTMs and other communication tools such as SMS updates, social media and the project website. • Crossing of existing sub-sea cables, by the crossing building works or piped protection to provide separation between cables. • 500 m buffer along either side of the Basslink Interconnector through the OWFA (inter-array cable). • Up to 12 cable crossings with cable protection used • Export cables - up to 19 month construction period • Array cables – up to 11 month construction period	restricted access to submarine power cables for repair or maintenance operations for the longest period of time.
IOU-I05	Displacement or interference with aviation	Height of construction equipment Up to 147 WTG WTGs up to 350 m tall (blade tip height above LAT) 500 m safety zone applied around each turbine and crane • Turbine lighting (see Section 7.1.2) • 4 years and 11 months (59months) of construction	The maximum WTG construction equipment height and associated recommended avoidance zones leading to the highest turbines over the largest footprint.

7.1.1 Wind farm layout

The wind farm layout is still in its conceptual stages and will be further developed following outcomes of environmental assessments, seabed surveys and wind modelling during the detailed design phase. Any changes will be in finalised in accordance with the design principles described in EIS Chapter 4 – Project description and EES Chapter 4 – Victorian works project description.

At the time of the impact and risk assessment, the configuration shown in the figure below represented the maximum design scenario and provides the basis for assessment. Although the location of structures will not be finalised until post-approval, this approach ensures that whatever is constructed will fall within the maximum design parameters already assessed.

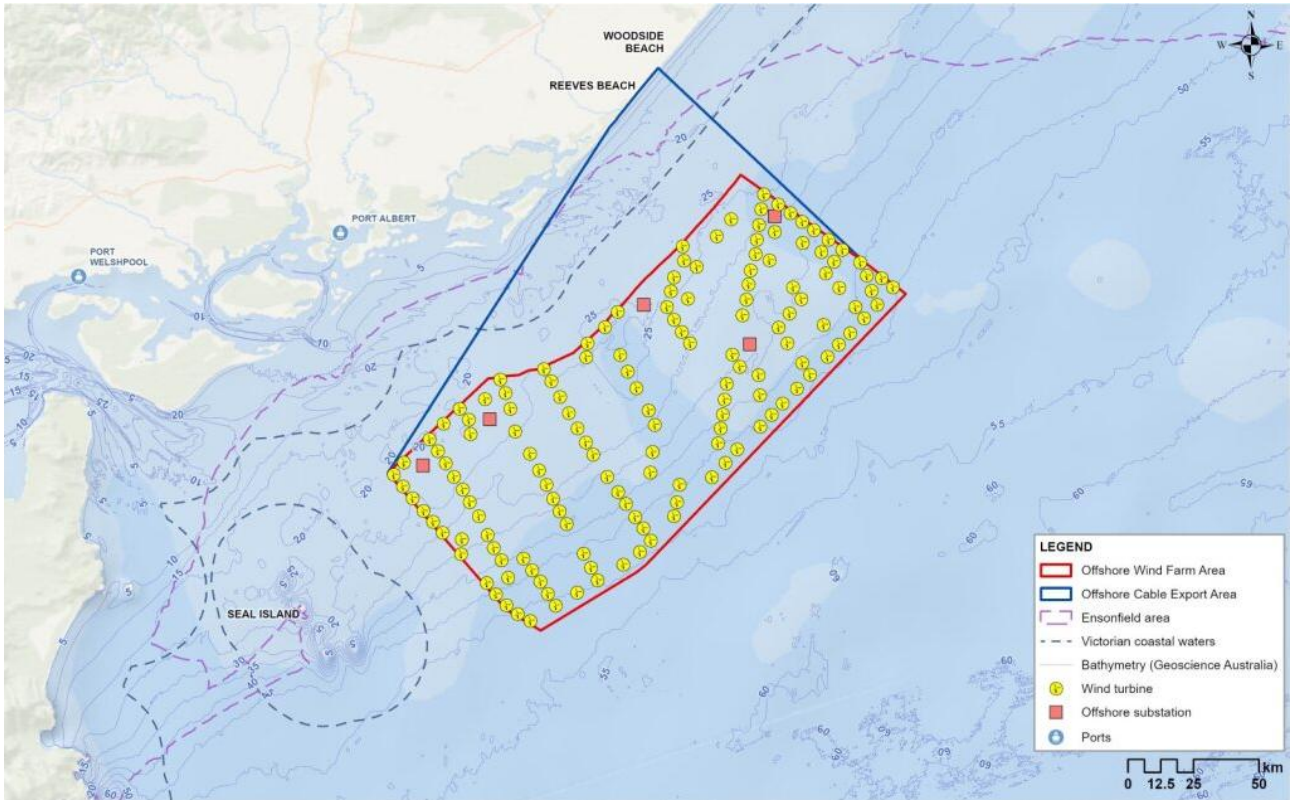


Figure 7-1 Indicative wind farm layout used for assessment with 147 turbines

7.1.2 Lighting plan

Lighting the wind farm is required for both maritime and aviation safety reasons. Maritime safety is addressed in Technical report N: Shipping and navigation and therefore will not be discussed here. This section relates to aviation lighting specifically.

During the construction phase, all structures (above the water level) regardless of construction status will be marked with temporary yellow flashing lights (visible through 360°) with a 2 nm range. Lights will be positioned on structures to ensure 360° visibility, including the use of multiple lights if required.

Consultation has not been undertaken with CASA and AirServices Australia regarding the final WTG layout and mitigations required to address aviation safety, therefore mitigations and designs presented in this report are subject to further consultation with the relevant aviation authorities. Once constructed, there are four offshore lighting configurations that are proposed to be used within the windfarm, for inner turbines, intermediate peripheral structures, offshore substations and significant peripheral structures. Proposed lighting design for each of these configurations are shown in the figures below.

