

Vic Offshore Wind Farm

Environmental Risk Assessment Framework

Final | 20 April 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Contents

	Page
1 Introduction	1
1.1 Background	1
1.2 Methodology	1
2 Impact assessment framework	1
2.1 Overview	1
2.2 Risk identification	2
2.3 Duration	3
2.4 Likelihood of impact	3
2.5 Consequence criteria	3
2.6 Risk evaluation	4
2.7 Mitigation	4
2.8 Summary table	5

Attachment A | Consequence criteria

1 Introduction

1.1 Background

To ensure a consistent, robust and transparent approach is applied to the assessment of potential impacts on the environment as a result of the Victorian Offshore Windfarm Project ('the Project'), this environment risk assessment framework has been developed. The framework contains a specific set of descriptors and criteria to help describe and evaluate risks.

1.2 Methodology

This Environmental Risk Assessment Framework has been developed based on widely adopted best practice and industry standards associated with environmental impact assessments.

The consequence criteria in Section 2.5 and Attachment A has been developed by technical specialists and experienced environmental practitioners, and in consideration of relevant Victorian environmental significance criteria.

2 Impact assessment framework

2.1 Overview

The risk assessment approach for the Project comprises evaluation of anticipated impacts with standard mitigation (e.g. statutory compliance), followed by determination of residual impacts, taking into consideration any additional mitigation measures to reduce the likelihood and/or consequence of the impact and hence the overall risk level.

Figure 1 illustrates the approach to the environmental risk assessment, incorporating an assessment of the 'standard mitigation' scenario, as well as the 'additional recommended mitigation' scenario.

Impacts have been assessed for the following Project phases:

- Pre-construction and construction (including establishment and decommissioning of the construction sites)
- Operation and maintenance (including initial testing and commissioning)
- Decommissioning (including potential rehabilitation work).

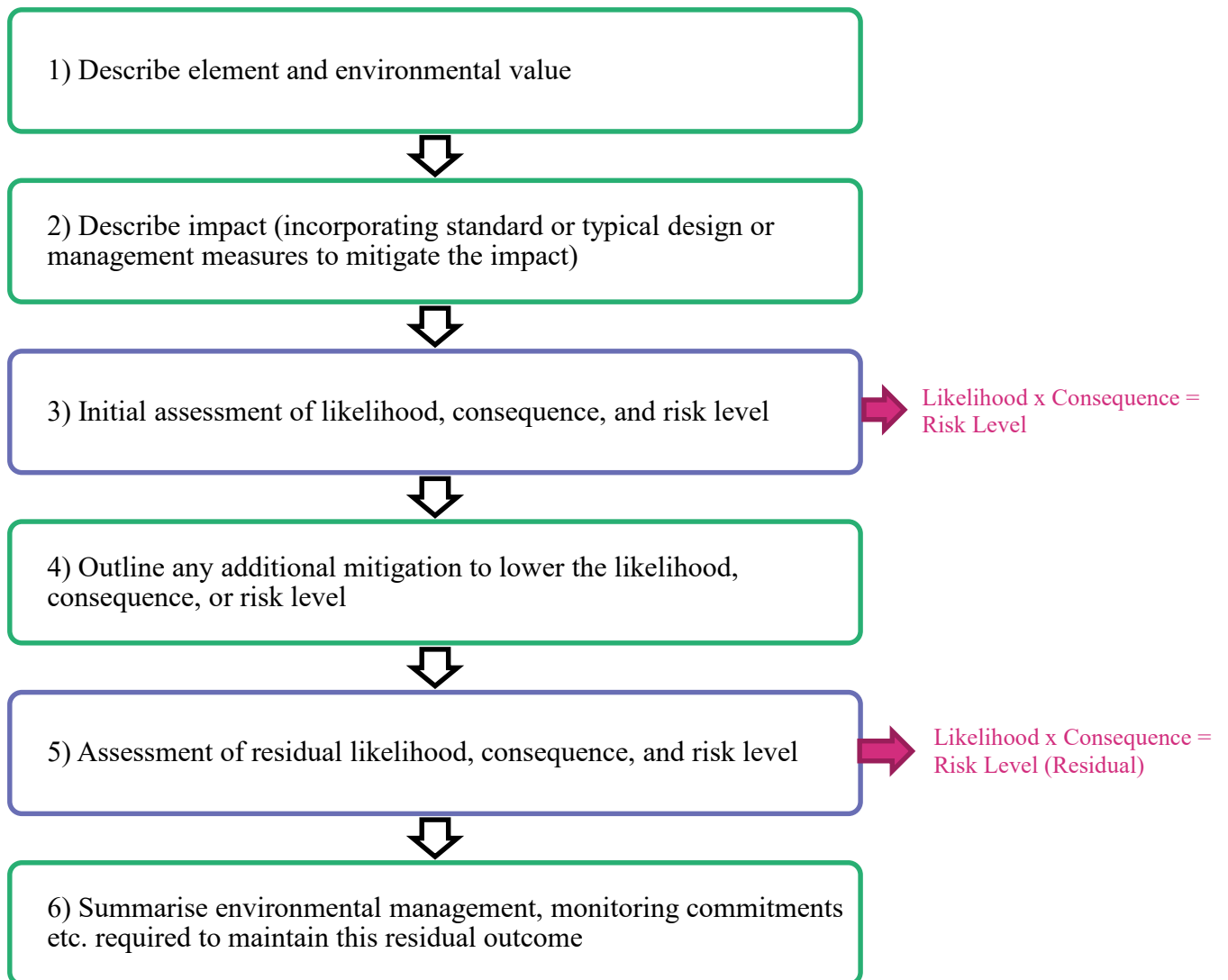


Figure 1 – Environmental impact assessment process

2.2 Risk identification

Potential Project risks have been predicted (see Table 5) by considering individual components and processes of the Project. Consideration has also been given to how different components and processes of the Project may interact with different components of the environment. When identifying potential environmental impacts associated with the Project, both onsite and offsite and direct and indirect impacts have been considered.

2.3 Duration

Table 1 outlines the general approach to classifying timeframes. Duration has been embedded into the consequence criteria.

Table 1 - Duration

Relative duration of environmental impacts	Description
Temporary	Days to months
Short term	Up to 1 year
Medium term	From 1 to 5 Years
Long term	From 5 to 50 Years
Permanent / irreversible	In Excess of 50 Years

2.4 Likelihood of impact

Table 2 has been adopted for classifying the likelihood of an identified impact arising as a result of the Project.

Table 2 - Likelihood of Impact

Likelihood of impacts	Risk probability categories
Rare	The event will only occur in exceptional circumstances
Unlikely	The event is not expected to occur in most circumstances
Possible	The event might occur at some time
Likely	The event will probably occur in most circumstances
Almost certain	The event is expected to occur in most circumstances

2.5 Consequence criteria

Consequence criteria has been developed for each environmental discipline (**Attachment A**). Where possible, duration has been incorporated into the criteria. **Table 3** below provides the general consequence criteria applied in the absence of aspect specific criteria.

Table 3 – General consequence criteria

Consequence	Criteria
Severe	Impacts considered critical to the decision-making process. They tend to be permanent, or irreversible, or otherwise long term, and/or can occur over large scale areas. Environmental receptors are extremely sensitive, and/or the impacts are of national significance. Typically, mitigation measures are unlikely to remove such effects.
Major	Impacts likely to be of importance in the decision-making process. They tend to be permanent, or otherwise long to medium term, and/or can occur over large or medium scale areas. Environmental receptors are high to moderately sensitive, and/or the impacts are of State significance.
Moderate	Impacts relevant to decision making, particularly for determination of environmental management requirements. These impacts tend to range from long to short term, and/or occur over medium scale areas or are focused

	within a localised area. Environmental receptors are moderately sensitive, and/or the impacts are of regional or local significance.
Minor	Impacts recognisable, but acceptable within the decision-making process. They are still important in the determination of environmental management requirements. These impacts tend to be short term, or temporary and at the local scale.
Insignificant	Minimal change to the existing situation. This could include impacts which are beneath levels of detection, impacts that are within the normal bounds of variation or impacts that are within the margin of forecasting error.

2.6 Risk evaluation

As shown in **Figure 1**, the risk level is a product of the likelihood of occurrence and consequence. The risk matrix in **Table 4** has been adopted for this Project.

Table 4 - Risk Matrix

		Consequence				
		Negligible	Minor	Moderate	High	Major
Likelihood	Highly unlikely	Very low	Very low	Low	Low	Medium
	Unlikely	Very low	Low	Low	Medium	Medium
	Possible	Low	Low	Medium	Medium	High
	Likely	Low	Medium	Medium	High	Very High
	Almost certain	Low	Medium	High	High	Very High

2.7 Mitigation

Mitigation measures have been identified with consideration of the following hierarchy:

1. Avoided where possible through appropriate location of Project infrastructure and planning of Project activities
2. 'Designed-out' where practicable, thereby minimising significant impacts to environmental values
3. Mitigated through implementation of environmental management plans to measure and minimise any impacts to the greatest practicable extent
4. Compensated for where impacts cannot be adequately mitigated, and residual effects predominate.

As illustrated in **Figure 1**, mitigation is addressed in two ways in the impact assessment framework.

The first assessment considers what would be the 'standard mitigation' approach to implementing the Project, i.e. taking account of standard practice and statutory obligations. For example, the implementation of erosion and sediment control would be a standard mitigation requirement that could reasonably be assumed to be in place for the construction phase. The initial description and assessment of impacts is to include a description of these standard measures.

The second assessment of mitigation is 'additional mitigation' which is aimed at reducing the likelihood, consequence, or risk of an identified impact occurring. Additional mitigation may not be necessary for all impacts but would be relevant to impacts identified as high or very high risk. For example, additional mitigation may include a species specific management plan to minimise impact during construction.

2.8 Summary table

Table 5 below contains a summary of the potential impacts and risks identified for the Project.

ID	Aspect	Impact description	Project phase	Initial Risk			Environmental effects	Significance rating	Justification for initial risk rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
Construction (incl. pre-construction)													
1	Aboriginal heritage (incl. underwater heritage)	Disturbance of known or previously unrecorded Aboriginal cultural heritage sites during pre-construction and construction works potentially impacting on heritage values	Construction (incl. pre-construction)	Possible	Moderate	Medium	No	N/a	The Project is within the Gunditjamarā – Part A Native Title determination ('Gunditjamarā'). The Gunditj Mirring Traditional Owners Aboriginal Corporation is the relevant Registered Aboriginal Party (RAP) for the Project. It is possible that known or previously unrecorded Aboriginal cultural heritage sites could be encountered within the construction footprint. While Project infrastructure would be located to avoid impacts as much as practicable (by utilising previously disturbed land and existing infrastructure easements and corridors where possible), some disturbance to Aboriginal cultural heritage sites could be required. This will be further examined and determined as the Project progresses, with the avoid, minimise, mitigate, offset hierarchy applied during design development.	Engagement and site walkovers with the Gunditjamarā and RAP will be carried out to confirm cultural heritage values within the construction footprint and Project areas. An Aboriginal Cultural Heritage Management Plan (CHMP) will be prepared to outline measures for the management and protection of Aboriginal heritage sites through all stages of the Project, and would include an unexpected finds procedure. Mitigation, such as salvage prior to works on-site, may be carried out for impact to areas containing large artefact scatters.	Possible	Moderate	Medium
2	Aboriginal heritage (incl. underwater heritage)	Impact to culturally sensitive landforms (Dreaming sites) during pre-construction and construction works resulting in long-term loss of connection to land	Construction (incl. pre-construction)	Possible	Moderate	Medium	No	N/a	The Project is within the Gunditjmarā – Part A Native Title determination covering all land within the Project area. It is possible that culturally sensitive landforms or intangible heritage sites are present within the Study area. Project infrastructure would utilise previously disturbed land where possible and avoid impacts to sensitive landforms and intangible heritage.	Engagement with Gunditjamarā and RAP will be carried out to confirm intangible cultural heritage values in the Study area. Design would avoid sites / minimise impacts to sites of cultural significance where practicable.	Possible	Minor	Low
3	Air quality (Air quality & GHGs)	Generation of air emissions and dust from pre-construction and construction works impacting on sensitive receptors and local air quality	Construction (incl. pre-construction)	Likely	Minor	Medium	No	N/a	Proposed pre-construction and construction works are expected to generate some air emissions (e.g. dust and grit through land disturbance and GHG and exhaust fumes etc. from construction vessels and vehicles), however this would be localised and of limited duration and there are limited sensitive receptors within the Study area.	A future air quality assessment would inform the requirements for a Construction Environmental Management Plan (CEMP). Dust monitoring programs and equipment (if required) could be used to determine when activities need to be altered to reduce dust emissions. Actions such as watercarts on haul roads and main construction sites could be used to generate less dust. Standard measures to limit the generation of dust and other air emissions (such as most efficient use of construction equipment and planning to reduce vessel and vehicle use and movements) would also be included in the CEMP.	Unlikely	Minor	Low
4	Aviation and radar (incl. EMI)	Interference to civil and military radar during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Negligible	Very Low	No	N/a	Portland airport is located adjacent to the Project area approximately 10.5km from the Wind Turbine Generators (WTGs). It provides regular passenger services for the southwest region of Victoria. There are no commercial airport or military bases in proximity to the Project area. Interference to aircraft radar during pre-construction and construction works is considered low due to the anticipated construction methodologies.	A future radar impact assessment would inform of any requirements to minimise impacts during construction. Engagement with relevant stakeholder to determine any impact on radars.	Unlikely	Negligible	Very Low
5	Aviation and radar (incl. EMI)	EMI during pre-construction and construction works impacting local television and radio	Construction (incl. pre-construction)	Unlikely	Minor	Low	N/a	N/a	There is limited potential for the Project to impact on telecommunication signals due to the location of the turbines offshore and low density in proximity to the coast.	Identification of broadcast towers and transmission path in proximity of the Project area. Engagement with relevant stakeholders to determine potential impact on telecommunications.	Unlikely	Negligible	Very Low
6	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Minor	Low	N/a	N/a	Portland airport is located adjacent to the Project area approximately 10.5km from the WTGs. It provides regular passenger services for the southwest region of Victoria. There are no commercial airports or military bases in proximity to the Project area. As scenic flights and emergency and regional services are expected to be largely carried out during day-light hours, impact from any night-lighting utilised during pre-construction or construction is anticipated to be low. This would be localised and of limited duration.	A future study of scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during construction.	Unlikely	Negligible	Very Low
7	Ecology - State benthic and marine	Potential impact on Victorian listed or threatened species and communities, or their habitat (terrestrial and marine)	Construction (incl. pre-construction)	Likely	High	High	Yes	N/a	Marine: There are no known critical habitats or Habitat Conservation Orders (HCO's) as declared under the <i>Flora and Gauna Guarantee Act</i> 1988 (FFG Act) within the Study area. The nearshore environment within the Study area contains a number of areas of reef, which would be expected to support sponges, ascidians, bryozoans and gorgonians. A detailed benthic habitat survey would be required to identify whether this includes any threatened species under the FFG Act. In addition to species listed as threatened under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) in row 11, there are a further three shorebirds, two seabirds, five fish, 13 benthic fauna and a dolphin species that are listed as threatened under the FFG Regulations, and potentially occur within the Study area. Terrestrial: There are 19 FFG Act-listed flora species within the Study area, one advisory-listed amphibian species, 19 terrestrial bird species within the Study area, of which 11 have been recorded within the Project area, 21 FFG Act-listed wetland/coastal bird species, of which 11 have been recorded within the Project area, two freshwater/diadromous fish within the Study area, two invertebrate species within the Study area which have not previously been recorded within the Project area, six terrestrial mammal species within the Study area, and one reptile species has been recorded within the Study area and Project area.	Further marine and terrestrial studies are required to collect baseline data and characterise existing conditions. Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the CEMP. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan. The Project is unlikely to involve the storage and handling of large quantities of chemicals, nor generate frequent vessel movements. Some other key and possible mitigation measures during construction are seasonal construction windows, bubble curtains, go slow measures and for the design to avoid TEC or high value habitat.	Possible	Moderate	Medium