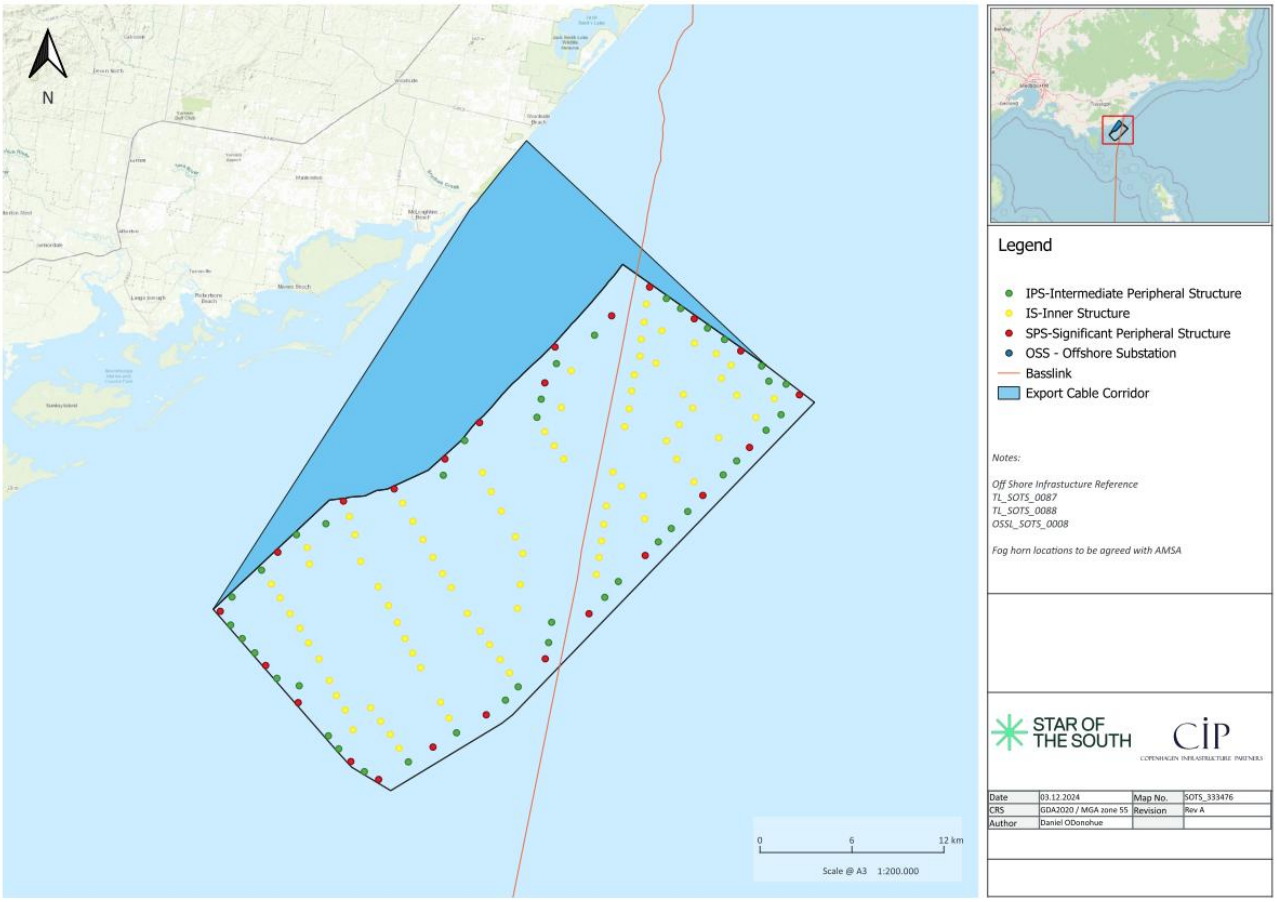


Figure 7-2 Offshore wind farm lighting plan based on 147 turbines

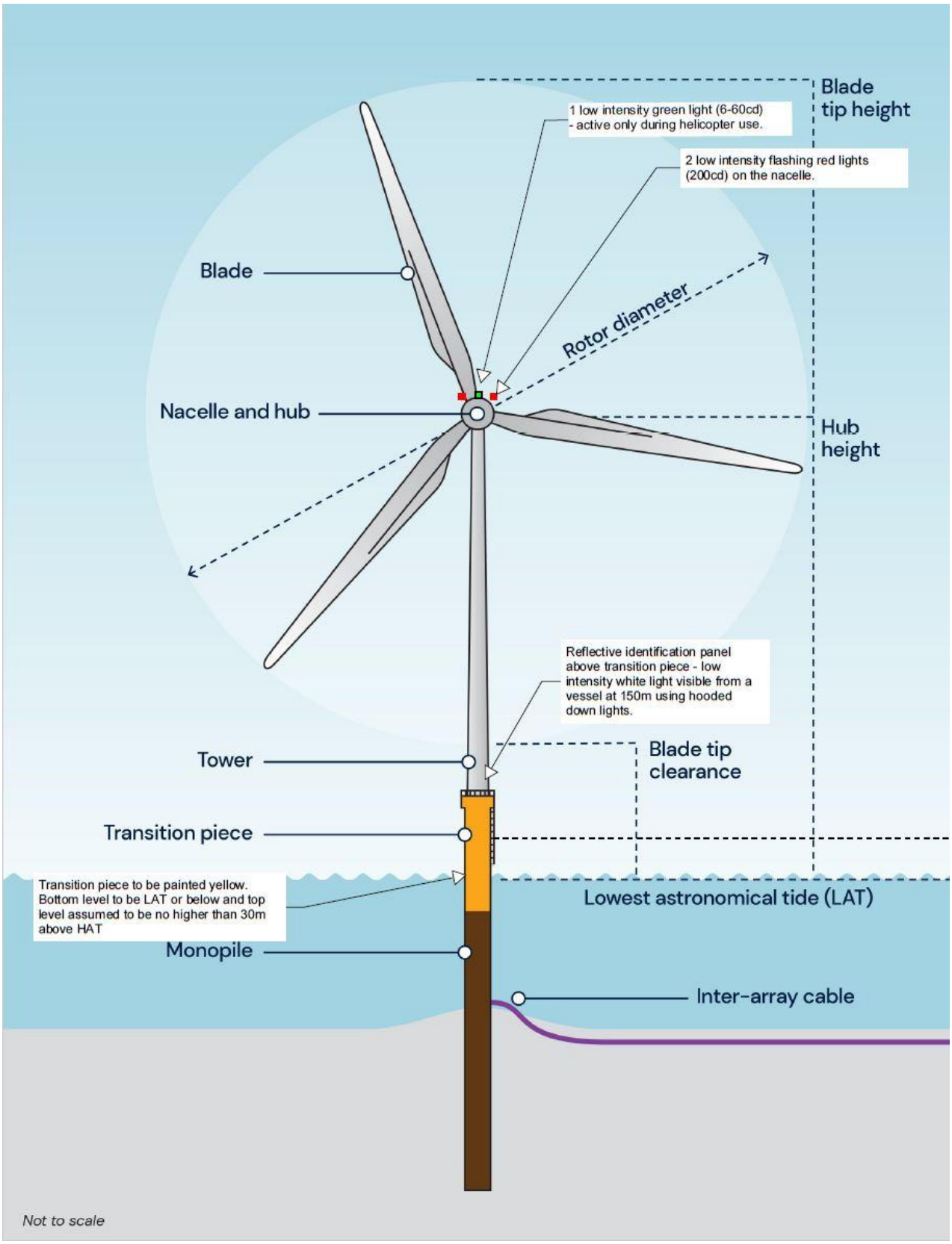


Figure 7-3 Inner turbine lighting plan

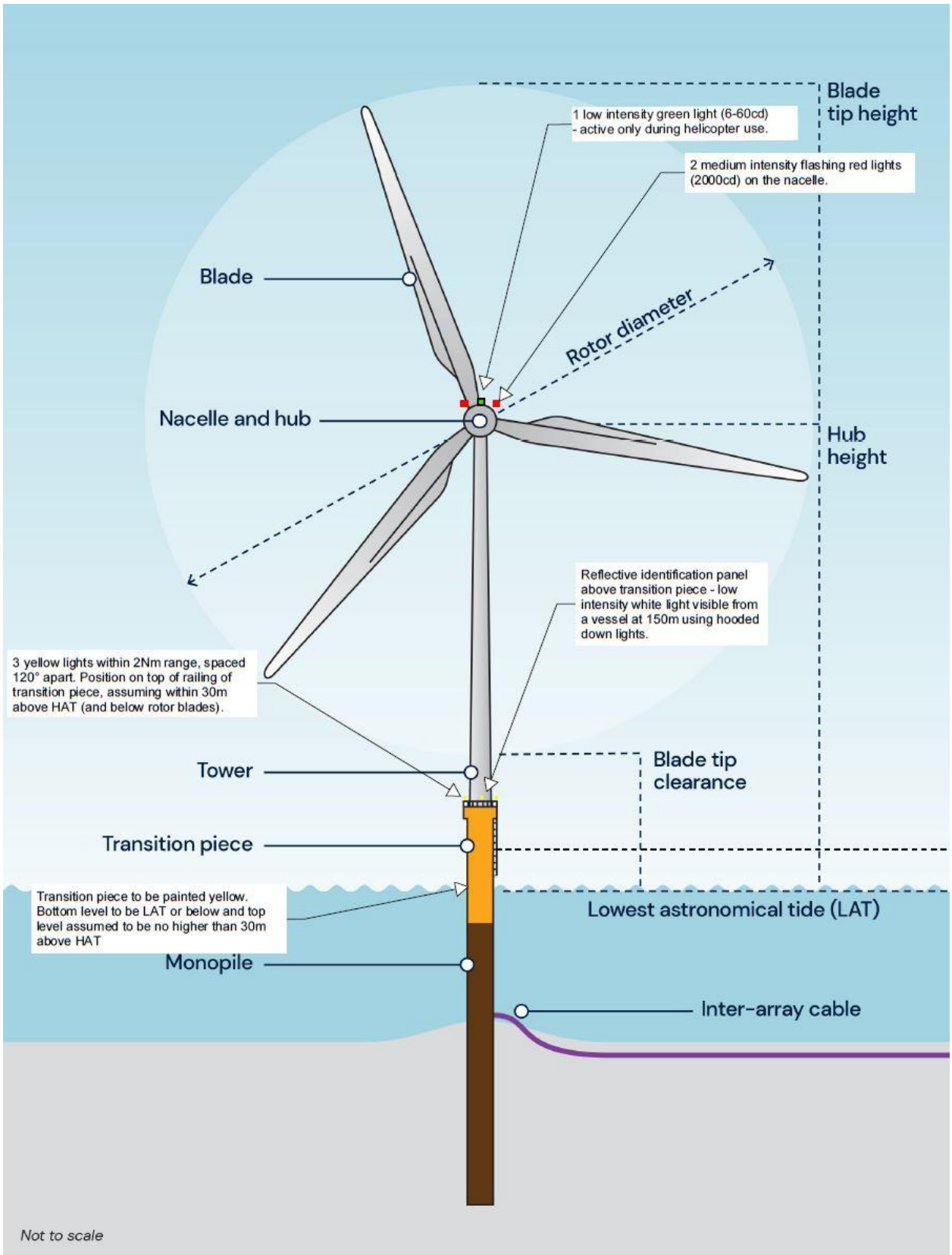


Figure 7-4 Intermediate peripheral structure lighting plan

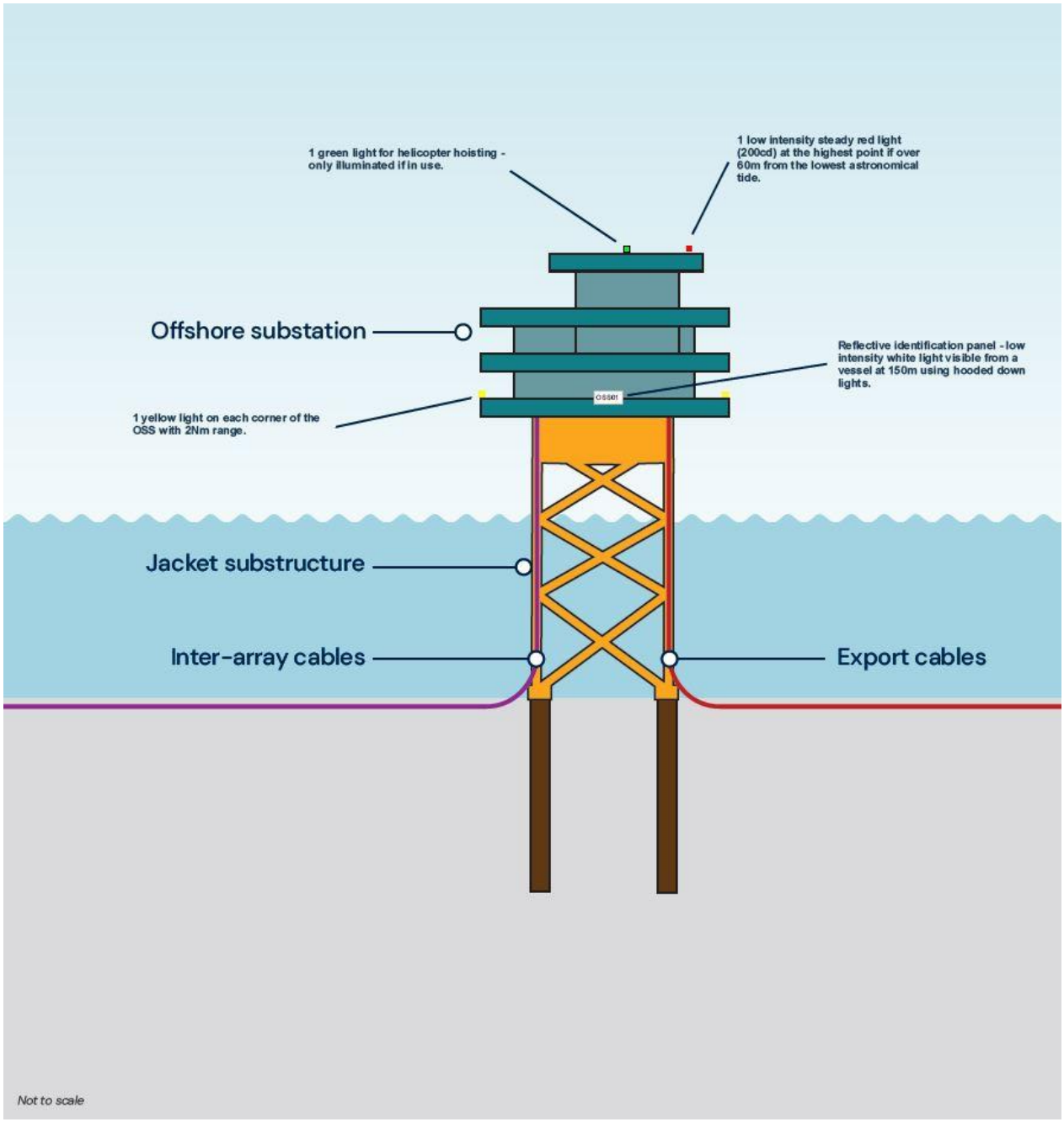


Figure 7-5 Offshore substation lighting plan

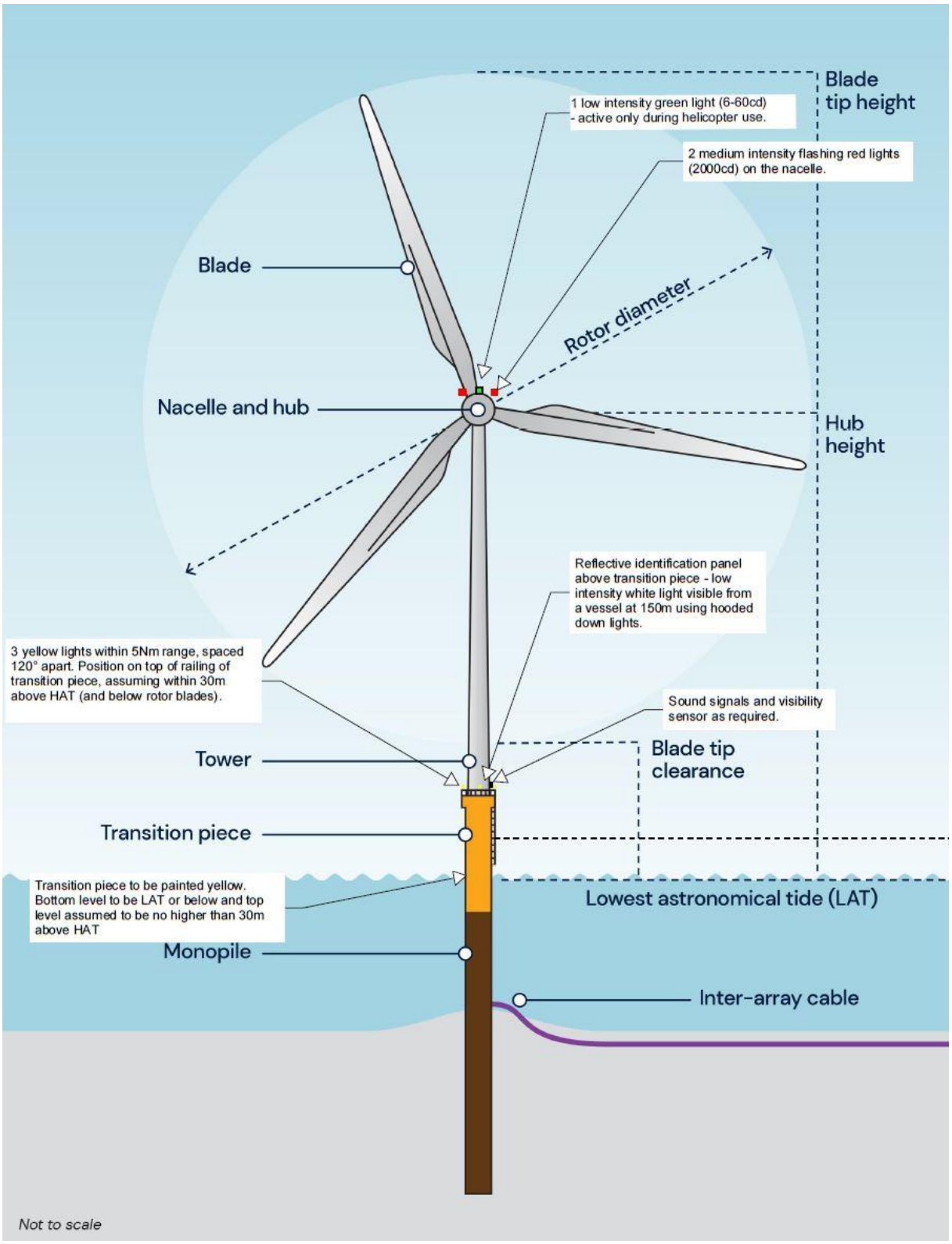


Figure 7-6 Significant peripheral structure lighting plan

7.1.2.1 Temporary construction lighting

The wind farm will be marked as a construction area during the construction phase via the use of temporary maritime construction cardinal buoys. This will be a combination of maritime cardinal marks and special marks along the perimeter of the OWFA for vessel demarcation. Several of the cardinal marks might transmit via Automatic Identification System (AIS). During the construction phase, all structures (above the water level) regardless of construction status will be marked with temporary yellow flashing lights (visible through 360°) with a 2 nm range at sea level. It is likely that two lights per structure will be used to ensure 360° visibility.

No specific aviation lighting or marking will be implemented during the construction phase. Star of the South will undertake promulgation of information to relevant aviation authorities and stakeholders prior to and during construction. Aviation lighting will be implemented on installed turbines and tall structures as soon as possible.

7.2 Operations Project Parameters

Table 7-2 specifies the parameters of the maximum design scenarios that have been assessed for operations. These represent the project parameters from the project envelope that would have the greatest potential impact to an identified sensitive receptor or receptor group. See Section 5.4 for more information on how maximum design scenarios are applied in the impact assessments.

Table 7-2 Maximum design scenario – operations

Impact/ Risk ID	Impact/ Risk	Maximum design scenario	Justification
IOU-I06	Displacement or interaction with of non-project vessels	• Up to 147 WTGs throughout the OWFA extent with safety markings and lights • Turbine blades as low as 35 m LAT • Up to 5 offshore substations (OSS) • Up to 418 km of inter array cables • Up to 40 km of interlink cables • Up to 8 export cables totalling up to 286 km • Up to two service operation vessels in the project area every day for the life of the wind farm • Potentially annual ROV vessel present • Potentially annual seabed surveys and depth of burial surveys once every three years • Cable repair vessels present once every other year. • Star of the South will consult with other uses of the sea (including the fishing industry) on any application for safety or protection zones prior being submitted under the OEI Act or any application for a marine exclusion zone being submitted in state waters under the Marine Safety Act 2010. • During operational maintenance activities demarcation of operational areas will be used and the use of escort vessels. The location of demarcation areas will be communicated regularly, including through NTMs and other communication tools such as SMS updates, social media and the project website.	The maximum amount of infrastructure, installation vessels and associated safety zones leading to the maximum amount of restricted access to the marine area for the longest period of time.
IOU-I07	Interference with submarine power cables	• Up to 147 wind turbine generators (WTGs) • Up to 5 offshore substations (OSS) • Up to 418 km of inter array cables • Up to 40 km of interlink cables • Up to 8 export cables totalling up to 286 km 500 m buffer along either side of the Basslink Interconnector through the OWFA (inter-array cable) • Cable repair vessels present once every other year.	The maximum amount of infrastructure and associated safety zones leading to the maximum amount of restricted access to submarine power cables for repair or maintenance

Impact/ Risk ID	Impact/ Risk	Maximum design scenario	Justification
		• Star of the South will consult with other users of the sea (including the fishing industry) on any application for safety or protection zones prior being submitted under the OEI Act or any application for a marine exclusion zone being submitted in state waters under the Marine Safety Act 2010. • During operational maintenance activities demarcation of operational areas will be used and the use of escort vessels. The location of demarcation areas will be communicated regularly, including through NTMs and other communication tools such as SMS updates, social media and the project website.	operations for the longest period of time.
IOU-I08	Turbine blade interference with radar, communications and meteorological equipment	• Up to 147 WTGs • Turbine blades as low as 35 m LAT • Turbine height up to 350 m • Operation 100% of the time • Start-up wind speed 3 m/s • Shut-down wind speed 35 m/s • Annual percentage downtime for turbines 4.7%	The maximum WTG height and associated safety zones leading to the highest turbines over the largest footprint with the maximum operational window
IOU-I09	Displacement or interaction with aircraft	• Up to 147 WTGs marked with safety aviation lighting • Turbine height up to 350 m • Aviation lighting as described in Section 7.1.2 • Operation 100% of the time • Start-up wind speed 3 m/s • Shut-down wind speed 35 m/s	The maximum WTG height and associated safety zones leading to the highest turbines over the largest footprint with the maximum operational window

7.3 Decommissioning

The MDS for the decommissioning phase assumes:

- Removal of offshore substation topsides and foundations to just below seabed
- Removal of WTGs, 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.

Decommissioning is expected to involve similar activities, types and numbers of vessels and equipment as the construction phase.. As for construction (see Table 7 1), assumptions are based on maximum build-out over the greatest area and use of temporary safety zones and buoyed decommissioning area.

7.4 Initial mitigation measures adopted as part of the project

As part of the project design process, a number of initial mitigations have been proposed to reduce the potential for impacts on shipping and navigation. As there is a commitment to implementing these measures as standard best practice, they are considered inherently part of the design of Star of the South and have therefore been considered within the impact assessment presented in this section. Many of these measures are considered standard industry practice for offshore wind globally and/or offshore industries in Australia.

Routine maritime or project-specific management plans provide initial sources of mitigation that are applied prior to the assessment of initial impacts. Initial mitigation measures for the construction phase are summarised in Table 7-3.

Mitigation measures referred to below are summarised in Section 13.1.

Table 7-3 Initial mitigation measures – construction, operation, decommissioning

ID	Mitigation measure	Mitigation description	Phase	Impact/risk pathway	Relevant impact/risk
OMU-M10	Petroleum exploration and Offshore Wind industry consultation	Conduct stakeholder consultation prior to and during marine construction piling to allow for seismic and geophysical survey operators to pre-plan surveys and co-ordinate infield survey management (for example, SIMOPS planning and line planning).	Pre-construction construction	Underwater noise impact to data quality in the petroleum exploration industry	IOU-I02
OMU-M11	Basslink consultation	Consultation will continue with the operator of Basslink to develop an agreement detailing the design and installation method of cable crossings and the responsibilities of each party.	Pre-construction	Interference with submarine power cables	IOU-I04
OMU-M12	Basslink survey	Survey of the portion of the Basslink Cable that is within the Offshore Project Area to inform cable crossing type and location. If the cable cannot be located then restrictions on anchoring by project vessels in the area will be implemented after further consultation with Basslink.	Pre-construction	Interference with submarine power cables	IOU-I04
OMU-M13	Safe diving controls	Application of DMAC 12 Safe Diving Distance from Seismic Surveying Operations during marine construction piling: 1. Where reasonably practicable, plans should be made to avoid overlapping piling and diving activities. Where this is not possible, the activities should be prioritised on a case-by-case basis. 2. Where diving and piling activity are scheduled to occur within a distance of 45 km, it would be good practice for all parties to be made aware of the planned activity where practicable. This should include clients/operators, diving and piling contractors. 3. Where diving and piling activity will occur within a distance of 30 km a joint risk assessment should be conducted between the clients/operators involved and the piling and diving contractors in advance of any SIMOPS plan being developed. The SIMOPS plan should include that: a. The maintenance of effective communication and co-operation between the piling vessel and the diving vessel is essential b. The minimum safe distance between parties should not be compromised by either party c. There should be regular effective communication between the piling vessel and diving vessel so that those in control of piling and diving operations are aware of each other's work programmes. A communications check should be conducted between vessels at a pre-defined regular frequency in order to reduce the chance of an unknown communications failure	Construction	Underwater noise impact to petroleum production, submarine power cable, or research divers	IOU-I01

ID	Mitigation measure	Mitigation description	Phase	Impact/risk pathway	Relevant impact/risk
		d. Should any member of the diving team in the water suddenly experience discomfort, the piling operation should be terminated as soon as possible. The SIMOPS plan should include contingency arrangements for this situation e. A diver's exposure should be terminated if the noise level: – i. interferes with diver communications; – ii. is considered to exceed acceptable noise exposure levels; – iii. induces discomfort; or – iv. places the diver at risk in any other way. Diving operations may continue if none of these criteria for terminating diving operations are present, including diving within 30 km of piling operations.			
VES-M01	Vessel Operations Framework	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: • 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 *Navigation Act 2012* (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 *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth), the *Navigation Act 2012* (Commonwealth) and the *Pollution of Waters by Oil and Noxious Substances Act 1986* (Victoria). 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). Star of the South will ensure that prior to procuring project vessels, all vessels have a record of inspections and compliance	Construction Operation Decommissioning	Displacement or interaction with non-project vessels	IOU-I03 IOU-I06
OFF-M10	Notices To Mariners	During all phases of the project, distribution of Notices To Mariners (NTMs) via the Australian Maritime Safety Authority (AMSA) and Safe Transport Victoria (STV) to notify third-party vessel operators of project	Construction Operation	Displacement or interaction with non-project vessels	IOU-I03 IOU-I06

ID	Mitigation measure	Mitigation description	Phase	Impact/risk pathway	Relevant impact/risk
		vessel movements, the establishment of safety zones, and the placement of permanent infrastructure (see SNV-M09 Charting of final layout on navigational charts). NTMs will provide advice on aids to navigation (AtoNs), safety issues, dangers or hazards to navigation. All NTMs will be published on the Australian Hydrographic Office (AHO) website and other local reporting as specified by the regulator. The Australian Maritime Safety Authority – Rescue Coordination Centre (AMSA - RCC) will also be advised of all project vessels' details, satellite communications and area of operation, as well as the relevant port authority. NTMs will be issued frequently for changes during construction and the schedule for issuing notices will be defined in consultation with AHO, AMSA and STV. Following completion of construction, a NTM will be issued to signal a change in the project phase from construction to operations, and the types of vessels that will be operating in the area for the next 30 years.	Decommissioning		
UWN-M03	Noise abatement system (NAS)	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.	Construction	Underwater noise impact to petroleum production and exploration divers, impact to submarine cable divers	IOU-I01
OMU-M14	Civil Aviation Safety Regulations compliance	Tall structures associated with the Project comply with the *Civil Aviation Safety Regulations 1998* (or equivalent) as required. Star of the South will notify CASA, AirServices Australia, Defence and the Aeronautical Information Service of the Royal Australian Air Force (RAAF AIS) in writing that the project proposes to construct or erect an object that will have a height of 100 metres or more above ground level, including the proposal, the proposed height and location, and the proposed timeframe for the erection of the object. The notification will be	Pre-construction	Displacement or interaction with aircraft	IOU-I05

ID	Mitigation measure	Mitigation description	Phase	Impact/risk pathway	Relevant impact/risk
		provided as soon as practicable after the final object design has been determined. Tall structures associated with the Project comply with subpart 139.E-Hazards to aircraft operations of the *Civil Aviation Safety Regulations 1998* as applicable to the project, including: - 139.165 Notifying CASA of certain proposed objects or structures.			
OMU-M15	Turbine layout notification	Submit final turbine layout to Airservices Australia and CASA once determined and prior to construction commencing.	Pre-construction	Displacement or interaction with aircraft	IOU-I05
OFF-M12	Safety and protection zones	Where construction, large scale maintenance activities (during operations) or decommissioning is taking place, temporary safety zones of up to 500 metres may be put in place around eligilbe infrastructure to protect the safety of third-party vessels and project infrastructure. During operations, protection zones may be in place up to 1852 meters from eligible infrastructure, placing limits on certain activities which present a risk to safety or infrastructure longer-term. Safety and protection zone applications (where required) will be submitted to the Offshore Infrastructure Regulator (OIR) in accordance with OEI Amendment Regulations 2024, following consultation with other marine users.	Construction Operation Decommissioning	Displacement or interaction with non-project vessels	IOU-I06
VES-M03	Marine Coordination Centre	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. 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.	Construction Operation	Displacement or interaction with aircraft and non-project vessels	IOU-I05 IOU-I06
OMU-M17	Cable crossing agreement	Pursue a cable crossing agreement with relevant cable operators. This agreement would include the design and installation method of cable crossings.	Pre-construction	Interference with submarine power cables	IOU-I07
OMU-M18	Co-existence agreement (cable operators)	Pursue a co-existence agreement with relevant cable operators. This agreement would include the responsibilities of each party and enable the free sharing of project information.	Pre-construction	Interference with submarine power cables	IOU-I07
OMU-M19	Co-existence agreement (CCS)	Identify opportunities to co-locate and/or identify no-go areas around some infrastructure through the implementation of a Co-existence Agreement with CarbonNet.	Construction	Interference with other infrastructure	IOU-I02

ID	Mitigation measure	Mitigation description	Phase	Impact/risk pathway	Relevant impact/risk
		Act in accordance with the MoU around activities in the overlap area and activities outside that area that may impact the other party. The MoU also outlines communication and information sharing. Has binding provisions around working towards a Co-existence agreement.			
OMU-M20	Infrastructure Lighting - Aviation	Aviation obstacle lighting is installed in accordance with the outcomes of the project aeronautical risk assessment process, including consideration of mitigations recommended during consultation with CASA and in compliance with the National Airports Safeguarding Framework Guideline D.	Construction Operation	Interference with aircraft	IOU-I08

7.5 Impact/risk pathways that have been considered and scoped out

On the basis of the existing environment and project description outlined in EIS Chapter 4 – Project description and EES Chapter 4 – Victorian works project description, a number of impacts/ risks have been considered for infrastructure and other users, but not assessed further due to their very low impact/ risk level or do not have a potential pathway. These impacts/ risks and the justification for not assessing them further are outlined in Table 7-4.