ID	Aspect	Impact description	Project phase	Initial Risk			Environmental effects	Significance rating	Justification for initial risk rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
8	Ecology - State terrestrial	Potential impact on non- threatened species and communities, or their habitat	Construction (incl. pre-construction)	Likely	High	High	Yes	N/a	The Project area is nominated to be a biologically important area for many non-threatened marine and terrestrial species . Therefore, there is a possible impact on non-threatened species within the Project area. Construction noise may cause changes to behaviour of fauna. The scale of impact is dependent on the size and cumulative noise impact of construction. Vessel movements during construction pose a risk of fauna strike, especially for large slow-moving fauna near the surface such as turtles and whales. Depending on vessel frequency and speed, there would be a risk of death/injury to fauna species. Construction vessels may introduce marine pests to the area and turbines provide a surface for fouling pest species. The environmental impacts of introduced species on benthic communities can be significant as marine pests can eradicate unique benthic communities and contaminate fisheries. Therefore, the unmitigated risk is high.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the CEMP. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.	Possible	Moderate	Medium
9	Ecology - State migratory birds	Potential impact on listed migratory birds, or their habitat (terrestrial and marine)	Construction (incl. pre-construction)	Possible	High	Medium	Yes	Yes	The Project area habitats many migratory species, including the: shy albatross, wandering albatross, Bulls albatross, antipodean albatross, Campbell albatross, black-browed albatross, Indian yellow-nosed albatross, common diving-petrol, and Australasian gannet. There is also a potential that there are: 23 FFG-Act listed terrestrial migratory birds in the Study area, and 22 coastal/wetland birds in the Study area based on an Arup Preliminary ecology assessment.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the CEMP. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.	Possible	Moderate	Medium
10	Ecology - EPBC listed threatened communities	Potential impact on Commonwealth listed threatened communities, or their habitat (terrestrial and marine)	Construction (incl. pre-construction)	Possible	High	Medium	Yes	Yes	Marine: The TEC Giant Kelp Marine Forests of South East Australia has the potential to occur within the eastern and western sections of the nearshore environment, around Cape Bridgewater and Nelson. The Commonwealth Marine Area commences three nautical miles from the coastline. The nearest Commonwealth Marine Park is the Nelson Marine Park (approximately 200km south of the Study area). The marine park is recognised as an important habitat for commercial fish, including tuna and mackerel. It is also a key migratory area for whales, including humpback, fin, blue and sei whales. A large portion of the Victorian coastline, including the Study area, falls within the Bonney Coast Upwelling. This upwelling is listed by the Commonwealth as a Key Ecological Feature, which while not a Matter of National Environmental Significance (MNES) in its own right, forms a component of the Commonwealth marine area MNES. The Bonney Coast Upwelling is a highly productive area provide important habitat to a wide range of species, including an important feeding area for blue whales, seabirds, penguins, pinnipeds and fish. At present, no direct physical disturbance of the Commonwealth Marine Area is proposed, however indirect impacts may potentially occur, such as poor water quality or the generation of underwater noise extending beyond state waters. The Victorian Study area does include the Discovery Bay Marine Park, however no infrastructure is planned within the park boundaries. The park protects reef and macroalgae habitats and supports a high diversity of marine life including whales, seabirds, fish, and Australian fur seals. Two Ramsar wetlands are adjacent to the Study area: Glenelg Estuary and Discovery Bay Wetlands and Lower Glenelg National Park. The Glenelg Estuary and Discovery Bay Wetlands supports an uncommon inland wetland type (peatlands), as well as a threatened ecosystem and threatened species . This wetland provides habitat for 95 waterbirds (including 24 species listed under international migratory bird agreements) as well as breeding habitat for beach nesting birds. The following Terrestrial EPBC listed threatened ecological community occur or may occur in the Study Area: •Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion •Other threatened ecological communities raised by the PMST would need to be reassessed once the modelled Ecological Vegetation Class (EVC) data has been verified.	Further marine studies are required to collect baseline data and characterise existing conditions which will inform the CEMP. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), bubble curtains, go slow measures and for the design to avoid TEC or high value habitat. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan.	Possible	Moderate	Medium
11	Ecology - EPBC listed threatened terrestrial species and migratory species	Potential impact on Commonwealth listed threatened species and migratory species, or their habitat	Construction (incl. pre-construction)	Possible	High	Medium	Yes	Yes	Listed Threatened Species: •Eight flora species •One amphibian species •Four terrestrial bird species •Two wetland/coastal bird species •Two freshwater/diadromous fish species •One freshwater invertebrate species •Four terrestrial mammal species •No terrestrial reptile species Listed Migratory Species: •Twenty-five migratory bird species, with twelve recorded within the Project Area	Further terrestrial studies are required to collect baseline data and characterise existing conditions which will inform the CEMP. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), bubble curtains, go slow measures and for the design to avoid TEC or high value habitat.	Possible	Moderate	Medium

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				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
12	Ecology - EPBC listed threatened marine species and migratory species	Potential impact on Commonwealth listed migratory species, or their habitat	Construction (incl. pre-construction)	Likely	Moderate	Medium	Yes	Yes	<p>Cetaceans: The endangered southern right whale migrates between summer feeding areas in the Southern Ocean to inshore coastal waters off Australia. The area around Portland is established as a BIA for these whales. The Portland area is also an important area for females with calves, as the Study area is a key area for breeding females. The endangered blue whale; two sub-species are known in Australia the Antarctic blue whale and the pygmy blue whale are known to occur in the Study area. The distribution of each subspecies varies and is not fully understood. The humpback whale has also been regularly recorded near the Study area and is mapped as part of the core range for the species, but is not considered a breeding, resting or feeding area. Other threatened whale species may occur occasionally in the Study area (i.e. fin, brydes and sei whales) however these are infrequently recorded and tend to occur further offshore i.e. 20-60km. Further investigations will be required to identify if blue whales come closer to shore at Portland, and whether underwater noise or vibration produced by wind turbines would cause the species to avoid the area.</p> <p>Pinnipeds: There is a known colony of Australian sea lions at Cape Bridgewater, to the east of the Study area. It is likely that individual animals forage within the Study area and may be sensitive to physical disturbance and underwater noise or vibration. The southern elephant seal listed as Vulnerable, breeds in Antarctic waters but does on occasion forage in southern Australia. The Study area is not listed as habitat or potential habitat within the Species Profile and Threats Database. The subantarctic fur seals may occasionally utilise the Study area, however haul out and breeding areas are only known further south, mainly on Macquarie Island.</p> <p>Sharks and Fish: Given the proximity of a seal colony at Cape Bridgewater, the Study area may attract a higher number of white sharks. The Study area is mapped as a BIA area for the sharks.</p> <p>Turtles: There are a number of sightings of threatened turtle species along the shoreline, including the leatherback and loggerhead Turtles; they would be using the nutrient rich waters surrounding the site for feeding purposes, however nesting occurs further northwards. The Study area is not likely to be considered key habitat for turtles.</p> <p>Seabirds: There are several records of a number of threatened seabirds being present within the Study area. The Study area is mapped as a BIA for the black-browed albatross, butlers</p>	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), bubble curtains, go slow measures and for the design to avoid TEC or high value habitat. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan.	Possible	Moderate	Medium
13	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Construction (incl. pre-construction)	Likely	Minor	Medium	N/a	No	<p>The Project area is within state waters and adjacent to Commonwealth waters. The nearest Commonwealth Marine Park is the Nelson Marine Park (approximately 200km south of the Study area, with an average depth of 4,600m). The marine park is recognised as an important habitat for commercial fish, including tuna and mackerel. It is also a key migratory area for whales, including humpback, fin, blue and sei whales.</p> <p>A large portion of the Victorian coastline, including the Study area, falls within the Bonney Coast Upwelling. This upwelling is listed by the Commonwealth as a Key Ecological Feature, which while not a MNES in its own right, forms a component of the Commonwealth marine area MNES. The Bonney Coast Upwelling is a highly productive area provide important habitat to a wide range of species, including an important feeding area for blue whales , seabirds, penguins, pinnipeds and fish.</p> <p>At present, no direct physical disturbance of the Commonwealth Marine Area is proposed, however indirect impacts may potentially occur, such as poor water quality or the generation of underwater noise extending beyond state waters.</p>	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables. If investigations are required in Commonwealth waters, an exploration license should be sought under the <i>Offshore Minerals Act</i> 1994. An exploration licence covers the exploration phase of a project and confers exclusive rights to the exploration for and recovery of samples from the licence area. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan.	Possible	Moderate	Medium
14	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during pre-construction and construction works	Construction (incl. pre-construction)	Almost Certain	Moderate	High	N/a	N/a	<p>The Project will require interface with a range of other significant infrastructure during pre-construction and construction, such as ports, roads, electricity networks and other services and utilities. Pro-active planning, early engagement and the implementation of a governance structure with third-parties would help identify risks and associated risk management strategies. Refer to 'Ports and harbours' for risk of potential impacts to existing port assets. Unexpected infrastructure interfaces would be identified during design development and construction planning through Dig Before You Dial searches and ground surveys. Hard interfaces will be identified early for pro-active management and engagement with third-parties.</p>	Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during pre-construction and construction.	Unlikely	Minor	Low
15	Ground conditions and contamination	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during pre-construction and construction works leading to potential risks to public health and the environment	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/a	N/a	<p>Construction of the Project will require excavation and stockpiling of soils to lay transmission lines and cables, with potential of soil contamination. There is an estimated extent of probable Acid Sulfate Soils in minor areas of the Project area. The potential for Acid Sulfate Soils and contaminated land within the construction footprint would be ascertained through on- site assessment during design development and pre-construction stages.</p>	A contamination assessment would establish baseline indicators of material at site, which would be used to inform the CEMP, particularly in relation to management and disposal of spoil. Spoil from earthworks would be reused on-site where possible or disposed of in accordance with EPA requirements. Careful consideration would be given to the location for the temporary stockpiling of spoil and excavated material, which may be required over the short term. Stockpiles would be managed in accordance with the Victoria Environment Protection Authority (EPA) Guideline for stockpile management (2020), which would reduce risk.	Unlikely	Minor	Low
16	Ground conditions and contamination	Land disturbance, erosion, alteration of water courses and drainage patterns, vegetation removal, land clearing or modification during pre-construction and construction works impacting soil and water quality	Construction (incl. pre-construction)	Likely	Minor	Medium	Yes	N/a	<p>The Project Area intersects the waterways of Surrey River and Wattle Hill Creek. Construction will require excavation and some land cover and vegetation clearance, having the potential to impact on soils, drainage patterns and surface water quality. The impacts to soils and ground conditions is not considered 'significant' under the Terrestrial Environmental Quality guideline because land use practices anticipated during construction will not significantly increase exposure and vulnerability of soils to salinisation due to vegetation clearing.</p> <p>Refer to 'Hydrology, flooding and water quality ' for potential impacts to freshwater receiving environments.</p>	Vegetation and dense land cover clearance would be minimised as much as practicable during design development. Areas containing significant drainage patterns or heavy water flows would be avoided. A CEMP would establish management measures for cleared areas to ensure impacts to soil and water quality are reduced. This would include installation of temporary drainage routes, sediment control measures and the progressive revegetation of disturbed areas, where practicable.	Possible	Minor	Low