Table 7-4 Infrastructure and other users risks scoped out

Potential impact/ risk	Justification
Oil spill during all project phases	Project-specific oil spill modelling was undertaken by RPS to assess potential for impact from the event of an oil spill. Spilt oil in the marine environment in itself is not considered to have any impact to infrastructure discussed under this scope. The appearance of visible surface oil around offshore petroleum structures would require investigation by the operator to determine the source of the leak (in other words, confirm if it is their leak) as they are required to report their operation oil spill incidents to the appropriate authority. In sufficient quantities floating oil may present an ignition risk and result in the shutdown of operations until safe operating conditions can be restored. Project construction vessels are likely to be fuelled with a diesel-like fuel, for example marine gas oil (MGO), carried in separate fuel tanks that are inter-connected and isolatable. In the event of a vessel collision that ruptured a fuel tank the entire contents of the tank could be released to the ocean, although the total loss is likely to be reduced by isolating the compromised tank and transferring fuel to adjacent tanks. To determine the potential impact to infrastructure and other users in the Gippsland Basin following a hydrocarbon spill from a vessel, analysis was performed on modelling results for floating oil from the northern end of the OWFA (Site V1) closest to the oil and gas infrastructure of the Gippsland Basin. Oil discharges are only visible to people at concentrations above approximately 60 parts per million (AMSA 2014), therefore the High threshold (more than or equal to 50 parts per million) has been used to determine the oil spill impact area. A spill of MGO along the nearshore boundary of the OWFA is expected to drift a relatively small distance (less than 50 kilometres) as floating oil before prevailing winds reduce surface concentrations to low exposure levels (less than one gram per square metre) due to entrainment, evaporation and dispersion (RPS, 2021c). These winds result in a predominant alongshore spill direction (north-east to south-west). The model also indicated that MGO would most likely entrain into the water column, with the predominant drift trajectories also driven alongshore by currents. Therefore, the area that may be impacted by floating oil at concentrations that humans are possible to see it and therefore raise an investigation is small (maximum 12 kilometres north of the OWFA) which does not contain any petroleum platforms. Therefore, any potential impact from oil to infrastructure or other users is not discussed in this report as impacts are not credible.
Underwater noise impact to data quality and divers during decommissioning	Underwater noise impact to data quality and maintenance divers has been scoped out from the decommissioning phase. Pile removal methodology typically includes a small amount of ‘piling’ at the same energy as installation however largely consists of ‘vibro-piling’ that is, vibrating the pile to aid in its removal. The underwater noise emitted from this activity is not sufficient to impact seismic survey data quality or maintenance divers.

8 CONSTRUCTION IMPACT ASSESSMENT

This section discusses the potential impacts of the project as a result of construction and commissioning activities and the associated mitigation measures that aim to reduce impacts to as low a level as reasonably practicable.

The following discussion refers to impacts associated with construction activities for the project. The assessment presented below describes the impacts with all the mitigation measures implemented i.e., with both initial and final mitigations implemented. Appendix A presents the detailed impact registers that assess the level of impact with application of initial and final mitigations measures.

8.1 Underwater noise impact to divers (IOU-I01)

During construction of the project, impulsive underwater noise will be emitted through impact pile driving. The engineering design and construction methods for these activities have not been finalised. Therefore, to inform the required environmental approvals, a noise envelope has been developed that represents the maximum design scenario for noise generated in the marine environment during foundation construction for the WTG and OSS foundations. Monopiles will be used for WTGs, and monopiles or jacket structure pin-piles may be used for construction of offshore substations.

Impact piling is expected to be the greatest source of underwater noise. This technique involves a large weight being dropped or driven (hammered) on top of a pile, forcing it into the seabed by a series of blows. The pile is repeatedly driven to the required depth and the number of blows required to achieve the target depth is influenced by seabed type, pile size and pile driving methods (Matuschek & Betke, 2009).

To estimate the extent and magnitude of impacts from underwater noise that may be produced during construction of the project, JASCO were contracted to model the sound propagation from project activities. Underwater noise impacts from pile driving were modelled using JASCO's pile driving source model and noise propagation models. Predictions from JASCO's propagation models have been validated against experimental data from a number of underwater acoustic measurement programs conducted by JASCO globally. The model considered a wide range of input parameters including water depth, seabed bathymetry, water temperature and proximity to sensitive receptors. The seabed geo-acoustic model was based on acoustic propagation loss measurements within the OPA. A detailed description of the modelling approach is provided in the Underwater Noise Modelling Attachment: VI.

Noise attenuation systems can be used during impact piling to decrease the propagation of sound energy away from piling. Star of the South have committed to the implementation of noise abatement systems during pile driving activities for monopile and jacket pile foundations (initial mitigation measure UWN-M03).

8.1.1 Impact assessment

DMAC advises on commercial diving safety management. DMAC notes that there is limited understanding of the effects of sound pressure waves on divers, and that the multiple factors involved make it difficult to determine a safe or tolerable distance for diving operations (DMAC 12 Rev. 2.1 – 2020). Therefore, to assess the potential impacts from piling on divers, a sound exposure threshold of 145 dB re 1 µPa (SPL) was applied which represents a human health assessment threshold for sound exposure to divers and swimmers, derived from Ainslie (2008) and Parvin (2005). Based on a number of studies examining the potential effects of underwater noise emissions on both military and recreational divers Parvin (2005) suggested 145 dB re 1 µPa (SPL) as a safety criterion for recreational divers within a frequency range between 100 and 500 Hz. This does not imply that this level is associated with the onset of injury, but instead where divers reported discomfort or 'severe aversion'.

For full underwater noise modelling outputs, please refer to the Underwater Noise Modelling Attachment: VI. The ensonified area (Section 5.2.3) is indicative of the area where underwater noise from piling operations with noise abatement may be above the human health threshold at any point during construction. The whole ensonified area will not be subject to noise impacts at the same time, rather it will be in specific locations around piling activities and move as construction progresses.

Receptors that potentially occur within the ensonified area include:

- Maintenance divers for petroleum production and subsea power cables for only one week every two to three years according to the accepted environment plan

- Research dives annually.

Petroleum production activities in the Gippsland Basin include underwater maintenance activities that require the use of divers. Divers are typically linked to a dive support vessel by an umbilical or tether system and use air diving, saturation diving or hard suit diving systems. Depending on operation length they may be diving from a bell with a dive support vessel nearby. Dive operations could be undertaken at any time and could be on any fixed subsea infrastructure, for example, pipelines, wellheads.

Research dives occur annually at sites on the eastern side of Wilsons Promontory, at Hogan Island and the northern extent of the Kent Group of islands, outside the ensonified area (Figure 6-9), and are therefore not expected to be impacted.

8.1.1.1 Petroleum production and subsea power cables

A small portion of the Tasmanian Gas Pipeline and of the Basslink Interconnector occur within the ensonified area.

As maintenance dives on petroleum production pipelines and submarine power cable assets are expected to occur for only one week every two to three years (Section 6.5) and the overall offshore construction window would not extend beyond four years and 11 months (see Section 2.7) with total duration of active piling of foundations not greater than two years across all stages, the potential for piling to occur at the same time as dive maintenance on assets within an area that would receive noise levels above the threshold, is inherently small.

In addition, application of the principles in the DMAC 12 Safe Diving Distance from Seismic Surveying Operations guideline (initial mitigation measure OMU-M13) would further mitigate underwater noise exposure to divers. These principles (refined for application to this activity) are detailed in Section 7.4.

Application of the first principle would eliminate any potential impact from underwater noise to divers in the petroleum or submarine cable maintenance industries. This is considered feasible due to the relatively small portion of cable or pipeline where maintenance work could potentially occur within the ensonified area and therefore the large area of cable or pipeline that could foreseeably be worked on during piling activities that would not receive noise levels above the threshold value. In this instance, the ability for business operations for petroleum production and submarine power cables to implement the initial mitigation is considered medium sensitivity as they have the ability to continue operations with a complex level of standard operational planning required. The impact would result in a low magnitude impact that is large scale and short- to medium-term and unlikely to be detectable with the implementation of standard mitigations as stated in Table 7-3. The consequence is therefore Minor.

Assuming the implementation of the initial mitigation measures listed in Section 7.4, the initial impact to receptors as a result of underwater construction noise is Minor (see below).

Table 8-1 Consequence associated with underwater noise during the construction phase

Potential impact	Receptor	Receptor sensitivity	Magnitude	Consequence
Underwater noise impact to divers	Petroleum production	Medium	Low	Minor
Underwater noise impact to divers	Submarine power cables	Medium	Low	Minor

8.1.2 Mitigation measures

8.1.3 Residual impacts

Residual impact ratings to infrastructure and other users following implementation of final mitigation measures are described in Table 8-2.

Table 8-2 Consequence associated with impact to divers from underwater noise

Potential Impact	Receptor Group	Receptor sensitivity	Initial consequence	Mitigation	Residual Consequence
Underwater noise impact to divers	Divers that operate within an area that is predicted to receive sound above the identified human health thresholds due to piling	Medium	Minor (D)	Not required	Minor (D)

8.1.4 Evaluation of residual impacts against assessment criteria

Based on the assessment above, the potential impacts to petroleum production and submarine power cable divers from construction noise are considered to be Minor and do not need to be reduced further. The predicted levels of impact are within the defined assessment criteria.

Table 8-3 Evaluation of residual impacts against assessment criteria

Assessment criteria	Evaluation	Confidence
A divers noise exposure from construction noise due to the project would not: • Interfere with diver communications; • Exceed levels considered to be acceptable noise exposure levels; • Induce discomfort; or • Place the diver at risk in any other way.	Implementation of the DMAC 12 principles as a mitigation measure would ensure that no diver would experience noise exposure from piling that exceeds the assessment criteria and noise abatement systems are in place during pile driving activities for monopile and jacket pile foundations	The impact assessment was completed with inherent precaution. The data was derived from a conservative modelling approach..
	Negligible impacts are expected from underwater noise emissions to divers with no long-term consequences predicted and therefore are considered consistent with the principles of ecological sustainability.	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.
Planning and management decisions are based on the best available environmental, social and economic information.	The impact assessment was completed using the best available information.	Access was available to the best publicly available information and exhaustive searches for this information was made by industry experienced professionals.
Management of impacts incorporates the precautionary principle.	No threats of serious or irreversible environmental and other damage were identified, such that the precautionary principle applies. The data was derived from a conservative modelling approach. In the event that the noise levels are larger than originally expected adaptive management will be implemented. For example, more conservative distances applied to risk assessments and SIMOPS planning.	The model used is industry recognised and validated against measured data. The data was derived from an inherently conservative modelling approach. A sound measurement program will be implemented to validate the noise modelling results.

8.2 Underwater noise impact to data quality (IOU-I02)

Underwater noise emissions would be generated by construction activities which could impact research that measures or uses sound as a survey technique. Petroleum exploration and offshore wind project activities in the Gippsland Basin that use sound as a survey technique include seismic surveys and geophysical surveys.

The main source of continuous noise would be from vessel propellers or DP thrusters. As this is continuous noise it is not recognised in seismic data as an ‘event’ it therefore would not have an impact to data quality

and is not considered further in this assessment. The main source of intermittent noise would be from underwater piling operations. Underwater piling noise typically produces noise in the lower frequency ranges which is also where seismic data is acquired. Piling sound may therefore be recorded as an ‘event’ in seismic data depending on the seismic array orientation to the piling activities being undertaken and can be difficult to distinguish from true data in post-processing, therefore reducing reliability of the data obtained.

Geophysical surveys can utilise a range of different sound sources with some sources such as chirps and pingers operating at a higher frequency range. Geophysical surveys undertaken with higher frequency sound sources are less likely to be negatively affected by pile driving noise as they would either not receive the low frequency of piling noise due to the design of their receivers or would be able to filter out the interference more readily in post processing. However, some geophysical surveys utilise low frequency sources such as mini airguns and these surveys may experience interference from pile driving noise.

8.2.1 Impact assessment

Acoustic interference with seismic sound acquisition depends largely on the direction of survey lines in relation to piling activities. If the piling noise source is perpendicular to the streamer array and therefore received from rear to front of the seismic streamers, there is no interference with data quality. However, if the streamer array is parallel to the noise source, the impulsive sound may be received simultaneously along the streamer and therefore be falsely recorded as an ‘event’, compromising data quality.

8.2.1.1 Petroleum exploration and offshore wind project geophysical surveys

It is assumed that at least one seismic or other geophysical survey may occur within the Gippsland Basin within the project construction period.

There are no planned petroleum exploration activities or geophysical surveys within the area that may be ensonified due to piling within the proposed construction period. However, there has historically been one vessel-based petroleum exploration activity undertaken in the Gippsland Basin per year, with an activity lasting up to six months. At least seven gas-condensate prospects have been identified throughout the Gippsland Basin which is likely to attract future petroleum exploration including seismic and exploration wells (Lepic 2021).

Additionally, the Australian Government has granted 12 feasibility licences for offshore wind projects within the Gippsland declared offshore wind area. Several feasibility licence holders are planning geophysical surveys to collect location specific data to inform design and detailed environmental assessments. It is expected that some will be completed prior to the proposed construction period. It is possible that others could coincide with construction.

Industry consultation will be undertaken prior to and during construction to coordinate activities and develop mitigation to reduce impact to seismic and geophysical data quality from noise sources, including piling, concurrent seismic acquisition, and rock dumping, is undertaken during survey pre-planning and design (for example, during acquisition simulation and modelling) and infield survey management (for example, SIMOPS planning and line planning). As noted above, potential impacts to geophysical surveys are lower due to the high frequency nature of most sound sources and the same mitigation measures will apply.

Following the application of industry standard initial mitigation measures listed in Section 7.4, it is expected that potential impact to petroleum exploration during construction due to underwater noise is Negligible. This is due to the ability of the petroleum exploration industry to adapt operations with no additional operational planning, or industry standard planning required and impacts within 10 km of the OPA during the construction period.

8.2.2 Mitigation measures

The initial impact rating to petroleum exploration data quality as a result of underwater noise from construction is Negligible. The impact level cannot be reduced further therefore no further mitigations are applied and the initial mitigations applied are sufficient to reduce the impacts.

8.2.3 Residual impacts

Table 8-4 Consequence associated with underwater noise impact to seismic data quality during the construction period

Potential Impact	Receptor	Receptor sensitivity	Initial consequence	Mitigation	Residual Consequence
Underwater noise impact to data quality	Petroleum exploration and offshore wind project geophysical surveys	Low	Negligible (E)	Not required	Negligible (E)

Evaluation of residual impact against assessment criteria

The residual impact is Negligible and cannot be reduced further. Any impact would be temporary and be readily managed (if required). The predicted levels of impact are within the defined assessment criteria.

An evaluation of the residual impact against the assessment criteria is provided in the table below.

Table 8-5 Evaluation of residual impact against the assessment criteria

Assessment criteria	Evaluation	Confidence/ Uncertainty
Existing infrastructure users of the project area are not disadvantaged by the development of the project.	Negligible impacts are expected from underwater noise to petroleum exploration data with the application of standard controls and no long-term consequences predicted. The residual impact is Negligible and cannot be reduced further.	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.
Planning and management decisions are based on the best available environmental, social and economic information.	The impact assessment was completed using the best available information.	Access was available to the best publicly available information and exhaustive searches for this information was made by industry experienced professionals.
Management of impacts incorporates the precautionary principle.	No threats of serious or irreversible environmental and other damage were identified, such that the precautionary principle applies. Impact assessment has been completed on the consideration of historical frequency of petroleum exploration rather than the basis of future planned activity, which is zero.	Uncertainty has been removed with the assumption that at least one survey would be undertaken in the OPA.

8.3 Displacement or interaction with non-project vessels during construction and commissioning (IOU-I03)

Star of the South supports shared use of the offshore area with other users such as recreational and commercial fishers and transiting vessels. However, to ensure safety of third-party vessels, project vessels and infrastructure, access in the vicinity of construction activity will require active management.

During the construction period of up to 4 years and 11 months (59 months), offshore construction activity may cause displacement of vessels. Displacement may occur from demarcation of areas within the OWFA, the use of safety zones, the presence of project vessels that have restricted ability to manoeuvre and the increasing presence of installed infrastructure as the construction period progresses. Vessel displacement could lead to increased encounters as vessels concentrate in other areas, however, due to the low vessel activity in the area, this is not expected to result in increased vessel to vessel collision risk. Potential impacts to commercial shipping, commercial and recreational fishing vessels and emergency rescue vessels are assessed further in Technical Report P: Shipping and Navigation.

During construction, the initial mitigation (see Section 7.4) of statutory safety zones will be implemented as well as demarcation of construction areas and the use of escort vessels. Whilst project construction vessels are transiting between port and the project area they would operate under all relevant Australian maritime regulations as described in the initial mitigations listed in Section 7.4.

This section considers the other current and future users of the project area that may be impacted by the Project, including non-project vessels associated offshore local offshore infrastructure, i.e. petroleum exploration and production, carbon sequestration, Defence vessels, and maintenance vessels associated with the Basslink Interconnector.

8.3.1 Impact assessment

8.3.1.1 Petroleum exploration vessels

There are no planned petroleum exploration activities over the project area. There has historically been one vessel-based petroleum exploration activity undertaken in the Gippsland Basin per year, with an activity lasting up to six months, however there has not been any petroleum exploration activity in the OWFA within the last 10 years.

The CarbonNet project has identified a potential carbon storage site to the south of their main target formation, overlapping the north of the OWFA. A 3D seismic survey was undertaken at the start of the life of Pelican (in 2018) and further surveys were proposed to be undertaken at five years, then at the end of life which is estimated to be at 25 years.

The potential impacts are restricted to within the OPA and limited to the duration of the construction period. In addition, petroleum exploration vessels are able to adapt operations and apply industry standard planning measures. As a result the potential impact to petroleum exploration is considered to be Negligible.

8.3.1.2 Petroleum production vessels

Light vessel traffic of approximately 100 m long vessels associated with petroleum production in the Gippsland and Bass Strait transit the OPA regularly (Pivot Maritime 2021).

It was determined through navigational modelling (Pivot Maritime 2021a) that deviating around the OWFA would result in a seven-minute increase of travel time between ports and petroleum production platforms. Consultation with vessel masters indicated that this insignificant increase in travel time would be preferable to attempting to navigate the OWFA and none would attempt to navigate the OWFA. This is considered to also apply to the construction period when the implementation of construction safety zones throughout the project area would necessitate the re-routing of vessels associated with petroleum production.

The potential impacts are restricted to within the OPA and limited to the duration of the construction period. In addition, petroleum production vessels are able to adapt operations and apply industry standard planning measures. As a result, the potential impact to petroleum production vessels is considered to be Negligible.

8.3.1.3 Defence

There are no designated Defence maritime training areas within the OPA, however Defence activities that may take place within the area include the transit of vessels for training exercises, hydrographic surveys, surveillance, enforcement and search and rescue.

During the construction period the implementation of construction demarcation and safety zones throughout the project area would necessitate the use of other marine areas and therefore displace Defence vessels. The consequence of this would be reduced through the application of basic planning measures, that may include coordination of training exercises, scheduling of surveys around construction activities and communication regarding surveillance, enforcement and search and rescue activities.

Potential impacts to Defence vessels are restricted to within the OPA for the duration of the construction period and Defence vessels are able to adapt operations and apply industry standard planning measures. As a result, the potential impact to Defence vessels is considered to be Negligible.

8.3.1.4 Submarine power cable maintenance vessels

Periodic maintenance associated with the Basslink Interconnector may occur through the OPA including cable-recovery and laying activities from a special-purpose vessel. This may include subsea surveys out to 500 m from the Basslink Interconnector (Basslink 2018). Approximately 28 km of the Basslink Interconnector overlaps the project area and therefore displaced Basslink vessels may experience reduced access at times during the construction period.

Consultation with Basslink has resulted in updates to the inter array cable design such that the number of cable crossings were reduced within the OPA, an exclusion zone for the project's geophysical and geotechnical surveys was developed in agreement with Basslink operators and a Co-Existence Agreement will be established for operations in the overlapping areas (see Section 4).

A relatively small portion of the cable is within the OPA (seven per cent of the total length of the Basslink Interconnector) therefore there is only a small area of cable that could foreseeably be impacted upon during construction activities. Based on the ability of submarine power cable operators vessels to adapt operations with a complex level of standard operational planning and the impact restricted to within the OPA for the duration of the construction period, the potential impact to submarine power cable maintenance vessels is considered to be Minor.

8.3.2 Mitigation measures

The initial impact level to petroleum exploration, production, submarine power cable and Defence vessels is Negligible and cannot be reduced further therefore no additional mitigations are applied. The proposed initial mitigations (Section 7.4) are considered sufficient to address potential impacts.

8.3.3 Residual impacts

Table 8-6 Consequence associated with displacement or interaction with vessels during the construction phase

Potential Impact	Receptor	Receptor sensitivity	Initial Consequence	Additional mitigation	Residual Consequence
Displacement or interaction with vessels	Petroleum exploration	Low	Negligible (E)	Not required	Negligible (E)
	Petroleum production	Low	Negligible (E)	Not required	Negligible (E)
	Defence	Low	Negligible (E)	Not required	Negligible (E)
	Submarine power cables	Medium	Minor (D)	Not required	Minor (D)

8.3.4 Evaluation of residual impact against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in Table 8-7.

Table 8-7 Evaluation of residual impact against the assessment criteria

Assessment criteria	Evaluation	Confidence/ uncertainty
Construction activities and equipment are limited to within the project area.	Displacement of other users may only occur in the assessed area, and therefore the impact to other users is limited to the project area only.	Planning requirements preclude the use of offshore construction equipment outside the designated areas, therefore confidence that the use is limited to this area is high.
Construction parameters do not exceed those described in the maximum design scenario.	Parameters in described in the maximum design scenario are those assessed in the EIS/EES process, and therefore the potential impacts from any other development scenario could not be greater than those assessed here.	Approval requirements preclude the development of offshore facilities beyond those assessed in the maximum design scenario, therefore confidence that the construction will be within these limits is high.

Assessment criteria	Evaluation	Confidence/ uncertainty
Stakeholders have sufficient time and opportunity to comment on the project including raising of objections or claims.	Feedback from stakeholders has been included in the impact assessment and would continue to be considered during the development and operation of the project.	Stakeholder consultation has been included into the design where applicable, and Star of the South has committed to open and continuous community engagement through the lifetime of the project, therefore certainty is high.
Project vessel activities are compliant with relevant Star of the South procedures and maritime law relating to navigation and safety at sea.	Star of the South has committed to adhering to all relevant local maritime laws relating to navigation and safety at sea.	Operating outside of legislated maritime requirements will attract penalties and introduce further risk for health and safety. The confidence that maritime laws will be adhered to is high.
Development is consistent with the principles of ecological sustainability	Negligible impacts are expected from displacement or interaction with other marine users with no long-term consequences predicted and therefore are considered consistent with the principles of ecological sustainability. The residual impact is Negligible and cannot be reduced further.	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.
Planning and management decisions are based on the best available environmental, social and economic information.	The impact assessment was completed using the best available information.	Access was available to the best available publicly available information and exhaustive searches for this information was made by industry experienced professionals.
Management of impacts incorporates the precautionary principle.	No threats of serious or irreversible environmental and other damage were identified, such that the precautionary principle applies. Impact assessment has been completed on the consideration of historical frequency of petroleum exploration rather than the basis of future planned activity, which is zero.	Evaluation of shipping and navigational risk through the PAWSA method is international standards and incorporates inherent precaution therefore confidence is high.
Existing infrastructure users of the project area are not disadvantaged by the development of the project.	Star of the South has committed to adhering to all relevant local maritime laws relating to navigation and safety at sea. Negligible impacts are expected from displacement or interaction with other marine users with no long-term consequences predicted. The residual impact is Negligible and cannot be reduced further.	Stakeholder consultation has been included into the design where applicable, and Star of the South has committed to open and continuous community engagement through the lifetime of the project, where disadvantaged users will have the opportunity to communicate with the project if required therefore the confidence that users will not be disadvantaged is high.

The potential impact to infrastructure and other users from displacement of non-project vessels during construction of the wind farm are Negligible to Minor. As such any impact would be temporary and be readily managed (if required). The predicted levels of impact are within the defined assessment criteria.

8.4 Interference with submarine power cables (IOU-I04)

A range of seabed disturbing activities would be required whilst installing offshore wind farm infrastructure, including:

- Installation of offshore foundations
- Installation of inter-array cables connecting strings of WTGs together and connecting the WTGs to the offshore transmission assets, as well as export cables connecting the wind farm to the mainland.

Prior to the installation of any offshore infrastructure a range of site preparation activities would be undertaken in the project area, including a pre-lay grapnel run undertaken by a multi-purpose vessel with a series of grapnels, chains, recovery winch and survey spread suitable for vessel positioning and data logging. The vessel would record any items encountered during the survey, including confirmation of the positions of existing infrastructure.

Power cables would be buried below the seabed wherever possible, within 750 m of a cable crossing location. Installation of inter-array cables would include the opening of the seabed either mechanically (for example, ploughing) or with water jet assistance and the cable being laid within the trench before the trench is backfilled. Inter-array cables that are not buried would be armoured with rock dumping or concrete mattresses.

WTG foundations would be driven into the seabed using a hammer.

Installation of project infrastructure would require a range of vessels including installation support vessels such as transportation freighters and barges, trenching vessels, dive and ROV support vessels, special operation vessels that may require anchoring during construction activities.

8.4.1 Impact assessment

8.4.1.1 Submarine power cables

The Basslink Interconnector route traverses the eastern part of the proposed OPA (Figure 6-9). The 28 km section that passes through the project area was laid in a soft sediment trench during construction in 2005. There is no rock armour to protect the cable and due to the shifting seabed it is generally not visible to the naked eye in the project area (Sherwood *et al.* 2016).

Either foundation installation method and the placement of jack-up vessels may result in damage to the Basslink Interconnector if an attempt is made to install foundations or the jack-up pods over the cable itself resulting in damages to the cable. Therefore, the project design envelope includes a 1 km buffer (minimum 500 m either side) along the Basslink Interconnector through the OPA such that no WTGs or OSS may be located on or near the Basslink Interconnector.

Anchoring of project construction vessels may result in damage to the Basslink Interconnector if anchoring occurs directly onto unburied sections of the cable, or if a vessel drags anchor onto the cable. The Basslink Interconnector is currently marked on nautical charts and it is recommended that anchoring is avoided in the vicinity of the cable. Basslink have a 24-hour emergency number for use if a vessel anchor becomes snagged on their cable and issue notice to mariners in the event that they are aware that part of the cable has become exposed. Basslink recommends that any snags on the cable are attempted to be freed using vertical lifting with normal power (Basslink 2017). If this does not work, then Basslink asks that the anchor is left with a buoy and the position communicated to Basslink for retrieval. The initial mitigation measure of a co-existence agreement between Star of the South and Basslink would enable the efficient operation planning and communication around anchor placement if required.

Installation of cable crossings, either of inter-array cables through the OWFA or export cables, could also result in damage to the Basslink Interconnector. As the cables are likely to cross the Basslink Interconnector, both the Basslink asset and the project infrastructure must be protected and made secure. This protection is typically ensured through armouring. Armouring includes the laying of rock, or concrete mattresses on top of the cable in order to maintain the location and integrity of the cable. Cables may also be laid on a cable support structure or sled to aid in separating cables from each other and maintain access to each cable for repair or maintenance activities. Installation of cable support structures or armouring may result in physical damage to the Basslink Interconnector either from the installation equipment or placement of the project infrastructure that results in physical damage to the cable. The portion of the Basslink Cable that is within the Offshore Project Area will be surveyed to inform cable crossing type and location. Consultation will continue with the operator of Basslink to develop an agreed design and installation method of the cable crossings and the responsibilities of each party. Given foundation installation and the placement of jack-up vessels may result in damage to the cable, a one kilometre buffer (min 500m either side) along the Basslink Interconnector has been established as part of the project design to prevent turbines or substations being located on or near the cable.

With these initial measures in place, with a complex level of standard operational planning and the impact being restricted to within the OPA, the potential impact to the submarine power cable is considered to be Minor.

Based on the ability of power cable installation vessels to adapt operations and the impact being restricted to within the OPA for the duration of the construction period, the potential impact to submarine power cable maintenance vessels is considered to be Minor.

8.4.2 Mitigation measures

The initial impact rating to submarine power cables as a result of construction is Minor with the application of initial mitigations of a co-existence agreement and cable crossing agreement, as agreed in consultation with the third-party operators described in Section 7.4. No further mitigations are required.

8.4.3 Residual impacts

Table 8-8 Consequence associated with interference with submarine power cables during construction

Potential Impact	Receptor	Receptor sensitivity	Initial Consequence	Additional mitigation	Residual Consequence
Interference with submarine power cables	Submarine power cables	Medium	Minor (D)	Not required	Minor (D)

8.4.4 Evaluation of residual impact against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in the table below.

Table 8-9 Evaluation of residual impact against the assessment criteria

Assessment criteria	Evaluation	Confidence/ uncertainty
Existing infrastructure users of the project area are not disadvantaged by the development of the project.	Star of the South has committed to mitigation measures to reduce impact to other users of the area. Minor impacts are expected from interaction with other marine users with no long-term consequences predicted.	Stakeholder consultation has been included into the design where applicable, and Star of the South has committed to open and continuous community engagement through the lifetime of the project, where disadvantaged users will have the opportunity to communicate with the project if required. Therefore, the confidence that users will not be disadvantaged is high.
Planning and management decisions are based on the best available environmental, social and economic information.	The impact assessment was completed using the best available information.	Access was available to the best publicly available information and exhaustive searches for this information was made by industry experienced professionals.
Management of impacts incorporates the precautionary principle.	No threats of serious or irreversible environmental and other damage were identified, such that the precautionary principle applies. Star of the South has committed to mitigation measures to reduce impact to other users of the area. Minor impacts are expected from interaction with other marine users with no long-term consequences predicted.	Simultaneous activities in the same spatial area are anticipated to be low however the assessment considers this as a regular occurrence therefore the confidence in the assessment is high.

8.5 Displacement or interaction with aircraft (IOU-I05)

This section presents an impact assessment based on the Aviation Impact Assessment Report (AIA) conducted for the OWFA by Aviation Projects. The full AIA can be found in Appendix C.

8.5.1 Impact assessment

Up to 147 WTGs of maximum 271 metre height, or 113 turbines with a maximum height of 350 m (LAT) are planned to be constructed in the OWFA during a construction period lasting up to 4 years and 11 months (59 months). During construction, vessel-based cranes will be used to hoist WTG components into place.

The airspace over the OPA includes several features that would be infringed by the proposed WTGs and associated construction equipment as shown in the table below. Note that the LSALT includes a 1,000 ft buffer on the highest obstacle in the area.

Table 8-10 Airspace feature over the OPA infringed by project infrastructure

Feature	Infringement
Grid LSALT east of 147°	Infringement of 900 ft LSALT protection surface
PANS-OPS for Yarram Aerodrome	Infringement of 1800 ft approach area
RAAF Training Areas' Lowest Safe Altitude (LSALT)	Infringement of training areas D and V of 700 ft LSALT

8.5.1.1 Grid LSALT

The Grid LSALT exists so that pilots can fly without visual reference to the ground or water and allows for pilots with technical problems to descend to a low level that has a predetermined safety margin over obstacles. The LSALT is determined for each route by assessment of the highest obstacle within an area and adding a minimum obstacle clearance margin of 1,000 ft. The proposed turbine height of 350 metres infringes the 900 ft LSALT Protection Surface in Grid East of 147°.

Impacts to aviation if turbines or construction equipment infringe the civil LSALT would occur throughout the project life immediate to the OWFA and are considered to be of Severe consequence. Constructing a building or other structure that protrudes into a prescribed airspace is defined as a 'controlled activity' under the *Airports Act 1996*, which is prohibited under the Act without required approvals or if permitted by regulation.

This East of 147° Grid LSALT would need to be raised to 2200 ft to accommodate the Project. This increase would not create an adverse hazard for flight operations in this Grid as adjoining Grid LSALT are significantly higher the 2200 ft AMSL.

8.5.1.2 PANS-OPS

The approach PANS-OPS surface of Yarram Airport includes an RNAV approach (Area Navigation route). RNAV allows an aircraft to use any flight path within the area and offer time and fuel savings, more efficient use of airspace and reduces dependence of radar vectoring. The minimum altitude within the initial segment of the Yarram RNP RWY 27 approach procedure is shown as 1800 ft AMSL. A protection buffer of 984 ft must be applied above the WTGs in the Project area. This PANS-OPS surface will therefore need to be raised to 2200 ft AMSL to accommodate the Project.

Impacts to aviation if turbines or construction equipment infringe the civil LSALT would occur throughout the project life immediate to the OWFA and are considered to be of Severe consequence. Placement of turbines that infringe a PANS-OPS surface contravenes the *Airports Act 1996* as described in the section above.

8.5.1.3 RAAF Training Areas' LSALT

The OPA is situated in the South-western Military Controlled Airspace of the RAAF Base East Sale (R359F), (Figure 6-1; RAAF 2018) and below training areas D, E, V and W. The proposed WTGs of 350 metres infringe the LSALT of training areas D and V (700 ft/ 213.3 m).

Impacts to Defence aviation would occur if turbines or construction equipment infringe the training area LSALT throughout the project life immediate to the OWFA and are considered to be of Severe consequence. Placement of turbines that infringe the Grid LSALT contravenes the *Airports Act 1996*. Constructing a building or other structure that protrudes into a prescribed airspace is defined as a 'controlled activity' under the Airports Act 1996. A person must not carry out a controlled activity in relation to a prescribed airspace.

The AIA (Appendix C) concluded that the penetration of the LSALT surfaces for the Defence training area requires consultation and discussion with Defence, but as their restricted areas commence at 4,000 ft it is not expected to impact current operations.

8.5.1.4 Search and rescue

The potential effects of wind farms on SAR operations in general are as follows:

- Large wind farms increase the probability of SAR operations having to occur amongst turbines. The large blade height means that low cloud may sometimes limit the safety of aircraft operation due to restricted view of blades.
- SAR operations are generally linear in nature (as per international standards (IAMSAR)). Non-linear WTG layouts in wind farms may therefore inhibit effective SAR if spacing between turbines does not allow for a linear line of sight.
- There may be a visual distraction effect caused by the presence of turbines and rotating blades to search crews.
- Turbines may also cause a temporary blocking of the vessel rescue unit, more likely in rough sea states. This is discussed in Technical Report P: Shipping and Navigation.

Based on marine incident data (Section 6.3.5), the frequency of SAR operations in the vicinity of the OWFA is low. The majority of incidents occurred in inshore areas, including within the OECA and within local ports proposed to be used for construction management, such as Barry Beach Marine Terminal. The large proportion of incidents were disablement of vessels and were not classed as of major consequence. However it is noted that the increased presence of vessels on site during construction as well as the potential for allision risk of third-party vessels with project structures, may result in a small increase in the likelihood of incidents occurring that require the provision of emergency response.

As part of designed-in avoidance, mitigation and management, SAR authorities will be part of on-going project engagement and will be notified of changing construction activities. The project marine coordination centre will be operational 24/7 during construction and will be able to respond in the event of an incident.

Based on the ability of SAR to adapt operations with standard operational planning and the impact restricted to within the OPA for the duration of the construction period, the potential impact to SAR is considered to be Negligible.

8.5.2 Mitigation measures

The overall initial consequence rating to aviation (Grid LSALT, Defence LSALT and PANS-OPS) is Severe.

It is not possible to lower the height of the WTGs. As part of the project development process, a project design envelope has been adopted for some component parameters, including WTG size. Under this approach, a range of values for WTG size have been retained for assessment. Providing upper and lower values will provide certainty about the works for regulators and stakeholders and a basis to assess the potential impacts in relation to each assessment topic. Providing these values however, will also allow for flexibility in the eventual design solution. That is necessary within an evolving industry where technology is rapidly changing and supply chains are uncertain. As the technology advances, manufacturers will be producing larger turbines (with larger rotors) that are more efficient in producing energy. The range of turbine parameters presented in the project design envelope allow for this advancement in turbine technology. Further detail on the project design envelope is provided in EIS Chapter 6 - Assessment Framework and EES Chapter 6 - Assessment Framework.

Smaller turbines with rotors below 236 meters were considered. However, it was decided that these would not be pursued with investigations revealing that larger turbines would be more effective in generating energy. Also, manufacturers are pursuing turbines that are more efficient, resulting in the production of larger models with rotors of 285 meters, which represents the maximum rotor diameter for the project. Up to 147 WTGs have been included in the project design envelope for installation and operation in the offshore wind farm area.