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				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
17	Groundwater	Impacts to ground water quality, levels or flow during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	N/a	N/a	Shallower water depths, and those above the surface, have a higher risk of local ground water quality being impacted during pre-construction and construction. Further investigation to ground-truth water depths and quality and local uses of groundwater will be undertaken.	Design development would look to avoid areas where the water table is above the surface, as far as practicable. Early installation of drainage controls and erosion and sedimentation monitoring during pre-construction and construction would assist in managing and mitigating impacts. Establishing appropriate procedures for handling, transporting and using potentially contaminating substances including diesel, petrol, oils, greases, cement and other construction chemicals would be included in the CEMP.	Unlikely	Minor	Low
18	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Potential for leaks and spills during pre-construction and construction works as a result of storage, handling and use of dangerous goods and construction equipment	Construction (incl. pre-construction)	Possible	Moderate	Medium	No	N/a	Vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants, bio-fouling paints and other chemicals. The Project is unlikely to involve the storage and handling of large quantities of chemicals, nor generate frequent vessel movements. The storage and handling of dangerous goods and hazardous materials have the potential to impact construction workers and the surrounding environment if leaks and spills occur, resulting in the potential contamination of air, soils, surface water, and/or groundwater.	Standard construction management measures such as storage of dangerous goods in accordance with the relevant guidance would be included in the CEMP and would reduce potential risks. A marine pollution risk assessment will be undertaken to inform the development of spill management strategies.	Unlikely	Moderate	Low
19	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Human exposure to unsafe levels of Electro-magnetic fields (EmF) during pre-construction and construction works	Construction (incl. pre-construction)	Highly unlikely/Rare	High	Low	No	N/a	Electro-magnetic fields are produced wherever electricity is used or transmitted. Therefore, the electricity supply to support work at the site is expected to be a source of Electro-magnetic fields. While there is no established evidence that exposure to Electro-magnetic fields from power lines, substations, transformers or other electrical sources, regardless of proximity, causes any health effects, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) still refers to guidelines that recommend the limiting of exposure to Electro-magnetic fields so that the threshold at which the interactions between the human body and external electric and magnetic fields that causes adverse effects within the body cannot be reached. It is expected that there would be a low risk of exceeding the levels recommended by ARPANSA. Exposure time would also be limited.	Undertake an assessment of the likely electro-magnetic emissions that may be generated during construction. Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/Rare	High	Low
20	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Potential for fire and increased bushfire risk during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Moderate	Low	No	N/a	The Project is located in a designated Bushfire Protection Area. The construction works may increase risk of fire from accidental ignition from construction equipment, fuels and chemicals.	Standard construction management measures such as management plans addressing these issues would be included in the CEMP and would reduce the risk of the Project increasing fires and bushfires in the local region.	Highly unlikely/Rare	Moderate	Low
21	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Vulnerability of the Project to natural hazards, extreme weather and climate change during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Moderate	Low	No	N/a	Climate induced risks include increased dust generation during drier weather, increased construction delays due to wet weather, increased rainfall resulting in increased flow events in watercourses, temporary flooding and risk of failure of erosion and sediment controls and potential for construction workers to experience heatstroke as a result of extreme heat and hot weather events.	Standard management measures such as management plans addressing these issues would be included in the CEMP and would reduce the impact on the Project, including adequate training and Personal Protective Equipment (PPE) being provided to construction workers.	Unlikely	Minor	Low
22	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Exposure of construction personnel or the public to unsafe conditions as a result of pre-construction and construction works and on-site practices	Construction (incl. pre-construction)	Possible	High	Medium	No	N/a	Offshore wind Project presents unique risks to construction workers because of the nature of offshore construction (ie. working at height and offshore, falls, electrical risks, subsea works and extreme weather experience in vast open spaces off the coast). In extreme circumstances this may result in death or serious injury of construction personnel. The wider community is not expected to be impacted as access to construction sites on and offshore will be restricted. The Project is not expected to emit radiation. Therefore, impacts to human health under the significance criteria is considered not significant.	Stringent site OHS plans would be developed and implemented to manage the risk of death or serious injury during construction on and offshore. Standard construction management measures would also reduce the likelihood of occurrence, including compulsory training and PPE provided to construction workers.	Unlikely	Major	Medium
23	Historic heritage (incl. shipwrecks)	Impact to listed and non-listed heritage places and/or objects (maritime and terrestrial) during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Moderate	Low	N/a	N/a	There are no Commonwealth listed heritage places or sites within the Study area or surrounds. There are a number of State heritage places and local culture heritage assets mapped in the area; these are namely buildings. A review of the Department of Agriculture, Water and the Environment (DAWE) historical shipwrecks register, determined that there are two underwater heritage items within the Study area. However, given the age of each item, it is considered unlikely that any artefacts remain.	Project infrastructure would be located to avoid impacts to State and local historic heritage assets. Management measures would be included in the CEMP (as required) to minimise any indirect impacts to mapped heritage places and sites.	Highly unlikely/Rare	Moderate	Low
24	Hydrology, flooding and water quality	Potential impacts to surface water quality onshore during pre-construction and construction works	Construction (incl. pre-construction)	Possible	High	Medium	Yes	N/a	Pre-construction and construction activities such as earthworks and vegetation clearing could potentially impact on nearby waterways (i.e. increased nutrients entering waterways). There is also the potential for leaks and spills during construction, which could potentially impact on surface water quality as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out and construction methods are further developed.	Further investigations will be carried out to understand the value of surface water environments in the area and to inform appropriate management measures to be applied. Design development would look to minimise impacts through siting of infrastructure and construction methodology. Early installation of drainage controls and erosion and sedimentation monitoring during pre-construction and construction works would assist in managing and mitigating impacts to land processes. Standard construction management measures in accordance with the VIC EPA requirements, such as bunding around earthworks and chemical storages and implementation of a CEMP, would reduce the risk of increased nutrient runoff or accidental spills and the potential impact on any waterways. Construction during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Unlikely	Moderate	Low

IDAspectImpact descriptionProject phase				Initial Risk			Environmental effects	Significance rating	Justification for initial risk ratingPossible mitigation measures		Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
25	Land use	Potential impact or major change to existing and planned future residential, recreational, commercial and industrial land uses during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/a	N/a	The Project will not cause major change to existing and future residential, recreational, commercial and industrial land uses during pre-construction and construction works as majority of the proposal is located offshore. The onshore components of the Project which are transmission assets, will be underground, and the transmission line supplying energy from the windfarm to the National Energy Market (NEM) will be overhead. The Project may intersect Public Use, Public Park Recreation, Public Conservation and Resource, Farming, Rural Conservation and Industrial 2 Zones. Exact locations of land clearing, reinstatement and buried infrastructure is not determined, yet however, the proposal aims to be compatible by ensuring minimal impact on the natural environment during construction and operation.	Further assessment will identify specific impacts and advice should be sought on future land uses around the site to ensure minimal impact, particularly on beneficial uses and users. There may be loss of amenity, inconvenience and disturbance associated with site establishment and earth works, particularly to local residents and those using the local road network. Consultation with local council, other key stakeholders and the community will assist in identifying and managing these impacts. A CEMP will further identify mitigation measures and safeguard current and future land and marine users. Therefore, it is considered unlikely that there would be a significant impact to the existing land use of the coastal and marine area.	Possible	Minor	Low
26	Land use	Property acquisition or tenure of land or waters during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	No	N/a	Currently a corridor is being investigated for the onshore components of the Project which include the onshore transmission infrastructure, with final locations to be determined during design development, and subject to further technical and environmental studies and discussions with Project stakeholders. For onshore construction, acquisition on of freehold land is unknown, there is a possible likelihood that there will be a tenure of waters during construction. Key construction activities would be carried out within state waters. This is a precautionary risk rating. As the design of the Project progresses the Project area will be further refined and may exclude/avoid residential areas.	Further assessment will identify specific impacts and in particular, any property acquisition required. Further design development will aim to reduce land use impacts by refining the Project area and construction boundary to avoid sensitive land uses. Effective stakeholder engagement and adhering to policies of the Planning Scheme and <i>Planning and Environment Act 1987 (P&E Act)</i> will reduce negative impacts to property owners or relevant stakeholders. The Project will be developed in accordance with the Portland Bay Coastal Infrastructure Plan 2007, and the Victorian Coastal Strategy 2014.	Unlikely	Minor	Low
27	Landscape & visual	Potential adverse impacts during pre-construction and construction works on visual and/or landscape values experienced from public open space (coast) or residential areas	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/a	N/a	There will be impacts to the landscape and visual amenity of the coastal and marine environment during construction from the presence of construction equipment, machinery, materials and the presence of dredging vessels, particularly to tourists and recreational users of the coast. The landscape character of the surrounding area holds ecological, and social significance to the community.	The visual impacts of construction works may result in loss of amenity for Portland community for a short period as well as those using the coastline for recreational activities. Preservation of coastal vegetation and screening where possible would minimise these impacts. Further visual assessments will be undertaken to understand the magnitude of change for the landscape character and impacts to the visual amenity at various viewpoints along the coastline.	Likely	Moderate	Medium
28	Marine geology, oceanography and physical processes	Changes to coastal and marine processes (such as tides, currents, water flow and wave patterns) potentially impacting on coastal land and assets, and the marine environment during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Minor	Low	N/a	N/a	Earthworks, dredging and seabed excavation may potentially impact marine processes during construction causing a potential risk of flooding during construction. The installation of temporary marine structures could alter local hydrodynamic processes, however, it is unlikely to be significant in the far-field with only minor and temporary influences related to localised scour in the near field. This risk rating is precautionary until further understanding of the marine geology is carried out and construction methods are further developed.	Appropriate computer modelling methods using tidal, wave and sediment modelling scenarios are required to assess hydrodynamic impacts to seafloor habitats and coastal geomorphological processes during the construction phase – both inside the windfarm and further afield (near shore).	Possible	Minor	Low
29	Marine water quality and sediment quality	Potential impacts to marine water and sediment quality during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	N/a	N/a	Construction activities such as earthworks and dredging could potentially impact marine water and sediment quality. The Glenelg biounit is located within the Project area (between the border of South Australia and Discovery Bay) and is characterised by extreme exposure to the prevailing weather (e.g. strong winds and swells). It is dominated by infralittoral rock and sublittoral sediment with some low-profile reef communities. The Glenelg biounit is a feeding and breeding habitat for several species. Construction activity may result in elevated nutrients and sediments which may cause turbidity, reduce light to seagrass meadows, decrease dissolved oxygen and may decrease fish diversity and abundance (VEAC 2019). There is also the potential for leaks and spills during construction, which could potentially impact on surface water quality and lead to contamination as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. This risk rating is precautionary with limited understanding of the existing water quality of the waterways.	If required, field investigations will be carried out to understand the value of surface water environments at the site and to inform appropriate management measures to be applied. Engage with relevant stakeholders such as water authorities. Early installation of drainage controls and erosion and sedimentation monitoring during site establishment and earthworks (if required) would assist in managing and mitigating impacts to land processes. Standard construction management measures in accordance with the VIC EPA requirements, such as bunding around earthworks and chemical storages and implementation of a CEMP, will reduce the risk of increased nutrient runoff or accidental spills and the potential impact on any waterways. Constructing during dry periods and non-sensitive periods would also avoid runoff impacts to receiving marine environments from degradation of water quality. A marine pollution risk assessment will be undertaken to inform the development of spill management strategies within the contingency plan.	Unlikely	Moderate	Low
30	Noise and vibration	Noise and/or vibration from pre-construction and construction activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors (onshore)	Construction (incl. pre-construction)	Possible	Minor	Low	N/a	N/a	Construction of the onshore substation, landfill site and underground cables may cause noise and vibration impacts to nearby sensitive receptors. Some minor noise will be generated by heavy vehicles using haulage routes. Sensitive receptors within the Project area may be sensitive to noise particularly as it is likely the ambient noise level will be low given the remoteness of the coastal area. Site selection was determined due to lower sensitive receptors in the area Construction would take place over a 24 month period and would be staged.	Further noise modelling and monitoring would identify areas where construction noise and vibration may exceed acceptable levels for sensitive receptors. Potential impacts shall be assessed against Statutory and guideline noise and vibration targets for operational noise and vibration. Mitigations strategies include use of noise suppression devices, noise barriers where appropriate and limiting time frames for noisy works.	Possible	Minor	Low
31	Noise and vibration	Underwater noise and/or vibration from pre-construction and construction activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species (offshore)	Construction (incl. pre-construction)	Almost Certain	High	High	N/a	Yes	The nearest affected noise sensitive receptors for the offshore components of the Project are marine flora and fauna. Exceedance of noise and vibration from construction activities (dredging, construction of water intake structure and pipe laying) is considered possible, particularly as it is likely the ambient noise level will be low given the remoteness of the area. Pile driving is assessed as extremely unlikely to be required and will be avoided as a priority. Driving of monopiles into seabed during construction will be sequential, and although of short duration (estimated to be 6 hours per monopile) would generate noises and vibrations which may cause a behavioural response in marine species up to several kilometres away (for impulsive and continuous generation of noise in extreme circumstances of continuous piling). However piling may need to occur seasonally to reduce interactions with listed threatened species likely to occur in the area. Noises from construction vessels will depend on the speed/power of travel, the type, size of vessel and the proximity of the marine species to the noise source.	Further underwater noise monitoring and modelling of piling works and vessel noise would identify risks and potential impacts to marine species. Mitigation measures would be incorporated into the CEMP including engaging a marine species-spotter to check there were no sensitive species in the work zone before construction work starts. Any recreational groups or tourism operators would be notified about the piling works before they start. Further, mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), safety zones/lookout, pingers etc. (e.g. SA DTI 2012). Blasting is to be avoided as high priority.	Possible	Major	High

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32	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/a	N/a	Existing port facilities will be used to support the transport and marshalling of equipment and Project components from globally distributed supply chains, as well as construction and maintenance vessels and activities. The nearest port is Port of Portland in close proximity to the Project. There are other ports outside the Glenleg region, including Port of Geelong located approximately 300km east of the Project area and Port of Melbourne located approximately 350km east of the Project area by roads. A suitable port or harbour would be chosen depending on proximity to the Project, water depths, tidal conditions, dedicated or shared berthing facilities, and potential opportunity to provide local employment opportunities. The size of the WTGs and plant and equipment required for construction may require ports to alter berthing facilities and change existing operations to accommodate an increased amount and frequency of vessels.	A future study of nearby harbour and ports will identify risks and limitations. Future stages of the Project would involve engaging with local port operators and implementing mitigation measures to reduce impact to existing port operations as much as possible.	Likely	Minor	Medium
33	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Minor	Medium	N/a	N/a	Exact location for the Project is not determined, yet there is a possible impact to shipping lanes, navigational setting or port approaches during pre-construction and construction works due to the Project being located in coastal waters and in close proximity to the Port of Portland. A desktop study is required to determine existing shipping channels that could interfere with the Project area. Risk to shipping and navigation is expected to be low due to the short term nature and minor change in shipping routes expected during construction.	Future study of shipping and navigation routes and local engagement with relevant stakeholders would inform any requirements needed to minimise impacts during construction. Siting decisions should also recognise shipping lanes and operations.	Unlikely	Minor	Low
34	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc.)	Potential impact (or benefit) to local, regional or state economic development and/or economic value of land and water during pre-construction and construction works	Construction (incl. pre-construction)	Highly unlikely/Rare	Negligible	Very Low	N/a	N/a	Construction is not expected to have an impact on regional or state economic development. There could be employment opportunities for the wider region which would benefit the regional economy. This is a positive risk rating.	The intent of the Project is to maximise benefits to the State and regional economy.	Highly unlikely/Rare	Negligible	Very Low
35	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc.)	Residential displacement, access restrictions and/or impact to community facilities, places of work, recreational uses or public open space during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Minor	Low	No	N/a	There will be no residential displacement during construction. There may be some disruption to access for locals and tourism during construction. Although these construction impacts would occur over a limited duration, it has the potential to impact on recreational and commercial fisheries. However, Discovery Bay is located within the centre of the Study area and commercial and recreational fishing is already prohibited within that location. There are a number of Protected Aquatic Biota (PABs) declared under the <i>Fisheries Act 1995</i> . These include Syngnathidea (i.e. seahorses, pipefish and seadragons) and the great white shark. A permit is required from the Victorian Fisheries Authority to take, injure, damage or destroy these species. Within the area there are licenses for western rock lobster, abalone and pipis and no aquaculture leases. Within the project and Study area the only commercial catch recorded is Blacklip Abalone. The area around between Cape Nelson and Cape Bridgewater has previously been reported as the largest catch of Blacklip Abalone in the Western Zone of Victoria and in the top ten locations within Victoria. A large number of species are recorded to be caught nearby off Portland. Any areas of reef will be important to the lifecycle of these important commercial and threatened species.	A Stakeholder Engagement Plan would be developed to manage the construction phases of the Project. Consultation would occur with relevant stakeholders regarding construction activities that may cause impacts e.g. property access, traffic controls. The environmental assessment would further identify and address community perception of the Project and determine predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a CEMP. Where usual accesses are impeded, an alternate access route would be provided.	Unlikely	Minor	Low
36	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc)	Disruption or impact to local or regional businesses through direct or indirect impacts during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/a	N/a	Tourism operators will likely experience decreased trade during construction if certain recreational activities are restricted including swimming, surfing kitesurfing, boating and fishing. Even if there is no actual decrease in access or amenity for recreational activities the community may still perceive negative construction stage impacts and decide not to travel to the Portland beaches, resulting in indirect impacts for local hotels, restaurants, cafes and retail outlets. Some fishing activities may also be restricted resulting in lower income for professional fishing businesses. However, construction is expected to take 24 months and therefore these impacts to the local and regional businesses will be short term and can be tested through consultation with key stakeholders. On the other hand, the influx of construction workers will contribute to the local economy of the area.	A Stakeholder Engagement Plan will be developed to manage the construction phases of the project. Consultation would occur with coastal business owners regarding construction activities that may cause impacts e.g. business access, traffic controls. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project CEMP. Where usual accesses are impeded, an alternate access route will be provided.	Likely	Minor	Medium
37	Traffic & transport (onshore)	Change to normal traffic and transport conditions during pre-construction and construction works including increased traffic, change to transport network connectivity, and change to road pavement conditions	Construction (incl. pre-construction)	Likely	Minor	Medium	N/a	N/a	Temporary road closures and changes to local traffic may be required. The traffic generated during site establishment and construction may cause delay due to insufficient road capacity, particularly the delivery of large plant and equipment. However, these impacts would occur over a limited duration. Given limited and timing, a precautionary initial risk rating was given.	Consultation would occur with relevant stakeholders regarding construction activities that may cause impacts e.g. property access, traffic controls. The environmental assessment would further identify and address community perception of the Project and determine predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a CEMP. Where usual accesses are impeded, an alternate access route would be provided. A Traffic Management Plan will be conducted to mitigate impacts to the road transport network.	Likely	Minor	Medium

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38	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Construction (incl. pre-construction)	Possible	Minor	Low	No	N/a	Construction activities will require the use of energy and water, with some waste (including general waste) generated. Given the limited construction details, such as resource and waste management during works, a precautionary initial risk rating was given.	There are opportunities to minimise the generation of waste and the resources/materials sent to landfill by imbedding the waste hierarchy into early works practices to maximise resource efficiency. This could be outlined in the CEMP. All waste will be managed and disposed in accordance with EPA waste management policies and regulations. Any hazardous liquid waste (oil water) will be captured and removed from site using a licensed waste contractor. There will be appropriate waste storage areas at the site during early works as required. There will be no waste disposed onsite and waste generation and disposal will be managed in accordance with the CEMP. Provisions to optimise the efficient use of water and energy during site establishment and maximise reuse and recycling i.e. use of on-site potable water tank during site establishment and sediment pond water (non-potable) for dust suppression purposes on site.	Unlikely	Minor	Low
Operation and Maintenance													
39	Aboriginal heritage (incl. underwater heritage)	Disturbance of known or previously unrecorded Aboriginal cultural heritage sites during operation and maintenance potentially impacting on heritage values	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	No	N/A	It is possible that known or previously unrecorded Aboriginal cultural heritage sites could be encountered within the Project area. However, it is not likely Aboriginal sites and objects would be affected during operation and maintenance as all ground disturbance activities would occur during site establishment and construction work.	A CHMP would be prepared to outline measures for management and protection of Aboriginal heritage sites, and would include and unexpected finds procedure.	Highly unlikely/Rare	Moderate	Low
40	Aboriginal heritage (incl. underwater heritage)	Impact to culturally sensitive landforms (Dreaming sites) during operation and maintenance works resulting in long-term loss of connection to land	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	No	N/A	It is possible that culturally sensitive landforms or intangible heritage sites are present within the Study area. Project infrastructure would utilise previously disturbed land where possible and avoid impacts to sensitive landforms and intangible heritage.	Engagement with the Gundit Mirring Traditional Owners will be conducted to confirm intangible cultural heritage values in the Study area. Design would avoid sites and minimise impacts to the sites of cultural significance where practicable.	Highly unlikely/Rare	Moderate	Low
41	Air quality (Air quality & GHGs)	Generation of air emissions and dust from operation and maintenance impacting on sensitive receptors and local air quality	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/a	N/a	Operation of the Project is not expected to generate air emissions. Any dust or odour emissions in relation to maintenance of the Project would be localised, negligible and below levels of detection. Given the low magnitude of the air quality impacts and the limited sensitive receptors in the area, air quality impacts are not considered significant under the significance criteria.	Operation will need to comply with EPA performance requirements, and any standards and licenses for air emissions. Air quality monitoring programs and equipment could be used determine when activities need to be altered to reduce emissions.	Highly unlikely/Rare	Negligible	Very Low
42	Aviation and radar (incl. EMI)	Interference to civil and military radar during operation	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/Rare	Minor	Very Low	N/a	N/a	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest airport being Portland Airport (approximately 10.5km away). The Project would not interfere with civil or military radar during the operation of the Project.	A future radar impact assessment would inform of any requirements to minimise impacts during operation and maintenance. Engagement with relevant stakeholder to determine any impact on radars.	Highly unlikely/Rare	Negligible	Very Low
43	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	N/a	N/a	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest airport being Portland Airport (approximately 10.5km away). Once constructed there is unlikely to be any obstruction of the OLS during operation. Some maintenance works on the turbines may case disturbance to usual aircraft operations but this will be done during the day and is unlikely to require night lighting. The operation of the WTGs may also obstruct scenic flight paths, and will be further investigated and determined.	Consultation with local councils and state government to determine what permanent changes to aviation and radar is required, if any. Additionally, a future radar impact assessment would inform of any requirements to minimise impacts during operation.	Unlikely	Minor	Low
44	Aviation and radar (incl. EMI)	EMI during operation and maintenance works impacting local television and radio	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/a	N/a	There is limited potential for the Project to impact on telecommunication signals due to the location of the turbines offshore and low density in proximity to the coast. Potential disruptions are likely to have been identified and mitigated during earlier phases of the Project.	Identification of broadcast towers and transmission path in proximity of the Project area to inform design and reduce impacts of radio signal.	Unlikely	Minor	Low
45	Ecology - State benthic and marine	Potential impact on Victorian listed or threatened species and communities, or their habitat (terrestrial and marine)	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	Yes	N/a	<p>Marine: There are no known critical habitats or Habitat Conservation Orders (HCO's) as declared under the <i>Flora and Fauna Guarantee Act 1988</i> (FFG Act) within the Study area. The nearshore environment within the Study area contains a number of areas of reef, which would be expected to support sponges, ascidians, bryozoans and gorgonians. A detailed benthic habitat survey would be required to identify whether this includes any threatened species under the FFG Act. There are three shorebirds, two seabirds, five fish, 13 benthic fauna and a dolphin species that are listed as threatened under the FFG Regulations, and potentially occur within the Study area.</p> <p>Terrestrial: There are 19 FFG Act-listed flora species within the Study area, one advisory-listed amphibian species, 19 terrestrial bird species within the Study area, of which 11 have been recorded within the Project area, 21 FFG Act-listed wetland/coastal bird species, of which 11 have been recorded within the Project area, two freshwater/diadromous fish within the Study area, two invertebrate species within the Study area which have not previously been recorded within the Project area, six terrestrial mammal species within the Study area, and one reptile species has been recorded within the Study area and Project area.</p>	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the Environmental Management Framework (EMF). A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan. The Project is unlikely to involve the storage and handling of large quantities of chemicals, nor generate frequent vessel movements.	Likely	Moderate	Medium