Consultation has not been undertaken with CASA and AirServices Australia regarding the final WTG layout as the layout is still subject to changes. In addition, specific guidance for aviation safety around offshore wind farms in Australia has not been developed. Therefore, once an AIA has been prepared on the final layout,

Star of the South will work with CASA, Airservices Australia and Defence to meet the guidelines determined to be applicable to offshore wind farms in Australia. The following outcomes will be sought through consultation:

- As the proposed turbine height of 350 m infringes of the Grid LSALT, the turbine height has to be lowered in these areas, or the Grid LSALT increased. It is not possible to lower the height of the turbines as discussed above. Therefore, for the turbines to not infringe the Grid LSALT east of 147° the LSALT should be raised to 2,200 ft. Star of the South has undertaken consultation with CASA and Airservices Australia and will provide a copy of the AIA once the final layout has been determined. Star of the South will continue to consult with CASA and Airservices Australia to increase the height of the Grid LSALT once a final turbine layout is made available.
- As described above, the turbines cannot be lowered so that they do not infringe on the Yarram PANS-OPS surface. Star of the South has undertaken consultation with Yarram Aerodrome and Airservices Australia and will provide a copy of the AIA once a final layout has been determined. Star of the South will work with the Yarram Aerodrome operations team regarding the PANS-OPS approach space so that the turbines will not infringe the PANS-OPS surface. A redesign of the PANS-OPS is required based on assessment of the current runway 09 and 27's procedure as shown in Appendix C.
- As the proposed turbine height of 350 m infringes of the Defence LSALT in areas D and V (including the standard 1,000 ft buffer), the turbines would either have to be lowered in that area, or the LSALT increased. As described above it is not possible to lower the height of the turbines. Therefore, further consultation should be undertaken with Defence regarding raising the LSALT of that training areas D and V within airspace R359F. As the Defence restricted area commences from 4,000 ft it is considered that there should be no objection to this happening.

The changes are expected to be inconsequential to current operations (Appendix C). With the application of these mitigations, the residual risk to aircraft from the offshore wind farm is considered to be Minor to Negligible.

The initial impact rating to SAR capability as a result of construction activities and turbine presence is rated Negligible. For receptor groups with an initial risk rating of Minor or below no further impact mitigation is required and the initial risk rating remains unchanged. The table below summarises the final mitigations applied for the receptors with an impact rating greater than Minor.

Table 8-11 Additional mitigation measures

ID	Mitigation Measure	Phase	Effectiveness
IOU-M01	Consult with CASA and Airservices Australia Star of the South will continue to consult with CASA and Airservices Australia to increase the height of the Grid LSALT once a final turbine layout is made available.	Pre-construction	Raising the Grid LSALT means that the turbines would not infringe it.
IOU-M02	Consult with the Yarram Aerodrome Star of the South will work with the Yarram Aerodrome operations team regarding the PANS-OPS approach space so that the turbines will not infringe the PANS-OPS surface.	Pre-construction	Redesign the RNAV approach so that the turbines do not infringe it.
IOU-M03	Consult with Defence Further consultation will be undertaken with Defence regarding raising the LSALT of training areas D and V within airspace R359F.	Pre-construction	Raising the areas D and V LSALT means that the turbines would not infringe it.

8.5.3 Residual impacts

Residual impact ratings for aviation following the implementation of final mitigation measures are described in the table above. With the application of final mitigations, any impact to aircraft due to the presence of turbines or associated construction equipment is expected to be Minor.

Table 8-12 Residual impact to receptors - construction

Potential impact	Receptor	Receptor sensitivity	Initial Consequence	Final mitigation	Residual Consequence
Displacement or interaction with aircraft	Grid LSALT	High	Severe (A)	IOU-M01	Minor (D)
	Yarram PANS-OPS	High	Severe (A)	IOU-M02	Minor (D)
	Defence	High	Severe (A)	IOU-M03	Minor (D)
	Search and rescue	Low	Negligible (E)	N/A	Negligible (E)

Evaluation of residual impact against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in the table below.

Table 8-13 Evaluation of residual impacts against the assessment criteria

Assessment criteria	Evaluation	Confidence
Stakeholders are given sufficient time and information regarding the development in accordance with the Airports (Protection of Airspace) Regulations 1996.	Stakeholder consultation with defence and local aerodromes has been conducted and will continue throughout project design and development as outlined in Section 4.	Records of consultation demonstrate stakeholders have responded meaningfully to consultation regarding potential impacts to their operations. Confidence in stakeholders receiving the level of information that they require now and into the future is high.
When wind turbines over 150 m above ground level are to be built within 30 km of a certified or registered aerodrome, the proponent should notify the Civil Aviation Safety Authority (CASA) and Airservices Australia. If the wind farm is within 30 km of a Defence aerodrome, Defence should be notified.	Stakeholder consultation with Defence and local aerodromes has been conducted and will continue throughout project design and development as outlined in Section 4.	Records of consultation demonstrate stakeholders have responded meaningfully to consultation regarding potential impacts to their operations. Confidence in stakeholders receiving the level of information that they require now and into the future is high.
Where a wind turbine 150 m or taller in height is proposed away from aerodromes, the proponent should conduct an aeronautical risk assessment.	It has been based on information provided by specialist aviation assessment consultants.	The aviation risk assessment has been provided added an appendix to this report.

9 OPERATIONS IMPACT ASSESSMENT

This section discusses the potential impacts of the project as a result of commissioning and operation of the project and the associated mitigation measures that aim to reduce impacts to as low a level as reasonably practicable.

9.1 Displacement or interaction with non-project vessels (IOU-I06)

Installed WTGs (up to 147) and substations (up to five) would be present within the OWFA for the operational life of the project (approximately 30 years) that would displace vessels from the turbine and substation sites.

In addition, operations and maintenance vessels would occur in the project area throughout the life of the project (approximately 30 years) in order to conduct routine maintenance and heavy repairs. Vessels may include service operation vessels, jack-up vessels, ROV support vessels, specialised seabed survey vessels and cable repair vessels. The frequency and duration of vessel presence within the project area would depend on many factors, described below:

- Service operation vessels are anticipated to be within the project are for the majority of the operational life of the project. Operation movements on site would involve a vessel typically visiting 5 to 10 WTG generators per day with a port call every 10 to 14 days.
- The frequency of heavy repair activity depends on the failure rate of the WTG generator main components. The amount of vessel activity would vary depending on the replacement to be performed (for example, a blade maintenance activity would involve more vessel movements than a one-off blade bearing replacement).
- The ROV vessel would generally support subsea preventive and corrective activities at the foundations of WTGs and OSS. It would most likely stay offshore during operations but might have few port calls depending on the expected duration of the campaign.
- Seabed surveys, depth of burial surveys and reburial campaigns for export/inter-array cables would typically occur every three years and might cover the full project area depending on engineering assessment.
- The frequency of inter-array and export cable repair activity depends on the failure rates of the export/inter-array cables and hardware used (t-connectors et cetera), the overall cable length and the cable layout. One failure per 1,000 km per year of export/inter-array cables is assumed which would lead to a repair operation occurring approximately once every other year.

The current users of the project area include non-project vessels associated with petroleum exploration and production (including carbon sequestration), Defence vessels, and maintenance vessels associated with the Basslink Interconnector.

Whilst project operations vessels are transiting between port and the project area they would operate under all relevant Australian maritime regulations.

Impact assessment

Petroleum exploration

There are currently no planned petroleum exploration activities within the OPA. Historically there has been one vessel-based petroleum exploration activity in Gippsland Basin per year lasting up to six months. There has not been petroleum exploration activities in the Offshore Wind Farm Area within the last 10 years (Table 6-6).

The CarbonNet project has identified a potential injection site to the south of their main target formation, overlapping the north of the Offshore Wind Farm Area. A 3D seismic survey was undertaken at the start of the life of Pelican (in 2018) and further surveys were proposed to be undertaken at five years, then at the end of life which is estimated to be at 25 years.

Based on the ability of petroleum exploration vessels to adapt operations with no or industry standard planning required and the impact restricted to the OPA for the long term, the potential consequence is considered to be Negligible.

Petroleum production

Light vessel traffic of approximately 100 m length vessels associated with petroleum production in the Gippsland and Bass Strait traverses the project area regularly (Pivot Maritime 2021). It was determined through navigational modelling (Pivot Maritime 2021a) that deviating around the Offshore Wind Farm Area would result in a six-minute increase of travel time between ports and petroleum production platforms. During consultation with vessel masters they indicated that this insignificant increase in travel time would be preferable to attempting to navigate the Offshore Wind Farm Area and none would attempt to navigate the Offshore Wind Farm Area.

Based on the ability of petroleum production vessels to adapt operations with no or industry standard planning required and the impact restricted to the OPA for the long term, the potential consequence is considered to be Negligible.

Defence

There are no designated Defence maritime training areas within the project area, however Defence activities may take place within the area including the transit of naval vessels, training exercises, hydrographic surveys, surveillance, enforcement and search and rescue. The installation of WTGs may necessitate Defence to use other marine areas for these purposes depending on the size and manoeuvrability of the vessel, and therefore displace Defence vessels.

Three-dimensional navigational modelling undertaken for the project has demonstrated that a 75 metre vessel could navigate through installed WTGs in an optimised layout with Low risk throughout the day and night in good weather conditions (Pivot Maritime, 2022). However, in poor weather conditions and with increased vessel traffic in the area the risk of anchor dragging increased and the amount of navigable waterway was reduced, increasing the risk to vessels of 75 m. The level of risk decreased with vessel size down to a 45 m vessel which presented Low navigational risk in all weather and lighting conditions (Pivot Maritime, 2022).

Based on the ability of Defence vessels to adapt operations with no additional or industry standard planning required and the impact restricted to the OPA for the long term, the potential consequence is considered to be Negligible.

Submarine cable maintenance vessels

Approximately 28 km of the Basslink Interconnector overlaps the OPA. Periodic maintenance associated with the Basslink Interconnector may occur during the windfarm operations including cable recovery and laying activities from a special-purpose vessel. This may include subsea surveys out to 500 m from the cable (Basslink 2018).

A relatively small portion of cable is within the OPA (seven per cent of the total length of the Basslink Interconnector) therefore there is only a small area of cable that could foreseeably be impacted upon during windfarm operations. Based on the ability of submarine power cable maintenance vessels to adapt requiring project-specific solutions to be developed at a high complexity level and the impact restricted to within the OPA for the duration of the life of the wind farm, the potential impact to submarine power cable maintenance vessels is considered to be Minor.

9.1.1 Mitigation measures

The initial consequence level to petroleum exploration, production, submarine power cable and Defence vessels is Negligible to Minor with the application of industry standard initial mitigation measures as described in Section 7.4. No additional mitigations are applied.

9.1.2 Residual impacts

Table 9-1 Consequence associated with displacement or interaction with vessels during operations

Potential Impact	Receptor	Receptor sensitivity	Initial consequence	Final Mitigation	Residual consequence
Displacement or interaction with vessels	Petroleum exploration	Low	Negligible (E)	Not required	Negligible (E)
	Petroleum production	Low	Negligible (E)	Not required	Negligible (E)
	Defence	Low	Negligible (E)	Not required	Negligible (E)

Potential Impact	Receptor	Receptor sensitivity	Initial consequence	Final Mitigation	Residual consequence
	Submarine power cables	Medium	Minor (D)	Not required	Minor (D)

Evaluation of residual impact against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in the table below.

Table 9-2 Evaluation of residual impact against the assessment criteria

Assessment criteria	Evaluation	Certainty
Operation activities and equipment are limited to within the project area.	Displacement of other users may only occur in the assessed area, and therefore the impact to other users is limited to the project area only.	Planning requirements preclude the use of offshore construction equipment outside the designated areas, therefore confidence that the use is limited to this area is high.
Operation parameters do not exceed those described in the maximum design scenario.	Parameters in described in the maximum design scenario are those assessed in the EIS/EES process, and therefore the potential impacts from any other development scenario could not be greater than those assessed here.	Approval requirements preclude the development of offshore facilities beyond those assessed in the maximum design scenario, therefore confidence that the construction will be within these limits is high.
Stakeholders have sufficient time and opportunity to comment on the project including raising of objections or claims.	Feedback from stakeholders has been included in the impact assessment and would continue to be considered during the operation of the project.	Stakeholder consultation has been included into the design where applicable, and Star of the South has committed to open and continuous community engagement through the lifetime of the project, therefore certainty is high.
Project vessel activities are compliant with relevant Star of the South procedures and maritime law relating to navigation and safety at sea.	Star of the South has committed to adhering to all relevant local maritime laws relating to navigation and safety at sea.	Operating outside of legislated maritime requirements will attract penalties and introduce further risk for health and safety. The confidence that maritime laws will be adhered to is high.
Development is consistent with the principles of ecological sustainability	Negligible impacts are expected from displacement or interaction with other marine users with no long-term consequences predicted and therefore are considered consistent with the principles of ecological sustainability. The residual impact is Negligible and cannot be reduced further.	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.
Planning and management decisions are based on the best available environmental, social and economic information.	The impact assessment was completed using the best available information.	Access was available to the best publicly available information and exhaustive searches for this information was made by industry experienced professionals.
Management of impacts incorporates the precautionary principle.	No threats of serious or irreversible environmental and other damage were identified, such that the precautionary principle applies. Impact assessment has been completed on the consideration of historical frequency of petroleum exploration rather than the basis of future planned activity, which is zero.	Evaluation of shipping and navigational risk through the PAWSA method is international standards and incorporates inherent precaution therefore confidence is high.
Existing infrastructure users of the project area are not disadvantaged by the development of the project.	Star of the South has committed to adhering to all relevant local maritime laws relating to navigation and safety at sea. Negligible impacts are	Stakeholder consultation has been included into the design where applicable, and Star of the South has committed to open and continuous

Assessment criteria	Evaluation	Certainty
	expected from displacement or interaction with other marine users with no long-term consequences predicted. The residual impact is Negligible and cannot be reduced further.	community engagement through the lifetime of the project, where disadvantaged users will have the opportunity to communicate with the project if required therefore the confidence that users will not be disadvantaged is high.

The potential risk to infrastructure and other users from displacement from non-project vessels during operation of the wind farm are Negligible to Minor and any impact would be readily managed (if required).

9.2 Interference with submarine power cables (IOU-I07)

Offshore cable maintenance may require activity within close proximity to existing submarine power cables, including Basslink infrastructure that traverses the eastern part of the proposed OWFA (Figure 6-7). Project cable maintenance activities may include:

- Remedial cable burial
- Inter-array cable repair
- Export cable repair.

Operations and maintenance vessels would be present periodically in the OPA throughout the life of the project (up to 30 years) in order to conduct routine maintenance and heavy repairs. Vessels may include service operation vessels, jack-up vessels, ROVs support vessels, specialised seabed survey vessels and cable repair vessels.

9.2.1 Impact assessment

The 28 km section of the Basslink Interconnector that passes through the project area was laid in a soft sediment trench during construction in 2005. During construction, project inter-array and export cables would be laid over the Basslink Interconnector. These crossings would be protected with rock armour or concrete mattresses. Inter-array cables may also be laid on a cable support structure or sled to aid in separating inter-array cables from each other and maintain access to each cable for repair or maintenance activities.

The placement of jack-up vessels may result in damage to the Basslink Interconnector if an attempt is made to place the jack-up pods over the cable itself. In addition, anchoring of project operation and maintenance vessels may result in damage to the Basslink Interconnector if anchoring occurs directly onto unburied sections of the cable, or if a vessel drags anchor onto the cable. The Basslink Interconnector is currently marked on nautical charts and it is recommended that anchoring is avoided in the vicinity of the cable. Basslink have a 24-hour emergency number for use if a vessel anchor becomes snagged on their cable and issue notice to mariners in the event that they are aware that part of the cable has become exposed. Basslink recommends that any snags on the cable are attempted to be freed using vertical lifting with normal power (Basslink 2017). If this does not work, then Basslink asks that the anchor is left with a buoy and the position communicated to Basslink for retrieval. The initial mitigation measure of a co-existence agreement between Star of the South and Basslink would enable the efficient operation planning and communication around anchor placement if required.

Any damage to the Basslink Interconnector would reasonably be expected to be restricted to within the OPA during operation activities and be resolved in the short-term.

Based on the ability of submarine power cable operators vessels to adapt operations with a complex level of standard operational planning and the impact restricted to within the OPA for the duration of project operations, the potential impact to submarine power cable maintenance vessels is considered to be Minor.

9.2.2 Mitigation measures

The initial impact rating to submarine power cables as a result of construction is Minor following the application of industry standard mitigations as described in Section 7.4. No further mitigations measures are required.

9.2.3 Residual impacts

Table 9-3 Consequence associated with interference with submarine power cables during operations

Potential Impact	Receptor	Receptor sensitivity	Initial consequence	Final Mitigation	Residual consequence
Interference with submarine power cables	Submarine power cables	Medium	Minor (D)	Not required	Minor (D)

Evaluation of residual impact against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in Table 9-4. The residual impact is Minor and as such any impact would be temporary and be readily managed (if required).

Table 9-4 Evaluation of residual impacts against the assessment criteria

Assessment criteria	Evaluation	Certainty
Existing infrastructure users of the project area are not disadvantaged by the operations of the project.	Star of the South has committed to mitigation measures to reduce impact to other users of the area. Minor impacts are expected from interaction with other marine users with no long-term consequences predicted.	Stakeholder consultation has been included into the design where applicable, and Star of the South has committed to open and continuous community engagement through the lifetime of the project, where disadvantaged users will have the opportunity to communicate with the project if required. Therefore the confidence that users will not be disadvantaged is high.
Planning and management decisions are based on the best available environmental, social and economic information.	The impact assessment was completed using the best available information.	Access was available to the best available publicly available information and exhaustive searches for this information was made by industry experienced professionals.
Management of impacts incorporates the precautionary principle.	Star of the South has committed to mitigation measures to reduce impact to other users of the area. Minor impacts are expected from interaction with other marine users with no long-term consequences predicted.	Simultaneous activities in the same spatial area are anticipated to be low however the assessment considers this as a regular occurrence therefore the confidence in the assessment is high.

9.3 Displacement of or interaction with aircraft (IOU-I08)

This section presents an impact assessment based on the Aviation Impact Assessment Report (AIA) conducted for the OWFA. The full AIA can be found in Appendix C.

9.3.1 Impact assessment

The MDS for turbines describes two scenarios that represent the extents of the PDE: scenario one comprising the maximum number of smallest turbines, and scenario two comprising the maximum number of the largest turbines:

Smaller WTGs – the smallest WTG within the PDE. For the purpose of the EIA, it is assumed to be 147 of the smallest WTG, with a rotor diameter of up to 236 metres and minimum tip height of 271 metres (LAT).

Larger WTGs – the largest WTG within the PDE. For the purpose of the EIA, it is assumed to be 113 of the largest WTG, with a rotor diameter of up to 285 metres and maximum tip height of 350 metres.

The operational period would be up to 30 years.

The airspace over the OPA as described in Section 6.3 includes several features that would be infringed by the proposed WTGs as they are currently determined. However, the application of permanent additional

mitigation measures during the construction period of raising the height of Grid LSALT east of 147°, redesign of the Yarram PANS-OPS approach space and raising the height of the LSALT for areas D and V would result in the removal of this infringement.

9.3.1.1 Grid LSALT

The Grid LSALT exists so that pilots can fly without visual reference to the ground or water and allows for pilots with technical problems to descend to a low level that has a predetermined safety margin over obstacles. The LSALT is determined for each route by assessment of the highest obstacle within an area and adding a minimum obstacle clearance margin. The proposed turbine height of 350 metres infringes the 900 ft LSALT Protection Surface in Grid East of 147°.

Impacts to aviation if turbines infringe the civil LSALT would occur throughout the project life immediate to the OWFA and are considered to be of Severe consequence. Placement of turbines that infringe the Grid LSALT contravenes the *Airports Act 1996*. Constructing a building or other structure that protrudes into a prescribed airspace is defined as a 'controlled activity' under the *Airports Act 1996*. A person must not carry out a controlled activity in relation to a prescribed airspace.

This East of 147° Grid LSALT would need to be raised to 2200 ft to accommodate the Project. This increase would not create an adverse hazard for flight operations in this Grid as adjoining Grid LSALT are significantly higher the 2200 ft AMSL.

9.3.1.2 PANS-OPS

The approach PANS-OPS surface of Yarram Airport includes an RNAV approach (Area Navigation route). RNAV allows an aircraft to use any flight path within the area and offer time and fuel savings, more efficient use of airspace and reduces dependence of radar vectoring. The minimum altitude within the initial segment of the Yarram RNP RWY 27 approach procedure is shown as 1800 ft AMSL. A protection buffer of 984 ft must be applied above the WTGs in the Project area. This PANS-OPS surface will therefore need to be raised to 2200 ft AMSL to accommodate the Project.

Impacts to aviation if turbines infringe the civil LSALT would occur throughout the project life immediate to the OWFA and are considered to be of Severe consequence. Placement of turbines that infringe a PANS-OPS surface requires approval under the *Airports Act 1996* as described in the section above.

9.3.1.3 RAAF Training Areas' Lowest Safe Altitude

The OPA is situated in the South-western Military Controlled Airspace of the RAAF Base East Sale, (Figure 6-1; RAAF 2018) and below training areas D, E, V and W. The proposed WTGs of 350 metres infringe the LSALT of training areas D and V (700 ft/ 213.3 m).

Impacts to Defence aviation would occur if turbines infringe the training area LSALT throughout the project life immediate to the OWFA and are considered to be of Severe consequence. Placement of turbines that infringe the Grid LSALT contravenes the *Airports Act 1996*. Constructing a building or other structure that protrudes into a prescribed airspace is defined as a 'controlled activity' under the Airports Act 1996. A person must not carry out a controlled activity in relation to a prescribed airspace.

The AIA (Appendix C) concluded that the penetration of the LSALT surfaces for the Defence training area requires consultation and discussion with Defence, but as their restricted areas commence at 4,000 ft it should not materially impact current operations.

9.3.1.4 Search and rescue

The potential effects of wind farms on SAR operations in general are as follows:

- Large wind farms increase the probability of SAR operations having to occur amongst turbines. The large blade height means that low cloud may sometimes limit the safety of aircraft operation due to restricted view of blades.
- SAR operations are generally linear in nature (as per international standards (IAMSAR)). Non-linear WTG layouts in wind farms may therefore inhibit effective SAR if spacing between turbines does not allow for a linear line of sight.

- There may be a visual distraction effect caused by the presence of turbines and rotating blades to search crews.
- Turbines may also cause a temporary blocking of the vessel rescue unit, more likely in rough sea states. This is discussed in Technical Report P: Shipping and Navigation.

Based on marine incident data (Section 6.3.5), the frequency of SAR operations in the vicinity of the OWFA is low. The majority of incidents occurred in inshore areas, including within the OECA and within local ports proposed to be used during construction, such as Corner Inlet. The large proportion of incidents were disablement of vessels and were not classed as of major consequence.

As discussed in Technical Report P: Shipping and Navigation, given the increased presence of vessels on site during operations as well as the potential for allision risk of third-party vessels with project structures, there may be a small increase in the likelihood of incidents occurring. Incidents may require the provision of emergency response, including pollution response due to accidental fuel spills, of which would be considered of high or very high consequence (including the potential for loss of life).

As part of designed-in avoidance, mitigation and management, SAR authorities will be part of on-going project engagement and will be notified of changing construction activities. Operators of the project are required under international law to comply with the existing emergency response requirements of SOLAS, as well as local response groups such as AMSA and STV. Although there may be some increased demand on SAR resources due to increased activity in the area, it will likely be mitigated by project vessels on site that would be able to respond immediately in an emergency situation. AMSA engagement is a component of the engagement strategy for aviation-based search and rescue operations that could be conducted in the area.

Based on the ability of SAR to adapt operations with standard operational planning and the impact restricted to within the OPA for the duration of the operations period, the potential impact to SAR is considered to be Negligible.

9.3.2 Mitigation measures

The overall initial consequence rating to aviation (Grid LSALT, Defence LSALT and PANS-OPS) is Severe to Negligible. With the application of mitigation measures described in Section 8.5.2, including raising the height of the overlapping civil and Defence LSALT and redesign of the Yarram aerodrome approach space, the residual consequence to aviation receptors is Minor to Negligible.

9.3.3 Residual impacts

Residual impact ratings for aviation following the implementation of final mitigation measures are described in the table below. With the application of final mitigations, any impact to aircraft due to the presence of turbines is expected to be Minor to Negligible.

Table 9-5 Residual impact to receptors – operations

Potential impact	Receptor	Receptor sensitivity	Initial Consequence	Final mitigation	Residual Consequence
Displacement or interaction with aircraft	Grid LSALT	High	Severe (A)	IOU-M01	Minor (D)
	Yarram PANS-OPS	High	Severe (A)	IOU-M02	Minor (D)
	Defence	High	Severe (A)	IOU-M03	Minor (D)
	Search and rescue	Low	Negligible (E)	N/A	Negligible (E)

Evaluation of residual impact against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in the table below.

Table 9-6 Evaluation of residual impacts against the assessment criteria

Assessment criteria	Evaluation	Confidence
Stakeholders are given sufficient time and information regarding the development in accordance with the	Stakeholder consultation with defence and local aerodromes has been conducted and will continue	Records of consultation demonstrate stakeholders have responded meaningfully to consultation regarding

Assessment criteria	Evaluation	Confidence
Airports (Protection of Airspace) Regulations 1996.	throughout project design and development as outlined in Section 4.	potential impacts to their operations. Confidence in stakeholders receiving the level of information that they require now and into the future is high.
When wind turbines over 150 m above ground level are to be built within 30 km of a certified or registered aerodrome, the proponent should notify the Civil Aviation Safety Authority (CASA) and Airservices Australia. If the wind farm is within 30 km of a military aerodrome, Defence should be notified.	Stakeholder consultation with Defence and local aerodromes has been conducted and will continue throughout project design and development as outlined in Section 4.	Records of consultation demonstrate stakeholders have responded meaningfully to consultation regarding potential impacts to their operations. Confidence in stakeholders receiving the level of information that they require now and into the future is high.
Where a wind turbine 150 m or taller in height is proposed away from aerodromes, the proponent should conduct an aeronautical risk assessment.	It has been based on information provided by specialist aviation assessment consultants.	The aviation risk assessment has been provided added an appendix to this report.

9.4 Turbine blade interference with radar, communications and meteorological equipment (IOU-I09)

There are eight civil facilities surrounding the OPA that fall within the area of interest described under NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS) (Figure 6-6).

9.4.1 Impact assessment

Once the wind farm is operational, radar signals can be reflected by WTGs due to their size and rotation of turbine blades, which is often greater compared to the size of radars' targets. This causes interference with radar images by presenting 'clutter' in radar images.

Radar clutter (or false radar returns) can confuse air traffic controllers by making it difficult to differentiate between real aircraft returns and returns that result from the detection of WTGs. Numerous false returns in a small area can be interpreted by radar processing software as an aircraft track, leading to false aircraft detections in an area, or mix with or shield a true aircraft rack. In military applications, this can lead to misdetections or enemy aircraft being undetected. In both civil and military applications this would reduce the ability of the radar operator to safety manage the airspace.

It is noted that there are GPS navaids at RAAF Base East Sale and Yarram aerodrome. Trials undertaken for North Hoyle Wind Farm tested Global Positioning System (GPS) performance in the vicinity of the North Hoyle WTGs, and found there to be no significant impact (MCA and QinetiQ Ltd, 2004), therefore this potential impact is not discussed further.

Weather radar can be impacted by radar clutter by blocking the detection of weather patterns or creating false readings.

Refinement of the project design (see Section 5.6) has moved the OWFA further from the coast, reduced the maximum number of WTGs from 400 to 147, and increased the minimum WTG spacing from 660 metres to 1062 metres. These changes reduce potential impacts to radar.

9.4.1.1 Civil radar

There are eight civil facilities surrounding the OPA that fall within the area of interest described under NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS). False radar returns across the offshore wind farm area can result in false radar returns which defend against aircraft collisions. An increase in aircraft collisions, that can result in catastrophic loss of life (severe consequence), may occur without the implementation of mitigations. In this case, project-specific solutions will be required to be developed at a high complexity level dependent on the radar equipment being used and the nature of the interference experienced.

9.4.1.2 Defence radar

Defence raised concerns regarding radar interference during early consultation, however subsequent advice from Defence Land Planning & Regulation, from consultation undertaken on 14 March 2025, indicates that the project's offshore wind turbines were unlikely to impact the operational integrity of the ATC surveillance radar located near RAAF Base East Sale.

The magnitude of impact could be medium scale and long-term, but reversible. Ongoing consultation will be undertaken with Defence Land Planning & Regulation, with the provision of a final layout provided for consideration prior to construction commencing. Project-specific solutions could require a high complexity level, dependent on the nature of the interference experienced.

9.4.1.3 Weather Radar

The Bureau of Meteorology (BoM) conducted a high-level impact analysis based on an early WTG layout and raised concerns about the project's potential impacts on the Bairnsdale weather radar. BoM indicates that if not avoided or if left unmitigated, the turbines could potentially interfere with the detection of weather beyond the farm and affect forecasting of weather conditions for Wilsons Promontory.

Further consultation with BoM in October 2025, regarding the revised OWFA and project design, indicated the updated high-level assessment (which is primarily based on the site boundary and turbine height) still suggested levels of interference with the Bairnsdale radar due to the site's northeastern corner being within 100km of the facility.

Recognising the project's turbine layout and configuration is still subject to detailed design, there are opportunities to reduce or remove these potential impacts. Further consultation and screening of the project design will be conducted with BoM, as detailed design is progressed. Star of the South is required to consult with the BoM as a condition of its feasibility licence and detail these consultation outcomes in the project's Management Plan under the *Offshore Electricity Infrastructure Act 2021* (OEI Act).

The magnitude of impact could be medium scale and long-term, but reversible.

9.4.2 Mitigation measures

Once tall objects including offshore WTGs are planned, civil radar interference can be mitigated in a number of ways depending on the radar equipment being used and the nature of the interference experienced. Radar interference modelling can assist to determine which methods will be most suitable for the Star of the South project. Common radar interference mitigation includes radar configuration where the software is configured to identify and ignore reflections from tall objects. Problematic WTGs can be relocated, or their height reduced. The radar can also be modified, with programming to 'ignore' the wind farm, 'infill' radars placed within the wind farm to present a more accurate radar image or different radar technologies used that filter out the wind farm interference. Star of the South will work with CASA, Airservices Australia and impacted providers to determine the need for aviation radar interference modelling or any measures to mitigate the impact from the offshore WTGs to the civil radar facilities in the region as required.

Star of the South intends to continue consultation with Defence with the aim of delivering a suitable radar solution.

SOTS will consult with BoM at the time of detailed design when a layout has been refined and, if required, undertake an industry service interference modelling assessment to determine if relevant mitigations would be required.

Table 9-7 Final mitigation measures for turbine blade interference with radar

ID	Receptor	Mitigation	Phase	Effectiveness
IOU-M04	Manage civil radar interference	When a final layout is known, Star of the South will work with CASA, Airservices Australia and impacted providers to determine the need for aviation radar interference modelling and any mitigation to reduce or remove the level of radar interference caused by the operation of the wind farm.	Pre-construction	Radar modelling will aid to identify mitigations to reduce potential impact to radar from the final wind turbine design.

ID	Receptor	Mitigation	Phase	Effectiveness
IOU-M05	Manage defence radar interference	Star of the South will continue consultation with Defence and submit final turbine layout once determined and prior to construction commencing.	Pre-construction	Consultation with Defence is aimed to deliver a suitable radar solution.
IOU-M06	Manage weather radar interference	Following confirmation of a final layout and turbine height, Star of the South will request another BoM preliminary screening assessment to identify any impacts to the Bairnsdale radar. If, following this screening, potential impacts are identified, Star of the South will work with BoM to undertake an industry service interference modelling assessment to determine any mitigations that would be required.	Pre-construction	Consultation with BoM is aimed to deliver a suitable radar solution.

9.4.3 Residual impacts

Considered with the application of initial mitigations described in Section 7.4, and the additional mitigations described in the section above, the residual magnitude is medium scale and long-term and is unlikely to be detectable. The residual consequence is therefore considered to be Moderate.

Table 9-8 Residual impact ranking to receptors – operations

Potential impact	Receptor	Receptor sensitivity	Initial Consequence	Final mitigation	Residual Consequence
Turbine blade interference with radar, communications and meteorological equipment	Civil radar	High	Severe (A)	IOU-M04	Moderate (C)
	Weather radar	High	Major (B)	IOU-M06ce	Moderate (C)
	Defence Radar	High	Major (B)	IOU-M05	Moderate (C)

9.4.4 Evaluation of residual impacts against assessment criteria

An evaluation of the residual impact against the assessment criteria is provided in Table 9-9.

Table 9-9 Evaluation of residual impacts against assessment criteria

Assessment criteria	Evaluation	Certainty
If wind turbines are proposed to be developed within the Building Restricted Area of a CNS facility, details are referred to Airservices Australia or Defence to allow them to assess the impact.	Consultation with Defence and Air Services Australia is ongoing through the design and development of the start of the South project as shown in Section 4.	Consultation records demonstrate ongoing consultation with relevant stakeholders.

It is noted that any future developments of instrument approach and landing procedures or instrument departure procedures at any airfield within 30 nautical miles of the boundary of the wind farm will be required to take the features of the wind farm into account during the design process.

The determination of siting future aviation navigation aids including surveillance equipment to support air traffic services must consider the effect the wind farm might have on the equipment.

10 DECOMMISSIONING IMPACT ASSESSMENT

Decommissioning will be progressively planned and budgeted for in accordance with Section 116 of the OEI Act, for the maintenance and removal of all property. It is acknowledged that there are uncertainties associated with full removal, with future activities subject to a Management Plan approved by the Regulator.

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. This section discusses the potential impacts of the project as a result of decommissioning activities and the associated mitigation measures that aim to reduce impacts to as low as reasonably practicable. The level of detail that can be provided in this section is commensurate with the level of detail available now about activities that may occur in 30+ years' time. Mitigation measures and management referred to are summarised in Section 15.

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

This Impact assessment is based on:

- 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.

10.1 Potential impacts and risks

Potential impacts from these activities are listed below and predicted residual impacts are summarised in Table 10-2;

- Displacement or interaction with non-project vessels during decommissioning
- Displacement or interaction with aircraft.

10.2 Mitigation measures

Mitigation measures implemented during the decommissioning phase are expected to be largely the same as those described in Section 8 for the construction phase, subject to provision of information enabling more focussed assessment. However, it should also be noted that the removal of infrastructure will inherently reduce potential impacts on other users once the decommissioning program is complete. As indicated in Section 115 of the *OEI Act 2021* and subject to the final requirements of the subordinate regulations a decommissioning management plan (DEC-M01;Table 10-1) will be developed during the operation phase of the project that includes more informed assessment of the impacts of decommissioning activities on infrastructure and other users receptor groups. A summary of potential mitigation measures for decommissioning is provided in Table 10-2.

Table 10-1 Mitigation measures (Decommissioning phase)

ID	Mitigation measure	Mitigation measure and description
DEC-M01	Marine Decommissioning Management Plan	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: • 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.

10.1 Summary residual impacts and risks

The magnitude of impacts from activities during the decommissioning phase are expected to be no greater than those during the construction phase, and likely will be less due to technology innovation over the period of OWF operation. Further to this, the removal of infrastructure will reduce displacement/interference impacts to other users once the decommissioning program is complete.

Assuming that decommissioning activities would principally be the same or lower magnitude as the construction activities and similar mitigation measures are used, the impact to infrastructure and other users from decommissioning activities ranges from minor to negligible (Table 10-2, Appendix A).

10.2 Evaluation of residual impact against assessment criteria

Based on assessment of significance for impacts to infrastructure and other users receptor groups during the construction phase, impacts during the decommissioning phase would be broadly acceptable. The project will commit to achieving the assessment criteria provided in Section 3.3, and thresholds of impacts will be within those assessed for construction (and are expected to be lower). More informed assessment of significance would be provided in the Decommissioning management plan.

Table 10-2Summary of decommissioning activities, consequences and mitigations

Project activity	Event (ID)	Receptor	Sensitivity	Initial Mitigations		Magnitude	Final Consequence	Additional mitigations
Decommissioning vessel presence	Displacement or interaction with non-project vessels during decommissioning (IOU-I10)	Non-project vessels associated with petroleum exploration	Low	VES-M01 OFF-M10 OFF-M012	Vessel Operations Framework Notice to Mariners Safety and protection zones	Low	Negligible (E)	Not required
		Non-project vessels associated with petroleum production	Low	VES-M01 OFF-M10 OFF-M012	Vessel Operations Framework Notice to Mariners Safety and protection zones	Low	Negligible (E)	Not required
		Defence vessels	Low	VES-M01 OFF-M10 OFF-M012	Vessel Operations Framework Notice to Mariners Safety and protection zones	Low	Negligible (E)	Not required
		Submarine power cable maintenance vessels	High	VES-M01 OFF-M10 OFF-M012	Vessel Operations Framework Notice to Mariners Safety and protection zones	Negligible	Minor (D)	Not required
Removal of submarine infrastructure	Interference with submarine power cables (IUO-I11)	Submarine power cable	Medium	OMU-M17 OMU-M18 OMU-M11	Cable crossing agreement Co-existence agreement (cable operators) Basslink consultation	Low	Minor (D)	Not required
Removal of turbines	Displacement or interaction with aircraft (IOU-I12)	Grid LSALT	High	IOU-M01	Consult with CASA and Airservices Australia	Low	Minor (D)	Not required
		PANS_OPS	High	IOU-M02	Consult with the Yarram Aerodrome.	Low	Minor (D)	Not required
		Defence	High	IOU-M03	Consult with Defence	Low	Minor (D)	Not required
		SAR	Low	VES-M01 OFF-M10	Vessel Operations Framework Notice to Mariners	Negligible	Negligible (E)	Not required

11 INTER-RELATED IMPACTS

Due to the spatial and temporal overlap of project activities, there is potential for the interaction of hazards assessed separately throughout Section 8 and 9 to result in inter-related impact(s) on infrastructure and other users that is greater than the sum of their separate impacts. The potential for inter-related impact exists for those receptors that may experience impacts from more than impact source. While individual impacts from a single source may not be significant, when combined with a second or additional sources of impact from the project spatially or temporally separated from the first, the impact may become significant.