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				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
46	Ecology - State terrestrial	Potential impact on non- threatened species and communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	Yes	N/a	The Project Area is nominated to be a biologically important area for many species, including whales, seabirds and sharks. Therefore, there is a possible impact on non-threatened species within the Project Area. Construction noise may cause changes to behaviour of fauna. The scale of impact is dependent on the size and cumulative noise impact of construction. Vessel movements during construction pose a risk of fauna strike, especially for large slow-moving fauna near the surface such as turtles and whales. Depending on vessel frequency and speed, there would be a risk of death/injury to fauna species. Construction vessels may introduce marine pests to area and turbines provide a surface for fouling pest species. The environmental impacts of introduced species on benthic communities can be significant as marine pests can eradicate unique benthic communities and contaminate fisheries. Therefore, the unmitigated risk is high.	Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts include seasonal maintenance windows (vary depending on species), safety zones/lookout for vessel strikes and vessel hull inspections to avoid introduction of pest/exotic species.	Possible	Moderate	Medium
47	Ecology - State migratory birds	Potential impact on listed migratory birds, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	Yes	Yes	The Project Area habitats many migratory species, including the: shy albatross, wandering albatross, Bullers albatross, antipodean albatross, Campbell albatross, black-bowed albatross, Indian yellow-nosed albatross, common diving-petrol, and Australasian gannet. The Study area may be part of the migratory pathway of critically endangered orange-bellied parrot and swift parrot.	Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the EMF.	Possible	Moderate	Medium
48	Ecology - EPBC listed threatened communities	Potential impact on Commonwealth listed threatened communities, or their habitat (terrestrial and marine)	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	Yes	Yes	Marine: The TEC Giant Kelp Marine Forests of South East Australia has the potential to occur within the eastern and western sections of the nearshore environment, around Cape Bridgewater and Nelson. The Commonwealth Marine Area commences three nautical miles from the coastline. The nearest Commonwealth Marine Park is the Nelson Marine Park (approximately 200km south of the Study area, with an average depth of 4,600m). The marine park is recognised as an important habitat for commercial fish, including tuna and mackerel. It is also a key migratory area for whales, including humpback, fin, blue and sei whales. A large portion of the Victorian coastline, including the Study area, falls within the Bonney Coast Upwelling. This upwelling is listed by the Commonwealth as a Key Ecological Feature, which while not a MNES in its own right, forms a component of the Commonwealth marine area MNES. The Bonney Coast Upwelling is a highly productive area provide important habitat to a wide range of species, including an important feeding area for blue whales, seabirds, penguins, pinnipeds and fish. At present, no direct physical disturbance of the Commonwealth Marine Area is proposed, however indirect impacts may potentially occur, such as poor water quality or the generation of underwater noise extending beyond state waters. The Victorian Study area does include the Discovery Bay Marine Park, however no infrastructure is planned within the park boundaries. The park protects reef and macroalgae habitats and supports a high diversity of marine life including whales, seabirds, fish, and Australian fur seals. Two Ramsar wetlands are adjacent to the Study area: Glenelg Estuary and Discovery Bay Wetlands and Lower Glenelg National Park. The Glenelg Estuary and Discovery Bay Wetlands supports an uncommon inland wetland type (peatlands), as well as a threatened ecosystem and threatened species. This wetland provides habitat for 95 waterbirds (including 24 species listed under international migratory bird agreements) as well as breeding habitat for beach nesting birds. The following Terrestrial EPBC listed threatened ecological community occur or may occur in the Study Area: •Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion •Other threatened ecological communities raised by the PMST would need to be reassessed once the modelled FVC data has been verified.	Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts during maintenance include seasonal construction windows (vary depending on species), bubble curtains, go slow measures and for the design to possibly avoid TEC or high value habitat. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan.	Possible	Minor	Low
49	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	Yes	N/a	The Project area is within state waters and adjacent to Commonwealth waters. The nearest Commonwealth Marine Park is the Nelson Marine Park (approximately 200km south of the Study area, with an average depth of 4,600m). The marine park is recognised as an important habitat for commercial fish, including tuna and mackerel. It is also a key migratory area for whales, including humpback, fin, blue and sei whales. A large portion of the Victorian coastline, including the Study area, falls within the Bonney Coast Upwelling. This upwelling is listed by the Commonwealth as a Key Ecological Feature, which while not a MNES in its own right, forms a component of the Commonwealth marine area MNES. The Bonney Coast Upwelling is a highly productive area provide important habitat to a wide range of species, including an important feeding area for blue whales, seabirds, penguins, pinnipeds and fish. During operation and maintenance, no direct physical disturbance of the Commonwealth Marine Area is proposed, however indirect impacts may potentially occur, such as poor water quality or the generation of underwater noise extending beyond state waters.	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of WTGs. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan.	Possible	Minor	Low

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50	Ecology - EPBC listed threatened terrestrial species and migratory species	Potential impact on Commonwealth listed species, migratory birds, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	Yes	Yes	<p>Listed Threatened Species:</p> <ul style="list-style-type: none"> •Eight flora species •One amphibian species •Four terrestrial bird species •Two wetland/coastal bird species •Two freshwater/diadromous fish species •One freshwater invertebrate species •Four terrestrial mammal species •No terrestrial reptile species <p>Listed Migratory Species:</p> <ul style="list-style-type: none"> •Twenty-five migratory bird species, with twelve recorded within the Project Area 	Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts during maintenance include seasonal construction windows (vary depending on species), bubble curtains, and go slow measures.	Possible	Moderate	Medium
51	Ecology - EPBC listed threatened marine species and migratory species	Potential impact on Commonwealth listed marine and migratory species, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	Moderate	Medium	Yes	Yes	<p>Cetaceans:</p> <p>The endangered southern right whale migrates between summer feeding areas in the Southern Ocean to inshore coastal waters off Australia. The area around Portland is established as a BIA for these whales. The Portland area is also an important area for females with calves, as the Study area is a key area for breeding females. The endangered blue whale; two sub-species are known in Australia the Antarctic blue whale and the pygmy blue whale are known to occur in the Study area. The distribution of each subspecies varies and is not fully understood. The humpback whale has also been regularly recorded near the Study area and is mapped as part of the core range for the species, but is not considered a breeding, resting or feeding area. Other threatened whale species may occur occasionally in the Study area (i.e. fin, brydes and sei whales) however these are infrequently recorded and tend to occur further offshore i.e. 20-60km). Further investigations will be required to identify if blue whales come closer to shore at Portland, and whether underwater noise or vibration produced by wind turbines would cause the species to avoid the area.</p> <p>Pinnipeds:</p> <p>There is a known colony of Australian sea lions at Cape Bridgewater, to the east of the Study area. It is likely that individual animals forage within the Study area and may be sensitive to physical disturbance and underwater noise or vibration. The southern elephant seal listed as Vulnerable, breeds in Antarctic waters but does on occasion forage in southern Australia. The Study area is not listed as habitat or potential habitat within the Species Profile and Threats Database. The subantarctic fur seals may occasionally utilise the Study area, however haul out and breeding areas are only known further south, mainly on Macquarie Island.</p> <p>Sharks and Fish:</p> <p>Given the proximity of a seal colony at Cape Bridgewater, the Study area may attract a higher number of white sharks. The Study area is mapped as a BIA area for the sharks.</p> <p>Turtles:</p> <p>There are a number of sightings of threatened turtle species along the shoreline, including the leatherback and loggerhead Turtles; they would be using the nutrient rich waters surrounding the site for feeding purposes, however nesting occurs further northwards. The Study area is not likely to be considered key habitat for turtles.</p> <p>Seabirds: There are several records of a number of threatened seabirds being present within the Study area. The Study area is mapped as a BIA for the black-browed albatross, butlers</p>	Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), bubble curtains, and go slow measures. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan.	Possible	Moderate	Medium
52	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	Minor	Medium	N/a	N/a	<p>The Project will require interface with a range of other significant infrastructure during operation and maintenance, such as ports, roads, electricity networks and other services and utilities. Infrastructure impacts would be identified during design development and construction stages of the Project in order to avoid any unexpected outcomes or significant impacts.</p> <p>Refer to 'Ports and harbours' for risk of potential impacts to existing port assets.</p>	Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during operation and maintenance.	Unlikely	Minor	Low
53	Ground conditions and contamination	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during operation and maintenance works leading to potential risks to public health and the environment	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/a	N/a	Operation of the Project is not expected to change ground conditions or generate risks related to contamination.	Possible mitigation measures during operation and maintenance would be managed through an OEMP (Operational Environmental Management Plan). Implementation of monitoring programs will ensure compliance with EPA requirements.	Unlikely	Minor	Low
54	Ground conditions and contamination	Land disturbance, erosion, alteration of water courses and drainage patterns, vegetation removal, land clearing or modification during operation and maintenance impacting soil and water quality	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/a	N/a	Operation of the Project is considered unlikely to impact ground conditions as land disturbance, vegetation removal and land clearing are all done in the construction stage of the Project. However, the potential for contamination as a result of general maintenance activities is considered to be low, based on the number of vehicles and equipment which would likely be used during maintenance.	Revegetation programs should assist in minimising erosion impacts throughout operation. If maintenance works are required, areas containing significant drainage patterns or heavy water flows would be avoided. The OEMP would establish management measures for cleared areas to ensure impacts to soil and water quality are reduced. This would include installation of temporary drainage routes, sediment control measures and the progressive revegetation of disturbed areas, where practicable.	Unlikely	Minor	Low
55	Groundwater	Impacts to ground water quality, levels or flow during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	N/a	N/a	Shallower water depths, and those above the surface, have a higher risk of local ground water quality being impacted during maintenance. Most changes to groundwater would occur during construction. Further investigation to ground-truth water depths and quality and local uses of groundwater will be undertaken.	Standard maintenance management measures in accordance with the VIC EPA requirements. Maintenance during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality. Appropriate management of temporary dewatering and groundwater control would be included in the EMF, including recharge back to aquifer down gradient if required.	Unlikely	Minor	Low

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56	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Human exposure to unsafe levels of Electro-magnetic fields (EmF) during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/Rare	Moderate	Low	No	N/a	Electro-magnetic fields are produced wherever electricity is used or transmitted. While there is no established evidence that exposure to Electro-magnetic fields from power lines, substations, transformers or other electrical sources, regardless of proximity, causes any health effects, the ARPANSA still refers to guidelines that recommend the limiting of exposure to Electro-magnetic fields so that the threshold at which the interactions between the human body and external electric and magnetic fields that causes adverse effects within the body cannot be reached. It is expected that there would be a low risk of exceeding the levels recommended by ARPANSA. Exposure time would also be limited.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/Rare	High	Low
57	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Potential for leaks and spills during operation and maintenance as a result of storage, handling and use of dangerous goods and equipment	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	No	N/a	Vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants, bio-fouling paints and other chemicals. The Project is unlikely to involve the storage and handling of large quantities of chemicals, nor generate frequent vessel movements. The storage and handling of dangerous goods and hazardous materials have the potential to impact maintenance workers and the surrounding environment if leaks and spills occur, resulting in the potential contamination of air, soils, surface water, and/or groundwater.	Standard chemical storage, handling and maintenance procedures will be required and would be included in the OEMP. Standard management measures such as storage of dangerous goods in accordance with the relevant guidance would be included in the OEMP to reduce potential risks.	Unlikely	Moderate	Low
58	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Potential for fire and increased bushfire risk during operation and maintenance works	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	N/a	N/a	The Project is located in a designated Bushfire Protection Area. Operation and maintenance works may increase risk of fire from accidental ignition from construction equipment, fuels and chemicals.	Standard maintenance management measures such as management plans addressing these issues would be included in the OEMP and would reduce the risk of the Project increasing fires and bushfires in the local region.	Highly unlikely/Rare	Moderate	Low
59	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Vulnerability of the Project to natural hazards, extreme weather and climate change during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	N/a	N/a	Climate induced risks include increased dust generation during drier weather, increased maintenance delays due to wet weather, increased rainfall resulting in increased flow events in watercourses, temporary flooding and risk of failure of erosion and sediment controls and potential for maintenance workers to experience heatstroke as a result of extreme heat and hot weather events.	Standard management measures such as management plans addressing these issues would be included in the OEMP and would reduce the impact on the Project, including adequate training and PPE being provided to construction workers.	Unlikely	Minor	Low
60	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Exposure of personnel or the public to unsafe conditions as a result of operation and maintenance and on-site practices	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	N/a	N/a	The Project presents unique risks to maintenance workers because of the nature of offshore maintenance (i.e.. working at height and offshore, falls, electrical risks, subsea works and extreme weather experience in vast open spaces off the coast). In extreme circumstances this may result in death or serious injury of maintenance personnel. The public will be restricted from accessing WTGs, therefore they will not be exposed to unsafe conditions. The Project is not expected to emit radiation. Therefore, impacts to human health under the significance criteria is considered not significant.	Stringent site OHS plans would be developed and implemented to manage the risk of death or serious injury during maintenance on and offshore. Standard construction management measures during maintenance works would also reduce the likelihood of occurrence, including compulsory training and PPE provided to construction workers. Restrictions for the public from entering WTG boundaries would also reduce the risk from unsafe conditions.	Unlikely	Moderate	Low
61	Historic heritage (incl. shipwrecks)	Impact to listed and non-listed heritage places and/or objects (maritime and terrestrial) during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/Rare	Moderate	Low	No	N/a	There are no Commonwealth listed heritage places or sites within the Study area or surrounds. There are a number of State heritage places and local culture heritage assets mapped in the area; these are namely buildings. A review of DAWE historical shipwrecks register, determined that there are two underwater heritage items within the Study area. However, given the age of each item, it is considered unlikely that any artefacts remain. Operation of the Project is not expected to impact any heritage places or objects.	Project infrastructure would be located to avoid impacts to State and local historic heritage assets. Management measures would be included in the OEMP (as required) to minimise any indirect impacts to mapped heritage places and sites.	Highly unlikely/Rare	Moderate	Low
62	Hydrology, flooding and water quality	Potential impacts to surface water quality during operation and maintenance works	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	Yes	N/a	Maintenance activities such as earthworks and vegetation clearing could potentially impact on nearby waterways (i.e. increased nutrients entering waterways). There is also the potential for leaks and spills during maintenance, which could potentially impact on surface water quality as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out.	Further investigations will be carried out to understand the value of surface water environments in the area and to inform appropriate management measures during maintenance and operation to be applied. Early installation of drainage controls and erosion and sedimentation monitoring during maintenance works would assist in managing and mitigating impacts to land processes. Maintenance works during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Unlikely	Moderate	Low

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63	Land use	Potential impact or major change to existing and planned future residential, recreational, commercial and industrial land uses during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	No	N/a	Maintenance requirements for the Project may temporarily affects residents and commercial users.	Ensure minimal impact during maintenance operation. Engagement and consultation will assist in providing timeframes for maintenance.	Unlikely	Minor	Low
64	Land use	Property acquisition or tenure of land or waters during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/Rare	Negligible	Very Low	N/a	N/a	Any acquisition or tenure changes would occur during construction, and as such there would be no further changes during operation.	No mitigation measure is proposed as land acquisition will not be required during operation.	Highly unlikely/Rare	Negligible	Very Low
65	Landscape & visual	Potential adverse impacts during operation and maintenance works on visual and/or landscape values experienced from public open space (coast) or residential areas	Operation and maintenance (incl. testing and commissioning)	Almost Certain	High	High	N/a	N/a	There will be impacts to the landscape and visual amenity of the coastal and marine environment as the Project will create permanent changes to the landscape character and visual amenity of Portland due to the presence of wind turbines. It is expected that the landscape character of the surrounding area holds ecological, and social significance to the community. Accordingly, the risk to landscape and visual is considered to be significant.	Further visual assessments will be undertaken to understand the magnitude of change for the landscape character and impacts to the visual amenity at various viewpoints along the coastline. Mitigation will be investigated further to reduce impacts where possible.	Almost Certain	High	High
66	Marine geology, oceanography and physical processes	Changes to coastal and marine processes (such as tides, currents, water flow and wave patterns) potentially impacting on coastal land and assets, and the marine environment during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	N/a	N/a	The marine structures will alter local hydrodynamic and coastal processes. This may result in localised changes to sedimentary processes (i.e. scour and sediment deposition). Glenelg biounit (between the border of South Australia and Discovery Bay) is a threat to elevated nutrients and sediments which may cause turbidity, reduce light to seagrass meadows, decrease dissolved oxygen and may decrease fish diversity and abundance . This risk rating is precautionary until further understanding of the marine geology is gained.	Appropriate computer modelling methods using tidal, wave and sediment modelling scenarios are required to assess hydrodynamic impacts to seafloor habitats and coastal geomorphological processes during the operational phase – both inside the windfarm and further afield (near shore).	Possible	Minor	Low
67	Marine water quality and sediment quality	Potential impacts to marine water and sediment quality during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	N/a	N/a	Turbidity/sediments - Operational activities should not create any plumes, therefore an operational impacts on turbidity/sediment is unlikely. Spills - Vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants and other chemicals. These substances can have lethal and sub-lethal effects to organisms (Yuewen and Adzigbli 2018) and can persist in the environment for long periods of time. An uncontrolled release could occur from (for example) vessel collision, equipment failure, leaks, etc. This risk rating is precautionary with limited understanding of the existing water quality of the waterways.	A marine pollution risk assessment will be undertaken to inform the development of spill management strategies for the OEMP. Standard chemical storage, handling and maintenance procedures will be required.	Unlikely	Minor	Low
68	Noise and vibration	Noise and/or vibration from maintenance activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors (onshore)	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	N/a	N/a	Maintenance of the onshore substation, landfall site and underground cables may cause noise and vibration impacts to nearby sensitive receptors. Sensitive receptors within the Project area may be sensitive to noise particularly as it is likely the ambient noise level will be low given the remoteness of the coastal area. Site selection was determined due to lower sensitive receptors in the area.	Further noise modelling and monitoring would identify areas where operational noise and vibration may exceed acceptable levels for sensitive receptors. Potential impacts shall be assessed against Statutory and guideline noise and vibration targets for operational noise and vibration. Appropriate mitigations strategies would be developed accordingly.	Unlikely	Negligible	Very Low
69	Noise and vibration	Underwater noise and/or vibration from maintenance activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species (offshore)	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	N/a	No	Operation of the WTGs is likely to generate low frequency underwater noise that are unlikely to cause acute impacts to marine fauna. However the noise and vibration is more continuous than noise throughout construction and may cause changes to behaviour of fauna. The scale of impact is dependent on the size and cumulative noise impact of the WTG array. Given that the Project area contains important marine species and likely has low background noise levels, the inherent risk of underwater noise impacts is high.	Further underwater noise modelling and monitoring would identify risks and potential impacts to marine species. Further work required to assess whether this could affect multiple individuals of a threatened species, as well as design measures that can be taken to minimise impact. Consideration of impacts would be incorporated into design development, and any residual impacts would be incorporated into the OEMP.	Possible	High	Medium

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70	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/a	N/a	Existing port facilities will be used to support the transport and marshalling of equipment from globally distributed supply chains, and construction and maintenance vessels and activities. The nearest port is the Port of Portland in close proximity to the Project. There are other ports outside the Glenleg region, including Port of Geelong located approximately 300km east of the Project area and Port of Melbourne located approximately 350km east of the Project area by roads. A suitable port or harbour would be chosen depending on proximity to the Project, water depths, tidal conditions, dedicated or shared berthing facilities, and potential opportunity to provide local employment opportunities. Post construction, ports will be well placed to accommodate requirements of large WTGs, maintenance vessels, plant and equipment. Accordingly, no further impacts are expected to ports during operation.	A future study of nearby harbour and ports will identify risks and limitations. Future stages of the project would involve engaging with local port operators and implementing mitigation measures to reduce impact to existing port operations as much as possible.	Unlikely	Minor	Low
71	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	Minor	Medium	N/a	N/a	The Project area has been selected based on its low marine traffic volumes among other criteria. Yet it may impact on shipping lanes, navigational setting or port approaches during operation and maintenance due to the Project being located in coastal waters and in close proximity to the Port of Portland. A desktop study is required to determine existing shipping channels that could interfere with the Project area. Risk to shipping and navigation is expected to be low due to the short term nature and minor change in shipping routes expected during operation and maintenance.	Future study of shipping and navigation routes and local engagement with relevant stakeholders would inform any requirements needed to minimise impacts during maintenance. Siting decisions should also recognise shipping lanes and operations.	Highly unlikely/Rare	Minor	Very Low
72	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc.)	Potential impact (or benefit) to local, regional or state economic development and/or economic value of land and water during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/Rare	Negligible	Very Low	N/a	N/a	Operation is not expected to have an impact on regional or state economic development. There could be employment opportunities for the wider region which would benefit the regional economy. This is a positive risk rating.	The intent of the Project is to maximise benefits to the State and regional economy.	Highly unlikely/Rare	Negligible	Very Low
73	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc.)	Residential displacement, access restrictions and/or impact to community facilities, places of work, recreational uses or public open space during maintenance works	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	N/a	N/a	There will be no residential displacement during operation and maintenance. There may be some disruption to access for locals and tourism during maintenance works. Although these maintenance impacts would occur over a short limited duration, it has the potential to impact on recreational and commercial fisheries. The operation and location of the WTGs have the potential to limit commercial fisheries activities.	Consultation would occur with relevant stakeholders regarding maintenance activities that may cause impacts e.g. property access, traffic controls. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a OEMP. Where usual accesses are impeded, an alternate access route would be provided.	Possible	Minor	Low
74	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc)	Disruption or impact to local or regional businesses through direct or indirect impacts during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	No	N/a	Tourism operators will likely experience decreased trade due to impacts to recreation and amenity in the area. Although a navigational safety zone would restrict some recreational activities, such as boating and fishing from coming close to the WTGs, all other recreational activities will be restored and experience limited amenity impacts (including swimming, surfing kitesurfing). Even if there is no decrease in access or amenity for recreational activities the community may still perceive negative operational stage impacts and decide not to the travel to the Portland beaches, resulting in indirect impacts for local hotels, restaurants, cafes and retail outlets. Some fishing activities may also be restricted resulting in lower income for professional fishing businesses.	A Stakeholder Engagement Plan will be developed for all the phases of the Project. Consultation would occur with coastal business owners regarding maintenance and operational activities that may cause impacts e.g. business access, traffic controls. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a Project OEMP. Where usual accesses are impeded, an alternate access route will be provided.	Likely	Moderate	Medium
75	Traffic & transport (onshore)	Change to normal traffic and transport conditions during operation and maintenance including increased traffic, change to transport network connectivity, and change to road pavement conditions	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/a	N/a	Traffic during operation and maintenance is not likely to impede on usual access and recreational activities.	Consultation would occur with relevant stakeholders regarding maintenance activities that may cause impacts e.g. property access, traffic controls. As traffic is not likely to impede on usual access and recreational activities during operation and maintenance, there is a low risk rating. However, where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into the EMF. Where usual accesses are impeded, an alternate access route would be provided. A Traffic Management Plan will be conducted to mitigate impacts to the road transport network.	Unlikely	Minor	Low
76	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	No	N/a	Operation will require the use of energy and water and there will be some waste products (including general waste) generated. Further operation details are required, therefore a precautionary initial risk rating has been given.	There are opportunities to minimise the generation of waste and the resources/materials sent to landfill by imbedding the waste hierarchy into early works practices to maximise resource efficiency. This could be outlined in the EMF. All waste will be managed and disposed in accordance with the applicable Victorian regulations. Any hazardous liquid waste (e.g. oily water) will be captured and removed from site using a licensed waste contractor. There will be appropriate waste storage areas at the site during early works as required. There will be no waste disposed onsite and waste generation and disposal will be managed in accordance with the EMF. Provisions to optimise the efficient use of water and energy during maintenance and maximise reuse and recycling.	Unlikely	Minor	Low
Decommissioning													
77	Aboriginal heritage (incl. underwater heritage)	Disturbance of known or previously unrecorded Aboriginal cultural heritage sites during decommissioning potentially impacting on heritage values	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Medium	N/a	N/A	The Gunditj Mirring Traditional Owners Aboriginal Corporation is the relevant RAP for the Project. It is possible that known or previously unrecorded Aboriginal cultural heritage sites could be encountered within the Project area. However, it is not likely Aboriginal sites and objects would be affected during decommissioning as all ground disturbance activities would occur first during site establishment and construction work.	A CHMP would be prepared to outline measures for management and protection of Aboriginal heritage sites, and would include and unexpected finds procedure.	Highly unlikely/Rare	Moderate	Low

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78	Aboriginal heritage (incl. underwater heritage)	Impact to culturally sensitive landforms (Dreaming sites) during decommissioning resulting in long-term loss of connection to land	Decommissioning (and site rehabilitation)	Unlikely	High	Medium	N/a	N/A	The Project is within the Gunditjmara – Part A Native Title determination covering all land within the Project area. However, it is not likely culturally sensitive landforms could be encountered within the Project during decommissioning as all disturbance activities would occur during early stages of the Project (site establishment and construction).	Engagement with the Gundit Mirring Traditional Owners will be conducted to confirm intangible cultural heritage values in the Study area. Design would avoid sites and minimise impacts to the sites of cultural significance where practicable.	Highly unlikely/Rare	Moderate	Low
79	Air quality (Air quality & GHGs)	Generation of air emissions and dust from decommissioning impacting on sensitive receptors and local air quality	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	N/a	N/a	Proposed decommissioning works are expected to generate some air emissions (e.g. dust and grit through land disturbance and GHG and exhaust fumes etc. from construction vessels and vehicles), however this would be localised and of limited duration and there are limited sensitive receptors within the Study area.	A future air quality assessment would inform the requirements for a Decommissioning Environmental Management Plan (DEMP). Dust monitoring programs and equipment (if required) could be used to determine when activities need to be altered to reduce dust emissions. Actions such as watercarts on haul roads and main construction sites could be used to generate less dust. Standard measures to limit the generation of dust and other air emissions (such as most efficient use of construction equipment and planning to reduce vessel and vehicle use and movements) would also be included in the DEMP.	Possible	Minor	Low
80	Aviation and radar (incl. EMI)	Interference to civil and military radar during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/Rare	Negligible	Very Low	N/a	N/a	Interference with aircrafts of radars during decommissioning is not expected. If necessary, changes to flight routes would have already taken place for construction and operation of the Project.	A future radar impact assessment would inform of any requirements to minimise impacts during decommissioning. Engagement with relevant stakeholder to determine any impact on radars.	Highly unlikely/Rare	Negligible	Very Low
81	Aviation and radar (incl. EMI)	EMI during decommissioning works impacting local television and radio	Decommissioning (and site rehabilitation)	Possible	Minor	Low	N/a	N/a	Interference to local television and radio is not expected during decommissioning. Potential disruptions are likely to have been identified and mitigated during earlier phases of the Project.	Future study of potential electromagnetic interferences is required to inform design and reduce impacts of radio signal.	Unlikely	Minor	Low
82	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during decommissioning works	Decommissioning (and site rehabilitation)	Possible	Minor	Low	N/a	N/a	Portland airport is located adjacent to the Project area approximately 10.5km from the WTGs. It provides regular passenger services for the southwest region of Victoria. There are no commercial airports or military bases in proximity to the Project area. As scenic flights and emergency and regional services are expected to be largely carried out during day-light hours, impact from any night-lighting utilised during decommissioning is anticipated to be low. This would be localised and of limited duration.	A future study of scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during decommissioning.	Possible	Minor	Low
83	Ecology - State benthic and marine	Potential impact on Victorian listed or threatened species and communities, or their habitat (terrestrial and marine)	Decommissioning (and site rehabilitation)	Likely	High	High	Yes	N/a	Decommissioning works are not expected to impact on groundwater or perched aquifers where benthic fauna occurs. This risk rating is precautionary until further assessment of local groundwater systems is carried out and decommissioning methods are further developed. Other decommissioning activities may impact benthic and marine wildlife; however the effects are likely to be temporary. Marine: There are no known critical habitats or HCO's as declared under the FFG Act within the Study area. The nearshore environment within the Study area contains a number of areas of reef, which would be expected to support sponges, ascidians, bryozoans and gorgonians. A detailed benthic habitat survey would be required to identify whether this includes any threatened species under the FFG Act. In addition to species listed as threatened under the EPBC Act in row 11, there are a further three shorebirds, two seabirds, five fish, 13 benthic fauna and a dolphin species that are listed as threatened under the FFG Regulations, and potentially occur within the Study area. Terrestrial: There are 19 FFG Act-listed flora species within the Study area, one advisory-listed amphibian species, 19 terrestrial bird species within the Study area, of which 11 have been recorded within the Project area, 21 FFG Act-listed wetland/coastal bird species, of which 11 have been recorded within the Project area, two freshwater/diadromous fish within the Study area, two invertebrate species within the Study area which have not previously been recorded within the Project area, six terrestrial mammal species within the	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. A survey will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Moderate	Medium
84	Ecology - State terrestrial	Potential impact on non- threatened species and communities, or their habitat	Decommissioning (and site rehabilitation)	Likely	High	High	Yes	N/a	The Project Area is nominated to be a biologically important area for many non-threatened marine and terrestrial species . Therefore, there is a possible impact on non-threatened species within the Project Area. Construction noise during decommissioning may cause changes to behaviour of fauna. The scale of impact is dependent on the size and cumulative noise impact of decommissioning. Vessel movements pose a risk of fauna strike, especially for large slow-moving fauna near the surface such as turtles and whales. Depending on vessel frequency and speed, there would be a risk of death/injury to fauna species. Construction vessels may introduce marine pests to the area and turbines provide a surface for fouling pest species. The environmental impacts of introduced species on benthic communities can be significant as marine pests can eradicate unique benthic communities and contaminate fisheries. Therefore, the unmitigated risk is high.	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. A survey will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan to avoid potential impacts to Victorian listed or threatened species and communities. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), safety zones/lookout for vessel strikes and vessel hull inspections to avoid introduction of pest/exotic species.	Possible	Moderate	Medium