Two types of inter-related effects have been assessed:

- Project lifetime effects - individual effects on each of the receptor groups across the construction, operation and maintenance, and decommissioning phases of the project.
- Receptor-led effects - multiple effects on the same receptor.

All related potential impacts were able to be reduced to Minor or Negligible consequence levels through the application of appropriate management and mitigation. Of those residual impacts determined to be Minor, the following receptors have been considered for possible inter-related impacts.

Table 11-1 Summary of inter-related impacts and risks

Potential impact and risk pathways	Receptor group	Phase of project (C, O, D)	Likely significant inter-related effects	Additional mitigations and management
Displacement or interaction with non-project vessels	Petroleum exploration and production	C, O, D	Combined, there is the potential for the overall impact to submarine power cables or petroleum production to be greater due to the increased number of operational planning required to operate in co-existence with the offshore wind farm.	Star of the South is undertaking consultation and developing co-existence agreements with operators that may be impacted by one or more aspects of the offshore wind farm (see Section 4). With the application of this mitigation, potential impacts are not predicted to be more than those of a single impact pathway.
	Submarine power cables	C, O, D		
Interference with submarine power cables	Submarine power cables	C, O, D	Combined, there is the potential for the overall impact to submarine power cables or petroleum production to be greater due to the increased number of operational planning required to operate in co-existence with the offshore wind farm.	Star of the South is undertaking consultation and developing co-existence agreements with operators that may be impacted by one or more aspects of the offshore wind farm (see Section 4). With the application of this mitigation, potential impacts are not predicted to be more than those of a single impact pathway.
Displacement or interaction with aircraft		C, O, D	Combined, there is the potential for the overall displacement or interaction with aircraft due to tall structures associated with the Project and airspace.	Star of the South is undertaking consultation and developing temporary safety zones of 500 metres will be in place around infrastructure as per regulations under the Offshore Electricity Infrastructure Act 2021. Safety zones will be communicated via NTMs and consultation bulletins.

12 CUMULATIVE IMPACT ASSESSMENT

This section provides an assessment of cumulative impacts for infrastructure and other users 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 or 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.

The method to consider cumulative impacts has been described in Section 5 and Chapter 6: - Assessment Framework within both the EIS and EES.

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 and EES submission.

12.1 Defining the zone of influence

For the purpose of evaluating cumulative impacts for infrastructure and other users, this assessment has identified other projects that are located within the zone of influence of this study, which form the ‘long list’. The zone of influence for this study has been defined as the spatial extent of potentially affected receptors across the following categories:

4. Aviation assets and airspace in the vicinity of the OWFA including:
   - Certified or military aerodromes within 30 nm.
   - Civilian, military and special use airspace and overhead air routes.
5. Radar equipment and facilities including air traffic control (Airservices Australia), Defence and BOM radar systems across the Gippsland OWZ.
6. Industry vessels servicing the Gippsland OWZ and the offshore petroleum fields. The key local ports for industry vessels are Port Albert and Lakes Entrance.
7. Submarine cabling infrastructure defined by the alignment of Bass Link through the Gippsland OWZ.

Temporally, the zone of influence extends from the proposed start of offshore construction in 2030, to the likely end of decommissioning works in 2070 (based on an operational life of 30 years and five years each of construction and decommissioning). Impacts are not expected to continue beyond the life and decommissioning of the project.

12.2 Project Screening

12.2.1 Projects within zone of influence

The long list of projects that fall within the ZOI for infrastructure and other users are presented in Table 12-1. This list is confined to offshore projects only. It is noted that operational projects, such as oil and gas and existing vessel operations, are considered part of the baseline and have been discussed in Section 6.

In assessing the potential for cumulative impacts for the Star of the South Offshore Wind Farm, it is important to consider that some developments, predominately those ‘proposed’ (referred) or identified in development plans, may not actually be taken forward, or fully built out. There is therefore a need to build in some certainty (or uncertainty) with respect to the potential impacts that may arise from such proposals, which is done by allocating projects into ‘tiers’. This approach allows appropriate weight to be given to each tier when considering the potential cumulative impacts.

The screening process described in Section 5.7 has been applied to determine the short list of projects taken forward within the CIA. Each of the projects in Table 12-1 have been evaluated against the cumulative performance criteria to determine whether there is the potential for cumulative impacts with the project and sufficient information available to undertake a meaningful assessment.

Table 12-1 Cumulative impact screening - Long list of projects in the zone of influence

Project or action	Data Confidence	Scale parameter	Receptor impact	Temporal overlap	Conclusion
(within the ZOI)	Certainty tier	Is the project or action of sufficient scale to warrant inclusion in the CIA?	Will the project / action adversely affect the same receptors as the project? And have a spatial overlap	Will the project / action result in adverse impacts, impacts to the same receptors as the project at the same time or on a timescale that could result in a cumulative impact?	Is the project / action shortlisted for the CIA?
Aurora Green Offshore Wind Farm Iberdrola Australia	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information.
Aurora Green Offshore Wind Farm Preliminary Surveys Iberdrola Australia	Tier 1 - Approved	No - activities expected to be small scale and/or result in low magnitude, temporary adverse impacts	N/A	N/A	No. Project/action not of sufficient scale to warrant inclusion in CIA.
Blue Mackerel North Offshore Wind Farm Parkwind	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information.
CarbonNet	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Gippsland Offshore Wind Farm 1 Ørsted	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Gippsland Offshore Wind Farm 2 Ørsted	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Gippsland Offshore Wind Farm Marine Survey Investigations Ørsted	Tier 1 - Approved	No - Impact offshore unlikely as only one or two extra vessels in ZOI at any one time. Survey vessels expected to be chartered from or use port of Corner Inlet and Port Albert, but not expected to significantly increase vessel traffic.	Yes - Non- project vessels may be impacted.	Yes – vessel presence for marine and avian observation, FLiDAR deploy and collection. Geotechnical and geophysical works will not overlap timing of the project (finished in 2025).	No. Project/action not of sufficient scale to warrant inclusion in CIA.

Project or action (within the ZOI)	Data Confidence Certainty tier	Scale parameter Is the project or action of sufficient scale to warrant inclusion in the CIA?	Receptor impact Will the project / action adversely affect the same receptors as the project? And have a spatial overlap	Temporal overlap Will the project / action result in adverse impacts, impacts to the same receptors as the project at the same time or on a timescale that could result in a cumulative impact?	Conclusion Is the project / action shortlisted for the CIA?
Gippsland Regional Port Project Qube Energy Pty Ltd	Tier 3 - proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Gippsland Skies Offshore Wind Farm AGL & Mainstream Renewable Power & Reventus Power & Direct Infrastructure	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Gippsland Skies Offshore Wind Project marine surveys (investigations) AGL & Mainstream Renewable Power & Reventus Power & Direct Infrastructure	Tier 2 - Seeking approval	Yes – underwater noise impacts to data quality No for non-project vessels - Impact offshore unlikely as only one or two extra vessels in ZOI at any one time. Survey vessels expected to be chartered from or use port of Corner Inlet and Port Albert, but not expected to significantly increase vessel traffic. Any displacement of vessels due to access restrictions during geophysical surveys would be temporary and localised.	Yes – Non-project vessels may be impacted. Unlikely to impact commercial shipping in shipping channels or emergency response access.	Yes - geophysical surveys are proposed for 2025, 2027 and 2028 or 2029 which may overlap offshore construction of the project from year 3.	Yes – cumulative impacts to data quality from underwater noise included in CIA. Cumulative impacts of project/action to non-project vessels not of sufficient scale to warrant inclusion in CIA.
Great Eastern Offshore Wind Farm Corio Generation	Tier 2 - Seeking approval	Yes – Offshore wind farm project construction and operation	Yes – all receptors. The Great Eastern Offshore Wind Project is located immediately south-east of the project	Yes – the Great Eastern Offshore Wind Project is proposed to be constructed from 2028-2032, with operations occurring until 2061.	Yes
Great Eastern Offshore Wind Farm - Preliminary Site Investigations	Tier 2 - Seeking approval	Yes – underwater noise impacts to data quality No for non-project vessels - Impact offshore unlikely as only	Yes – Non-project vessels may be impacted. Unlikely to impact commercial shipping in	No - geophysical surveys are proposed for 2024-2025 and therefore do not overlap timing of the project.	No – there is no temporal overlap of pathway that may produce cumulative impacts of note. Impacts to

Project or action (within the ZOI)	Data Confidence Certainty tier	Scale parameter Is the project or action of sufficient scale to warrant inclusion in the CIA?	Receptor impact Will the project / action adversely affect the same receptors as the project? And have a spatial overlap	Temporal overlap Will the project / action result in adverse impacts, impacts to the same receptors as the project at the same time or on a timescale that could result in a cumulative impact?	Conclusion Is the project / action shortlisted for the CIA?
Corio Generation		one or two extra vessels in ZOI at any one time. Survey vessels expected to be chartered from or use port of Corner Inlet and Port Albert, but not expected to significantly increase vessel traffic. Any displacement of vessels due to access restrictions during geophysical surveys would be temporary and localised.	shipping channels or emergency response access.		non-project vessels when combined with those of the project/action not of sufficient scale to warrant inclusion in CIA and expected timing of offshore activities does not overlap.
High Sea Wind Ocean Winds (EDP Renewables & ENGIE)	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Kent Offshore Wind RWE	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Kut-Wut Bratauallung CIP	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Navigator North Offshore Wind Farm Origin Energy & RES	Tier 3 - Proposed	N/A	N/A	N/A	No. Tier 3 project - screened out of the CIA due to a lack of information
Navigator North Offshore Wind Farm – Early Marine Survey Investigations Origin Energy & RES	Tier 2 – Seeking approval	No - Impact offshore unlikely as only one or two extra vessels in ZOI at any one time.	Yes - Commercial and recreation vessels may be impacted. Unlikely to impact commercial shipping in shipping channels or emergency response access.	No - Expected timing of offshore activities does not overlap.	No - Project/action not of sufficient scale to warrant inclusion in CIA and expected timing of offshore activities does not overlap.

Ten identified potential cumulative impact projects within the Zone of Influence of the project, including nine proposed offshore wind farms, are assessed as tier three (Low certainty) projects (Table 12-1) and therefore are screened out of the CIA (refer Section 5.7) due to insufficient information. It is acknowledged that these other tier three offshore wind projects are within the same region of Bass Strait as Star of the South as such cumulative impacts to the same receptors may occur. However, it is highly unlikely that all projects will progress to construction and, as publicly available information on these projects does not provide design details, timing of project phases or the extent of infrastructure, making assumptions about these elements may overestimate impacts and provides no meaningful assessment for accurate decision making.

Based on the screening process (Table 12-1), two potential projects have been short-listed for an assessment of cumulative impacts on receptors (Table 12-2). This assessment is presented in Section 12.3.3.

Table 12-2 Short-list projects assessed

Project	Stage	Project description	Relevance to this assessment	Certainty	Assessment Assumptions
Gippsland Skies Offshore Wind Project marine surveys (investigations)	Seeking approval	Marine survey investigations to support the Gippsland Skies Offshore Wind Project are proposed in the Gippsland Basin from 2025 and include geophysical surveys (2025, 2027 and 2028 or 2029), geotechnical surveys (2025, 2027- 2028, 2029-2032), and boat-based ecological surveys.	Spatial relevance: located 30 km south-west of Wilsons Promontory and therefore underwater noise impacts from both projects have the potential to impact on the same receptors as Star of the South Temporal relevance: geophysical surveys are proposed for 2025, 2027 and 2028 or 2029 which may overlap offshore construction of the project from year 3. Potential cumulative impact pathway: Generation of underwater noise, affecting marine survey data collection.	Tier 2 (Medium)	The assessment relies on the information publicly available for the proposed project at the time of this assessment.
Great Eastern Offshore Wind Farm Corio Generation	Seeking approval	Great Eastern Offshore Windfarm is a referred offshore wind farm located adjacent to the OWFA, to the south-east. It will be located approximately 25-45 km off the Gippsland coast. Potential landfall areas are indicated to be between Ninety Mile Beach National Park and McGauran's Beach. Consists of up to 172 wind turbines which are expected to have fixed bottom foundations, up to	Spatial relevance: located within the Gippsland Offshore Wind Area, adjacent and south-east of the OWFA, and therefore has the potential to impact the same shipping and navigation receptors as Star of the South. Temporal relevance: According to the project lifecycle depicted on the project website, it is possible that the construction and operations phase of the project may overlap with those of the Star of the South project.	Tier 2 (Medium)	GEOW is very similar in scope to the Star of the South. It is assumed that impacts to receptors will be directly comparable. The assessment relies on the information publicly available for the proposed project at the time of this assessment.

Project	Stage	Project description	Relevance to this assessment	Certainty	Assessment Assumptions
		eight offshore sub-stations and associated infrastructure in operation, generating up to 2.5 GW of electricity. Construction is expected to occur from 2028 to 2032, and all activities completed by 2061.	Potential cumulative impact pathway: (1) Underwater noise (2) Submarine power cables (3) Aviation airspace (4) Radar (5) Industry vessels.		

It is noted that offshore wind farms seek consent for a MDS and the 'as ’built' offshore wind farm will be selected from the range of consented scenarios. As is often the case, the MDS presented in the early application stage (referral) are often refined during the EIS/EES and potentially further during the determination period. The ‘as built’ project may then be different to the MDS that is approved. This process of refinement can result in a reduction to associated project parameters, for example the number of export cables to be installed and the number of turbines. The CIA presented here has been undertaken based on information presented in the publicly available referral documents.

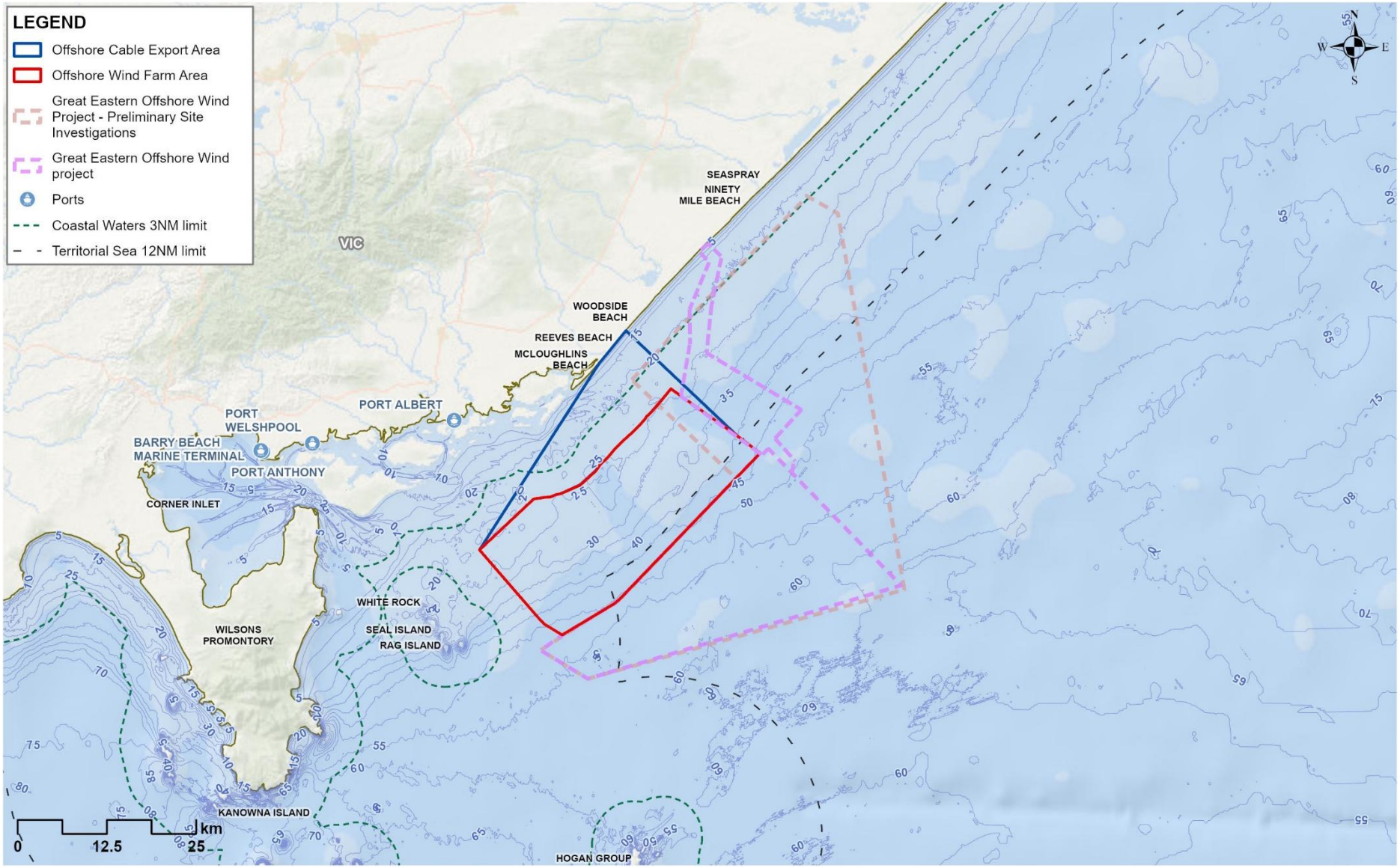


Figure 12-1 Short listed projects within the infrastructure and other users cumulative impact zone of influence

12.3 Assessment of cumulative impacts

12.3.1 Underwater noise

Great Eastern Offshore Wind Consists of up to 172 wind turbines which are expected to have fixed bottom foundations, up to eight offshore sub-stations and associated infrastructure. Although the engineering design and construction methods for this project has not been finalised, it is expected that construction will generate underwater noise from pile installation. This may be impulsive underwater noise emitted during impact pile driving or intermittent continuous noise if vibro-piling is used. Either could affect diving activities and the acquisition of acoustic survey data (see sections 8.1 and 8.2).

Great Eastern Offshore Wind is a very similar scale to Star of the South and expected to have similar impacts to these receptors, being only a minor residual impact on diving activities and negligible residual impact on survey data quality.

Cumulatively, simultaneous piling activities could increase the extent of the area impacted by underwater noise within the region, resulting in overlapping ensonified areas, and concurrent construction schedules would reduce the time between noisy activities, when other activities could occur.

Gippsland Skies Offshore Wind Project geophysical surveys are proposed in 2025, 2027 and 2028 or 2029, subject to approval and therefore could overlap offshore construction periods of the project. Concurrent underwater-noise generating activities could increase the complexity of SIMOPs planning required between projects.

Therefore, the impact is considered minor, as it would be medium to large in scale, but over a short-term, whilst coordination between the projects and proposed infrastructure operators in the area will minimise disruption between operators.