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85	Ecology - State migratory birds	Potential impact on listed migratory birds, or their habitat (terrestrial and marine)	Decommissioning (and site rehabilitation)	Possible	High	Medium	Yes	Yes	The Project area habitats many migratory species, including the: shy albatross, wandering albatross, Bullers albatross, antipodean albatross, Campbell albatross, black-browed albatross, Indian yellow-nosed albatross, common diving-petrol, and Australasian gannet. The Study area may be part of the migratory pathway of critically endangered orange-bellied parrot and swift parrot. It would appear that although habitat for the orange-bellied parrot exists within the Study area, it is not currently utilised by the species, and would likely not be considered habitat critical to its survival as a species. There are no contemporary records of the swift parrot occurring along the coastline of south-western Victoria, near the Study area, however recent mapping by BMT does indicate the species may occur. Whilst the Study area does not contain habitat for the species i.e. Eucalypt woodlands, it is possible that individuals pass through the Study area whilst migrating to their preferred habitat. There is also a potential that there are: 23 FFG-Act listed terrestrial migratory birds in the Study area, and 22 coastal/wetland birds in the Study area based on an Arup Preliminary ecology assessment.	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. A survey will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Moderate	Medium
86	Ecology - EPBC listed threatened communities	Potential impact on Commonwealth listed threatened communities, or their habitat (terrestrial and marine)	Decommissioning (and site rehabilitation)	Possible	High	Medium	Yes	Yes	<p>Marine:</p> <p>The TEC Giant Kelp Marine Forests of South East Australia has the potential to occur within the eastern and western sections of the nearshore environment, around Cape Bridgewater and Nelson. The Commonwealth Marine Area commences three nautical miles (defined as three nautical miles from LAT under the <i>Seas and Submerged Lands Act 1973</i> from the coastline, also known as the TSB.</p> <p>The nearest Commonwealth Marine Park is the Nelson Marine Park (approximately 200km south of the Study area, with an average depth of 4,600m). The marine park is recognised as an important habitat for commercial fish, including tuna and mackerel. It is also a key migratory area for whales, including humpback, fin, blue and sei whales.</p> <p>A large portion of the Victorian coastline, including the Study area, falls within the Bonney Coast Upwelling. This upwelling is listed by the Commonwealth as a Key Ecological Feature, which while not a MNES in its own right, forms a component of the Commonwealth marine area MNES. The Bonney Coast Upwelling is a highly productive area provide important habitat to a wide range of species, including an important feeding area for blue whales, seabirds, penguins, pinnipeds and fish.</p> <p>At present, no direct physical disturbance of the Commonwealth Marine Area is proposed, however indirect impacts may potentially occur, such as poor water quality or the generation of underwater noise extending beyond state waters. The Victorian Study area does include the Discovery Bay Marine Park, however no infrastructure is planned within the park boundaries. The park protects reef and macroalgae habitats and supports a high diversity of marine life including whales, seabirds, fish, and Australian fur seals. Two Ramsar wetlands are adjacent to the Study area: Glenelg Estuary and Discovery Bay Wetlands and Lower Glenelg National Park.</p> <p>The Glenelg Estuary and Discovery Bay Wetlands supports an uncommon inland wetland type (peatlands), as well as a threatened ecosystem and threatened species . This wetland provides habitat for 95 waterbirds (including 24 species listed under international migratory bird agreements) as well as breeding habitat for beach nesting birds.</p> <p>The following Terrestrial EPBC listed threatened ecological community occur or may occur in the Study Area:</p> <ul style="list-style-type: none"> •Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion •Other threatened ecological communities raised by the PMST would need to be reassessed 	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. A survey will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Moderate	Medium
87	Ecology - EPBC listed threatened terrestrial species and migratory species	Potential impact on Commonwealth listed threatened species and migratory species, or their habitat	Decommissioning (and site rehabilitation)	Possible	High	Medium	Yes	Yes	<p>Listed Threatened Species:</p> <ul style="list-style-type: none"> •Eight flora species •One amphibian species •Four terrestrial bird species •Two wetland/coastal bird species •Two freshwater/diadromous fish species •One freshwater invertebrate species •Four terrestrial mammal species •No terrestrial reptile species <p>Listed Migratory Species:</p> <ul style="list-style-type: none"> •Twenty-five migratory bird species, with twelve recorded within the Project Area 	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. A survey will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels. A marine pollution risk assessment should be undertaken to inform the development of spill management strategies within contingency plan to potentially avoid potential impacts to Victorian listed or threatened species and communities. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), safety zones/lookout for vessel strikes and vessel hull inspections to avoid introduction of pest/exotic species.	Possible	Moderate	Medium

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88	Ecology - EPBC listed threatened marine species and migratory species	Potential impact on Commonwealth listed marine migratory species, or their habitat		Likely	Moderate	Medium	Yes	Yes	<p>Cetaceans: The endangered southern right whale migrates between summer feeding areas in the Southern Ocean to inshore coastal waters off Australia. The area around Portland is established as a BIA for these whales. The Portland area is also an important area for females with calves, as the Study area is a key area for breeding females. The endangered blue whale; two sub-species are known in Australia the Antarctic blue whale and the pygmy blue whale are known to occur in the Study area. The distribution of each subspecies varies and is not fully understood. The humpback whale has also been regularly recorded near the Study area and is mapped as part of the core range for the species, but is not considered a breeding, resting or feeding area. Other threatened whale species may occur occasionally in the Study area (i.e. fin, brydes and sei whales) however these are infrequently recorded and tend to occur further offshore i.e. 20-60km). Further investigations will be required to identify if blue whales come closer to shore at Portland, and whether underwater noise or vibration produced by wind turbines would cause the species to avoid the area.</p> <p>Pinnipeds: There is a known colony of Australian sea lions at Cape Bridgewater, to the east of the Study area. It is likely that individual animals forage within the Study area and may be sensitive to physical disturbance and underwater noise or vibration. The southern elephant seal (listed as Vulnerable) breeds in Antarctic waters but does on occasion forage in southern Australia. The Study area is not listed as habitat or potential habitat within the Species Profile and Threats Database. The subantarctic fur seals may occasionally utilise the Study area, however haul out and breeding areas are only known further south, mainly on Macquarie Island.</p> <p>Sharks and Fish: Given the proximity of a seal colony at Cape Bridgewater, the Study area may attract a higher number of white sharks. The Study area is mapped as a BIA area for the sharks.</p> <p>Turtles: There are a number of sightings of threatened turtle species along the shoreline, including the leatherback and loggerhead Turtle; they would be using the nutrient rich waters surrounding the site for feeding purposes, however nesting occurs further northwards. The Study area is not likely to be considered key habitat for turtles.</p> <p>Seabirds: <i>There are several records of a number of threatened seabirds being present within</i></p>	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. A survey will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels. Further marine studies are required to baseline data and characterise existing conditions. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables, as these will likely be removed during decommissioning.	Possible	Moderate	Medium
89	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	N/a	No	<p>The Project area is within state waters and adjacent to Commonwealth waters. The nearest Commonwealth Marine Park is the Nelson Marine Park (approximately 200km south of the Study area, with an average depth of 4,600m). The marine park is recognised as an important habitat for commercial fish, including tuna and mackerel. It is also a key migratory area for whales, including humpback, fin, blue and sei whales.</p> <p>A large portion of the Victorian coastline, including the Study area, falls within the Bonney Coast Upwelling. This upwelling is listed by the Commonwealth as a Key Ecological Feature, which while not a MNES in its own right, forms a component of the Commonwealth marine area MNES. The Bonney Coast Upwelling is a highly productive area provide important habitat to a wide range of species, including an important feeding area for blue whales, seabirds, penguins, pinnipeds and fish.</p> <p>At present, no direct physical disturbance of the Commonwealth Marine Area is proposed, however indirect impacts may potentially occur, such as poor water quality or the generation of underwater noise extending beyond state waters.</p>	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. Surveys will inform the DEMP. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Moderate	Medium
90	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Minor	Low	N/a	N/a	Infrastructure impacts would be identified during design development and construction stages of the Project in order to avoid any unexpected outcomes or significant impacts.	Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during decommissioning	Unlikely	Minor	Low
91	Ground conditions and contamination	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during decommissioning leading to potential risks to public health and the environment	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	N/a	N/a	Decommissioning of the Project will require excavation and stockpiling of soils, particularly for the underground components, with potential of soil contamination. There is an estimated extent of probable Acid Sulfate Soils in minor areas of the Project area. The potential for Acid Sulfate Soils and contaminated land within the Project footprint would be ascertained through on- site assessment during design development and pre-construction stages.	A contamination assessment would establish baseline indicators of material at site, which would be used to inform the DEMP, particularly in relation to management and disposal of spoil. Spoil from earthworks would be reused on-site where possible or disposed of in accordance with EPA requirements. Careful consideration would be given to the location for the temporary stockpiling of spoil and excavated material, which may be required over the short term. Stockpiles would be managed in accordance with the EPA's Managing Stockpiling: Guidance Sheet (2020), which would reduce risk.	Unlikely	Moderate	Low
92	Ground conditions and contamination	Land disturbance, erosion, alteration of water courses and drainage patterns, vegetation removal, land clearing or modification during decommissioning impacting soil and water quality	Decommissioning (and site rehabilitation)	Unlikely	Minor	Low	No	N/a	The Project area intersects the waterways of Surrey River and Wattle Hill Creek. Decommissioning of the Project is considered unlikely to impact ground conditions as land disturbance, vegetation removal and land clearing are all done in the construction stage of the Project. However, the potential for contamination as a result of general decommissioning activities is considered to be low, based on the number of vehicles and equipment which would likely be used during maintenance.	The Project area is depicted as the black dotted-line in Figure 1 below. This is a broad and in	Unlikely	Minor	Low