12.3.2 Submarine power cables

The Basslink Interconnector route traverses the eastern part of the proposed OWFA (Figure 6-9). Great Eastern Offshore Wind is located immediately south-east of the project. The Basslink Interconnector traverses the western part of their proposed offshore wind farm area and the northern end of the Basslink Interconnector traverses the cable crossing preliminary site investigation area.

Great Eastern Offshore Wind is very similar in scale to the Star of the South. Installation of offshore foundations and inter-array cables for the Great Eastern Offshore Wind project during construction, and maintenance of project assets during operations, can be expected have similar impacts to the Basslink Interconnector to that of the project.

Based on the ability of submarine power cable operators' vessels to adapt operations, with a complex level of standard operational planning, the potential cumulative impact to submarine power cable operators is considered to be Minor. Standard operating procedures (e.g., SIMOPs) between the projects will minimise disruption.

12.3.3 Aviation assets and airspace

Great Eastern Offshore Wind is located immediately south-east of the project and will feature up to 172 offshore turbines with a maximum blade tip height of 375 m. The OWFA for the project has an impact on the RNP RWY 27 initial approach segment for Yarram Airport. Great Eastern Offshore Wind is located 'behind' the project with regards to this approach segment, and therefore any mitigation developed for the project is assumed to remove any impact from the Great Eastern Offshore Wind project.

Due to their locations offshore, the projects would be located outside OLS associated with certified aerodromes.

Great Eastern Offshore Wind has the potential to impact RAAF Base East Sale, subject to confirmation of AIP Departure and Approach Procedures. The project is within Military Controlled Airspace of the RAAF Base East Sale. 301A is associated with military flying training from RAAF Base East Sale. Within it, and the other special use airspace associated with RAAF Base East Sale, are individual training areas that are segregated from each other to allow for autonomous training aircraft separation. Subject to confirmation of

the airspace above the projects, the maximum height of turbines AMSL for all projects may infringe this military training area. The military derived LSALTs may require a consequential adjustment for all projects.

CASR 139.165 requires the owner of a structure (or proponents of a structure) that will be 100 m or more above ground level to inform CASA. This must be given in written notice and contain information on the proposal, the height and location(s) of the object(s) and the proposed timeframe for construction.

Any obstacles above 100 m AGL (including temporary construction equipment) must be reported to Airservices Australia NOTAM office to ensure pilots are aware of them, prior to them being incorporated in published operational documents.

The cumulative impacts are therefore considered moderate, being of a medium to large scale and long-term, but reversible at the end of operation. As outlined above, the projects are able to work with aviation operators who would be able to adapt operations through operational planning, where required.

12.3.4 Radar equipment and facilities

Once a wind farm is operational, radar signals can be reflected by WTGs due to their size and rotation of turbine blades, which is often greater compared to the size of radars' targets. This causes interference with radar images by presenting 'clutter' in radar images.

Cumulatively, there is an increased extent of the potential impact on existing radar equipment and facilities during construction and operational phases. This potentially includes Defence and weather radar.

The OWFA and the Great Eastern Offshore Wind project is located outside of RAAF Base East Sale's ATC radar system, according to EUROCONTROL guidelines. Defence has indicated that the project may require a detailed assessment.

Star of the South will continue consultation with Defence and submit final turbine layout once determined and prior to construction commencing.

Star of the South will also consult with BoM when a final layout is known to assess the need, and if required, undertake an industry service interference modelling assessment to determine if mitigations would be required.

12.3.5 Industry vessels

Great Eastern Offshore Wind is a very similar project to Star of the South and expected to have similar impacts. During construction periods, offshore construction activity may cause displacement of vessels. Displacement may occur from demarcation of areas within the construction area, the use of safety zones, the presence of project vessels that have restricted ability to manoeuvre and the increasing presence of installed infrastructure as the construction period progresses.

Vessel displacement could lead to increased encounters as vessels concentrate in other areas, however, due to the low vessel activity in the area, this is not expected to result in increased vessel to vessel collision risk.

The cumulative impact on industry vessels from the projects would be an increased extent of displacement or increased interaction with non-project vessels during construction or operation activities. It is expected that there will be separation between the active work areas for the individual projects and vessels will have the ability to navigate freely in the areas between. The origin and departure ports for local industry vessels are Port Albert and Lakes Entrance. Whilst project operations vessels are transiting between port and the project areas they would operate under all relevant Australian maritime regulations and have access to nautical navigation charts with obstacles duly denoted. Notices to Mariners should be issued, where required, to ensure safety at sea.

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. The marine coordination centre will operate 24/7 in the construction phase and in the operations phase it will be manned during working hours and operate 24/7 during large scale maintenance campaigns such as blade replacement. The cumulative displacement and/or increased interaction with non-project vessels is expected to be minor.

13 SUMMARY OF MITIGATION MEASURES

13.1 Mitigation and management

The mitigation measures that are proposed to avoid, mitigate or manage impacts associated with the project are summarised in Table 13-1.

Table 13-1 Mitigation measures relevant to infrastructure and other users

ID	Mitigation measure	Mitigation description	Phase
OFF-M10	Notices To Mariners	During all phases of the project, distribution of Notices To Mariners (NTMs) via the Australian Maritime Safety Authority (AMSA) and Safe Transport Victoria (STV) to notify third-party vessel operators of project vessel movements, the establishment of safety zones, and the placement of permanent infrastructure (see SNV-M09 Charting of final layout on navigational charts). NTMs will provide advice on aids to navigation (AtoNs), safety issues, dangers or hazards to navigation. All NTMs will be published on the Australian Hydrographic Office (AHO) website and other local reporting as specified by the regulator. The Australian Maritime Safety Authority – Rescue Coordination Centre (AMSA - RCC) will also be advised of all project vessels' details, satellite communications and area of operation, as well as the relevant port authority. NTMs will be issued frequently for changes during construction and the schedule for issuing notices will be defined in consultation with AHO, AMSA and STV. Following completion of construction, a NTM will be issued to signal a change in the project phase from construction to operations, and the types of vessels that will be operating in the area for the next 30 years.	Construction Operation Decommissioning
OFF-M12	Safety and protection zones	Where construction, large scale maintenance activities (during operations) or decommissioning is taking place, temporary safety zones of up to 500 metres may be put in place around eligilbe infrastructure to protect the safety of third-party vessels and project infrastructure. During operations, protection zones may be in place up to 1852 meters from eligible infrastructure, placing limits on certain activities which present a risk to safety or infrastructure longer-term. Safety and protection zone applications (where required) will be submitted to the Offshore Infrastructure Regulator (OIR) in accordance with OEI Amendment Regulations 2024, following consultation with other marine users.	Construction Operation Decommissioning
UWN-M03	Noise abatement system (NAS)	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.	Construction
VES-M01	Vessel Operations Framework	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	Construction Operation

ID	Mitigation measure	Mitigation description	Phase
		framework to be approved by the regulator, in accordance with International and Australian maritime legislation, including: 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 *Navigation Act 2012* (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 *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Commonwealth), the *Navigation Act 2012* (Commonwealth) and the *Pollution of Waters by Oil and Noxious Substances Act 1986* (Victoria). 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). Star of the South will ensure that prior to procuring project vessels, all vessels have a record of inspections and compliance	Decommissioning
VES-M03	Marine Coordination Centre	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. 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.	Construction Operation
OMU-M10	Petroleum exploration and Offshore Wind industry consultation	Conduct stakeholder consultation prior to and during marine construction piling to allow for seismic and geophysical survey operators to pre-plan surveys and conduct infield survey management (for example, SIMOPS planning and line planning).	Pre-construction construction
OMU-M11	Basslink consultation	Consultation will continue with the operator of Basslink to develop an agreement detailing the design and installation method of cable crossings and the responsibilities of each party.	Pre-construction
OMU-M12	Basslink survey	Survey of the portion of the Basslink Cable that is within the Offshore Project Area to inform cable crossing type and location. If the cable cannot be located then restrictions on anchoring by project vessels in the area will be implemented after further consultation with Basslink.	Pre-construction
OMU-M13	Safe diving controls	Application of DMAC 12 Safe Diving Distance from Seismic Surveying Operations during marine construction piling: Where reasonably practicable, plans should be made to avoid overlapping piling and diving activities. Where this is not possible, the activities should be prioritised. Where diving and piling activity are scheduled to occur within a distance of 45 km, it would be good practice for all parties to be made aware of the planned activity where practicable. This should include clients/operators, diving and piling contractors. Where diving and piling activity will occur within a distance of 30 km a joint risk assessment should be conducted between	Construction

ID	Mitigation measure	Mitigation description	Phase
		the clients/operators involved and the piling and diving contractors in advance of any SIMOPS plan being developed. The SIMOPS plan should include that: The maintenance of effective communication and co-operation between the piling vessel and the diving vessel is essential The minimum safe distance between parties should not be compromised by either party There should be regular effective communication between the piling vessel and diving vessel so that those in control of piling and diving operations are aware of each other's work programmes. A communications check should be conducted between vessels at a pre-defined regular frequency in order to reduce the chance of an unknown communications failure Should any member of the diving team in the water suddenly experience discomfort, the piling operation should be terminated as soon as possible. The SIMOPS plan should include contingency arrangements for this situation A diver's exposure should be terminated if the noise level: i. interferes with diver communications; ii. is considered to exceed acceptable noise exposure levels; iii. induces discomfort; or iv. places the diver at risk in any other way. Diving operations may continue if none of these criteria for terminating diving operations are present, including diving within 30 km of piling operations.	
OMU-M14	Civil Aviation Safety Regulations compliance	Tall structures associated with the Project comply with the *Civil Aviation Safety Regulations 1998* (or equivalent) as required. Star of the South will notify CASA, AirServices Australia, Defence and the Aeronautical Information Service of the Royal Australian Air Force (RAAF AIS) in writing that the project proposes to construct or erect an object that will have a height of 100 metres or more above ground level, including the proposal, the proposed height and location, and the proposed timeframe for the erection of the object. The notification will be provided as soon as practicable after the final object design has been determined. Tall structures associated with the Project comply with subpart 139.E- Hazards to aircraft operations of the *Civil Aviation Safety Regulations 1998* as applicable to the project, including: 139.165 Notifying CASA of certain proposed objects or structures.	Pre-construction
OMU-M15	Turbine layout notification	Submit final turbine layout to Airservices Australia and CASA once determined and prior to construction commencing.	Pre-construction
OMU-M17	Cable crossing agreement	Pursue a cable crossing agreement with relevant cable operators. This agreement would include the design and installation method of cable crossings.	Pre-construction
OMU-M18	Co-existence agreement (cable operators)	Pursue a co-existence agreement with relevant cable operators. This agreement would include the responsibilities of each party and enable the free sharing of project information.	Pre-construction
OMU-M19	Co-existence agreement (CCS)	Identify opportunities to co-locate and/or identify no-go areas around some infrastructure through the implementation of a Co-existence Agreement with CarbonNet. Act in accordance with the MoU around activities in the overlap area and activities outside that area that may impact the other party. The MoU also outlines communication and	Construction

ID	Mitigation measure	Mitigation description	Phase
		information sharing. Has binding provisions around working towards a Co-existence agreement.	
OMU-M20	Infrastructure Lighting - Aviation	Aviation obstacle lighting is installed in accordance with the outcomes of the project aeronautical risk assessment process, including consideration of mitigations recommended during consultation with CASA and in compliance with the National Airports Safeguarding Framework Guideline D.	Construction Operation
IOU-M01	Consult with CASA and Airservices Australia	Star of the South will continue to consult with CASA and Airservices Australia to increase the height of the Grid LSALT once a final turbine layout is made available.	Pre-construction
IOU-M02	Consult with the Yarram Aerodrome	Star of the South will work with the Yarram Aerodrome operations team regarding the PANS-OPS approach space so that the turbines will not infringe the PANS-OPS surface.	Pre-construction
IOU-M03	Consult with Defence	Further consultation will be undertaken with Defence regarding raising the LSALT of training areas D and V within airspace R359F.	Pre-construction
IOU-M04	Manage civil radar interference	When a final layout is known, Star of the South will work with CASA, Airservices Australia and impacted providers to determine the need for aviation radar interference modelling and any mitigation to reduce or remove the level of radar interference caused by the operation of the wind farm.	Pre-construction
IOU-M05	Manage defence radar interference	Star of the South will continue consultation with Defence and submit final turbine layout once determined and prior to construction commencing.	Pre-construction
IOU-M06	Manage weather radar interference	Following confirmation of a final layout and turbine height, Star of the South will request another BoM preliminary screening assessment to identify any impacts to the Bairnsdale radar. If, following this screening, potential impacts are identified, Star of the South will work with BoM to undertake an industry service interference modelling assessment to determine any mitigations that would be required.	Pre-construction

13.2 Monitoring and adaptive management

Monitoring that is proposed to avoid, mitigate or manage impacts associated with the project are summarised in Table 13-2 below. Adaptive management is not always necessary in all cases but may be required if monitoring identifies that residual impacts are greater than predicted.

Table 13-2 Monitoring that is proposed to avoid, mitigate or manage impacts

ID	Monitoring	Adaptive management	Phase
OFF-M22	Stakeholder consultation Stakeholder engagement will be undertaken during all phases of the project to ensure stakeholders have opportunities to raise issues and feedback, and for these to be assessed and responded to appropriately. Stakeholder communications will provide regular updates and advanced notice of planned activities throughout the project's construction, operations and decommissioning, so that stakeholders (including maritime users) can manage their activities accordingly. A range of accessible communication and engagement methods will be adopted to reach relevant stakeholders, including traditional (notifications, posters, meetings) and digital (social media, website) tools.	Stakeholder engagement will be undertaken during all phases of the project to ensure stakeholders have opportunities to raise issues and feedback, and for these to be assessed and responded to appropriately.	All

14 SUMMARY OF IMPLICATIONS UNDER RELEVANT LEGISLATION

This study has assessed the impacts of construction, operation and decommissioning of the project on marine infrastructure and other users.

The significance of the impacts and risks have been assessed in accordance with the evaluation framework, based on applicable legislation, policy, guidelines and standards and the evaluation objectives and environmental significance guidelines arising from the government terms of reference established to guide the assessments.

The following sections summarise these identified impacts under the relevant Commonwealth and Victorian legislation.

14.1 Commonwealth

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.

The socioeconomic values of the Commonwealth marine environment relevant to this scope are:

- Petroleum exploration and production
- Seabed areas for submarine power cables
- Vessels that transit the area.

It is considered that the project would not have significant impacts on socioeconomic values of the Commonwealth marine environment as there is no real chance or possibility that the project will have a significant impact in accordance with the significant impact criteria as described in the Significant Impact Guidelines 1.1.

14.2 Victorian

In relation to the evaluation objectives set out in the scoping requirements for the project under the *Environment Effects Act 1978* (as summarised in Section 3.2), the project would not have significant impacts on infrastructure and other users because it considers and minimises the impacts on the following specified values:

- Business, industry (including agriculture and fisheries) or tourism opportunities.

The impact assessment process considers relevant objectives of ESD as defined by the Ministerial guidelines for assessment of environmental effects under the EE Act 1978 (guidelines):

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations.

It also considers relevant guiding principles of ESD:

- That decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equity considerations.
- The need to consider the global dimension of environmental impacts of actions and policies.
- The need to develop a strong, growing and diversified economy which can enhance the capacity for environment protection.
- The need to facilitate community involvement in decisions and actions on issues that affect the community.

All use, development and works on marine and coastal Crown land by any party, including committees of management and local government, requires consent under the *Marine and Coastal Act 2018*. Relevant receptors that occur within the area covered by a Marine and Coastal Consent for the project are:

- Petroleum production, submarine power cable, or research divers
- Vessels associated with petroleum production and exploration, submarine power cables, and Defence.

The recommended mitigations as outlined in this Technical report will form part of the Marine and Costal Act Consent application.

15 CONCLUSION

The purpose of this report is to assess the potential impacts and risks to infrastructure and other users associated with the Star of the South Offshore Wind Farm to inform the preparation of the EIS/EES required for the project.

The types of potential impacts that were identified and assessed were:

- The underwater noise impact from construction activities exceeding established threshold levels for divers (including from the petroleum industry, submarine power cable maintenance or research industry)
- The physical presence of construction vessels and installed infrastructure resulting in displacement of or interaction with non-project vessels, including from the petroleum, Defence or other industries
- Underwater noise from construction activities resulting in a reduction of data quality in the petroleum industry
- Seabed construction activities, including cable laying, resulting in interference with or damage to submarine power cables
- The presence of WTGs resulting in displacement of or interaction with aviation, including declared airspaces
- The presence of WTGs interfering with radar.

All impacts and risks during the construction phase were assessed to have Minor to Negligible consequence levels, including underwater noise, displacement or interaction with non-project vessels, and interference with submarine power cables.

The potential impact of the presence of WTGs on radar, communications and meteorological equipment was assessed to be Moderate. This impact is relevant to meteorological, Defence and civil industries. The key mitigations proposed to achieve these levels of impact include radar interference modelling, and continued consultation with Defence, BoM, CASA and other relevant stakeholders.

The potential impact of the construction and presence of WTGs on aircraft was assessed to be Minor, reduced from Severe by the implementation of key mitigations including raising the Gris LSALT, modifying Yarram Approach PANS-OPS surface and raising the LSALT of Defence areas. These mitigations would be further developed in consultation with CASA, Airservices Australia, airfield operators and Defence. The changes are expected to be inconsequential to current operations.

The remaining impacts were all Minor to Negligible. The potential impact to submarine power cables such as Basslink is Minor during both construction and operations through the application of mitigations derived from routine maritime and project-specific management plans derived from applicable Australian and international legislation, guidelines and principles. This includes the implementation of agreements between operators which was a key outcome of consultation undertaken for the project. Underwater noise impacts on divers and data instruments are Minor to Negligible with the implementation of standard industry mitigations including the Application of DMAC 12 Safe Diving Distance from Seismic Surveying Operations. During construction there is Minor to Negligible interference with submarine power cables. The potential impacts on other (non-project) vessels during both construction and operations are Minor to Negligible with the implementation of standard industry mitigations.

In summary, the project's residual impacts to infrastructure and other users from construction and operations activities have been assessed to be Moderate to Negligible. The potential impact to civil radar, weather radar and military radar are Moderate, while impacts to all other receptors are Minor to Negligible.

Cumulatively with other proposed offshore windfarms, there is potentially a moderate impact on local aviation, with turbines potentially infringing airspace over a medium to large scale and for the life of the project, but reversible at the end of operation. Any amendment of administrative controls on aviation for one offshore windfarm would likely also address potential impacts from other offshore windfarms.

Decommissioning risks are considered to be broadly similar to that as discussed in the construction impact assessment section. A Decommissioning Management Plan will be developed during the operations phase of the project that includes more informed assessment of the impacts of decommissioning activities on infrastructure and other users and associated mitigation measures.

In relation to the evaluation objectives set out in the Star of the South EIS Guidelines and EES Scoping Requirements, it is considered that the project would not have significant impacts on infrastructure and other users with the application of mitigations.

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