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93	Groundwater	Impacts to ground water quality, levels or flow during decommissioning	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/a	N/a	Shallower water depths, and those above the surface, have a higher risk of local ground water quality being impacted during decommissioning. Further investigation to ground-truth water depths and quality and local uses of groundwater will be undertaken for decommissioning.	For some environmental aspects, broader study areas have been created to understand wider	Unlikely	Minor	Low
94	Human health, Hazards and risks (incl. EmF, Fire, Human health, etc)	Human exposure to unsafe levels of Electro-magnetic fields (EmF) during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/Rare	Moderate	Low	No	N/a	Electro-magnetic fields are produced wherever electricity is used or transmitted. While there is no established evidence that exposure to Electro-magnetic fields from power lines, substations, transformers or other electrical sources, regardless of proximity, causes any health effects, the ARPANSA still refers to guidelines that recommend the limiting of exposure to Electro-magnetic fields so that the threshold at which the interactions between the human body and external electric and magnetic fields that causes adverse effects within the body cannot be reached. It is expected that there would be a low risk of exceeding the levels recommended by ARPANSA. Exposure time would also be limited.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/Rare	Moderate	Low
95	Human health, Hazards and risks (incl. EMF, Fire, Human health, etc.)	Potential for leaks and spills during decommissioning as a result of storage, handling and use of dangerous goods and equipment	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	No	N/a	Vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants, bio-fouling paints and other chemicals. The Project is unlikely to involve the storage and handling of large quantities of chemicals, nor generate frequent vessel movements. The storage and handling of dangerous goods and hazardous materials have the potential to impact decommissioning workers and the surrounding environment if leaks and spills occur, resulting in the potential contamination of air, soils, surface water, and/or groundwater.	A marine pollution risk assessment should be undertaken to inform the development of spill management strategies. Standard chemical storage, handling and maintenance procedures will be required and would be included in the DEMP to reduce potential risks.	Unlikely	Moderate	Low
96	Human health, Hazards and risks (incl. EMF, Fire, Human health, etc.)	Potential for fire and increased bushfire risk during decommissioning works	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Low	No	N/a	The Project is located in a designated Bushfire Protection Area. Decommissioning works may increase risk of fire from accidental ignition from construction equipment, fuels and chemicals.	Standard construction management measures such as management plans addressing these issues would be included in the DEMP and would reduce the risk of the Project increasing fires and bushfires in the local region.	Highly unlikely/Rare	Moderate	Low
97	Human health, Hazards and risks (incl. EMF, Fire, Human health, etc.)	Vulnerability of the Project to natural hazards, extreme weather and climate change during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Low	No	N/a	Climate induced risks include increased dust generation during drier weather, increased delays due to wet weather, increased rainfall resulting in increased flow events in watercourses, temporary flooding and risk of failure of erosion and sediment controls and potential for decommissioning workers to experience heatstroke as a result of extreme heat and hot weather events.	Standard management measures such as management plans addressing these issues would be included in the DEMP and would reduce the impact on the Project, including adequate training and PPE being provided to construction workers.	Unlikely	Minor	Low
98	Human health, Hazards and risks (incl. EMF, Fire, Human health, etc.)	Exposure of personnel or the public to unsafe conditions as a result of decommissioning and on-site practices	Decommissioning (and site rehabilitation)	Possible	High	Medium	No	N/a	The Project presents unique risks to construction workers because of the nature of offshore decommissioning (i.e. working at height and offshore, falls, electrical risks, subsea works and extreme weather experience in vast open spaces off the coast). In extreme circumstances this may result in death or serious injury of construction personnel. The wider community is not expected to be impacted as access to sites on and offshore will be restricted. The Project is not expected to emit radiation. Therefore, impacts to human health under the significance criteria is considered not significant.	Stringent site OHS plans would be developed and implemented to manage the risk of death or serious injury during construction on and offshore. Standard management measures would be included in the DEMP and reduce the likelihood of occurrence, including compulsory training and PPE provided to construction workers.	Unlikely	Moderate	Low
99	Historic heritage (incl. shipwrecks)	Impact to listed and non-listed heritage places and/or objects (maritime and terrestrial) during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Low	No	N/a	There are no Commonwealth listed heritage places or sites within the Study areas or surrounds. There are a number of State heritage places and local culture heritage assets mapped in the area; these are namely buildings. A review of DAWE historical shipwrecks register, determined that there are two underwater heritage items within the Study area. However, given the age of each item, it is considered unlikely that any artefacts remain.	Project infrastructure would be located to avoid impacts to State and local historic heritage assets. Management measures would be included in the DEMP (as required) to minimise any indirect impacts to mapped heritage places and sites.	Highly unlikely/Rare	Moderate	Low
100	Hydrology, flooding and water quality	Potential impacts to surface water quality during decommissioning works	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/a	N/a	Decommissioning activities such as earthworks and vegetation clearing could potentially impact on nearby waterways (i.e. increased nutrients entering waterways). There is also the potential for leaks and spills during decommissioning, which could potentially impact on surface water quality as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out and construction methods are further developed.	Further investigations will be carried out to understand the value of surface water environments in the area and to inform appropriate management measures to be applied. Early installation of drainage controls and erosion and sedimentation monitoring during all stages of works would assist in managing and mitigating impacts to land processes. Standard management measures in accordance with the VIC EPA requirements, such as the implementation of a DEMP, would reduce the risk of increased nutrient runoff or accidental spills and the potential impact on any waterways. Decommissioning during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Unlikely	Moderate	Low

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101	Land use	Potential impact or major change to existing and planned future residential, recreational, commercial and industrial land uses during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/Rare	Minor	Very Low	N/a	N/a	Decommissioning of the Project would not generate any additional impacts other than those already identified during the construction phase. As such, changes would have already taken place for the construction and operation of the Project. Land could be returned to open space and general farming, or utilised for other industrial purposes.	Consultation would occur with the local council regarding the new use of land.	Highly unlikely/Rare	Negligible	Very Low
102	Land use	Property acquisition or tenure of land or waters during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/Rare	Minor	Very Low	N/a	N/a	Any acquisition or tenure impacts would have been identified and addressed during earlier stages of the Project, and as such there would be no further changes during decommissioning.	No mitigation measure is proposed as land acquisition will not be required during decommissioning.	Highly unlikely/Rare	Negligible	Very Low
103	Landscape & visual	Potential adverse impacts during decommissioning works on visual and/or landscape values experienced from public open space (coast) or residential areas	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/a	N/a	Decommissioning of the Project would cause similar impacts as those identified for the construction phase. Additional vessels and decommissioning equipment (cargo ships, cranes etc.) would reduce the visual amenity further. However, if the WTGs are removed entirely the visual amenity of the area would be re-established to pre-construction landscape character and amenity.	Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity once the Project is decommissioned. Landscaping and revegetation would be used to rehabilitate onshore areas.	Possible	Minor	Low
104	Marine geology, oceanography and physical processes	Changes to coastal and marine processes (such as tides, currents, water flow and wave patterns) potentially impacting on coastal land and assets, and the marine environment during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Negligible	Very Low	N/a	N/a	Decommissioning equipment is unlikely to change coastal geomorphological processes because of their temporary nature, however more hydrodynamic modelling is required to assess the risk of removing the WTGs from the Project area.	Appropriate computer modelling methods using tidal, wave and sediment modelling scenarios are required to assess hydrodynamic impacts to seafloor habitats and coastal geomorphological processes during the decommissioning phase – both inside the windfarm and further afield (near shore).	Unlikely	Negligible	Very Low
105	Marine water quality and sediment quality	Potential impacts to marine water and sediment quality during decommissioning	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/a	N/a	Turbidity/sediments - Modelling will be required to assess turbidity generated by construction and decommissioning activities. Spills - Vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants and other chemicals. These substances can have lethal and sub-lethal effects to organisms (Yuewen and Adzibli 2018) and can persist in the environment for long periods of time. An uncontrolled release could occur from (for example) vessel collision, equipment failure, leaks, etc. This risk rating is precautionary with limited understanding of the existing water quality of the waterways.	A marine pollution risk assessment will be undertaken to inform the development of spill management strategies within the DEMP. Standard chemical storage, handling and maintenance procedures will be required.	Unlikely	Minor	Low
106	Noise and vibration	Noise and/or vibration from decommissioning activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors (onshore)	Decommissioning (and site rehabilitation)	Possible	Minor	Low	N/a	N/a	Decommissioning of the onshore substation, landfall site and underground cables may cause noise and vibration impacts to nearby sensitive receptors. Some minor noise will be generated by heavy vehicles using haulage routes. Sensitive receptors within the Project area may be sensitive to noise particularly as it is likely the ambient noise level will be low given the remoteness of the coastal area.	Further noise modelling and monitoring would identify areas where noise and vibration may exceed acceptable levels for sensitive receptors. Mitigations strategies include use of noise suppression devices, noise barriers where appropriate and limiting time frames for noisy works.	Unlikely	Negligible	Very Low
107	Noise and vibration	Underwater noise and/or vibration from decommissioning activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species (offshore)	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	No	N/a	The nearest affected noise sensitive receptors for the offshore components of the Project are marine flora and fauna. Exceedance of noise and vibration from construction activities (dredging, construction of water intake structure and pipe laying) is considered possible, particularly as it is likely the ambient noise level will be low given the remoteness of the area. Taking the monopiles out of the seabed during decommissioning will be sequential, and of short duration. This would generate noises and vibrations which may cause a behavioural response in marine species up to several kilometres away (for impulsive and continuous generation of noise). However, decommissioning may need to occur seasonally to reduce interactions with listed threatened species likely to occur in the area. Noises from vessels will depend on the speed/power of travel, the type, size of vessel and the proximity of the marine species to the noise source.	Further underwater noise monitoring would identify risks and potential impacts to marine species. Mitigation measures would be incorporated into the DEMP including engaging a marine species-spotter to check there were no sensitive species in the work zone before work starts.	Possible	Moderate	Medium

IDAspectImpact descriptionProject phase				Initial Risk			Environmental effects	Significance rating	Justification for initial risk ratingPossible mitigation measures		Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	EES Referral Criteria	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
108	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	N/a	N/a	Existing port facilities will be used to support the transport and marshalling of equipment for decommissioning vessels and activities. The nearest port is the Port of Portland in close proximity to the Project. There are other ports outside the Glenleg region, including Port of Geelong located approximately 300km east of the Project area and Port of Melbourne located approximately 350km east of the Project area by roads. A suitable port or harbour would be chosen depending on proximity to the Project, water depths, tidal conditions, dedicated or shared berthing facilities, and potential opportunity to provide local employment opportunities. Decommissioning may require ports to change existing operations to accommodate an increased amount and frequency of vessels.	A future study of nearby harbour and ports will identify risks and limitations. Future stages of the project would involve engaging with local port operators and implementing mitigation measures to reduce impact to existing port operations as much as possible.	Unlikely	Minor	Low
109	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during decommissioning	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	N/a	N/a	The Project area has been selected based on its low marine traffic volumes among other criteria. Yet it may impact on shipping and navigation is expected to be low due to the short term nature and minor change in shipping routes expected during decommissioning. A desktop study is required to determine existing shipping channels that could interfere with the Project area.	Future study of shipping and navigation routes and local engagement with relevant stakeholders would inform any requirements needed to minimise impacts during decommissioning. Siting decisions should also recognise shipping lanes and operations.	Unlikely	Minor	Low
110	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc.)	Potential impact (or benefit) to local, regional or state economic development and/or economic value of land and water during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/Rare	Negligible	Very Low	N/a	N/a	Decommissioning is not expected to have an impact on regional or state economic development. There could be employment opportunities for the local community and wider region which would benefit the regional economy. This is a positive risk rating.	The decommissioning of the Project will provide benefits to the local and regional economy.	Highly unlikely/Rare	Negligible	Very Low
111	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc.)	Residential displacement, access restrictions and/or impact to community facilities, places of work, recreational uses or public open space during decommissioning	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/a	N/a	There will be no residential displacement during decommissioning. There may be some disruption to access for locals and tourism during decommissioning works. Although these decommissioning impacts would occur over a short limited duration, it has the potential to impact on recreational and commercial fisheries.	Consultation would occur with relevant stakeholders regarding decommissioning activities that may cause impacts e.g. property access, traffic controls. The environmental assessment would further identify and address community perception of the Project and determine predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a DEMP. Where usual accesses are impeded, an alternate access route would be provided.	Unlikely	Minor	Low
112	Socio-economic (incl. Tourism, Commercial fisheries, Recreational activities etc)	Disruption or impact to local or regional businesses through direct or indirect impacts during decommissioning	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	N/a	N/a	Tourism operators will likely experience decreased trade during decommissioning if certain recreational activities are restricted including swimming, surfing kitesurfing, boating and fishing. Even if there is no decrease in access or amenity for recreational activities the community may still perceive negative impacts and decide not to the travel to the Portland beaches, resulting in indirect impacts for local hotels, restaurants, cafes and retail outlets. Some fishing activities may also be restricted resulting in lower income for professional fishing businesses. However, decommissioning activities will be short term.	A Stakeholder Engagement Plan will be developed to manage the decommissioning phases of the project. Consultation would occur with coastal business owners regarding decommissioning activities that may cause impacts e.g. business access, traffic controls. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project DEMP. Where usual accesses are impeded, an alternate access route will be provided.	Likely	Minor	Medium
113	Traffic & transport (onshore)	Change to normal traffic and transport conditions during decommissioning including increased traffic, change to transport network connectivity, and change to road pavement conditions	Decommissioning (and site rehabilitation)	Possible	Minor	Low	N/a	N/a	Traffic impacts would be similar to the construction phase including increased traffic, change to transport network connectivity, and change to road pavement conditions.	A Stakeholder Engagement Plan would be developed to manage the construction phases of the Project. Consultation would occur with relevant stakeholders regarding decommissioning activities that may cause impacts e.g. property access, traffic controls. A Traffic Management Plan will be conducted to mitigate impacts to the road transport network.	Unlikely	Minor	Low
114	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	No	N/a	Decommissioning is likely to result in large amounts of waste due if dismantling of WTGs is required. Waste would include the wind turbines, foundations, sub-sea cables, meteorological masts, offshore and onshore substations and any scour materials. Decommissioning activities will require use of energy and water, and there will likely be both construction and general waste generated. If decommissioning involve the repowering or refurbishment of the WTGs, this would extend the life of offshore windfarm and reuse resources already established.	There are opportunities to minimise the generation of waste and the resources/materials sent to landfill by imbedding the waste hierarchy into early works practices to maximise resource efficiency. This could be outlined in the DEMP. All waste will be managed and disposed in accordance with the applicable Victorian regulations. Any hazardous liquid waste (i.e. oily water) will be captured and removed from site using a licensed waste contractor. There will be appropriate waste storage areas at the site during early works as required. There will be no waste disposed onsite and waste generation and disposal will be managed in accordance with the DEMP. Provisions to optimise the efficient use of water and energy during decommissioning and maximise reuse and recycling i.e. use of on-site potable water tank during site establishment and sediment pond water (non-potable) for dust suppression purposes on site. All waste will be managed and disposed/recycled in accordance with applicable Victorian regulations.	Possible	Minor	Low

Attachment A

Consequence criteria

Levels of Consequence					
Discipline	Insignificant	Minor	Moderate	High	Severe
Aboriginal Heritage (incl. underwater Aboriginal heritage)	Nil impact to Aboriginal archaeological objects or sites. No impact to intangible cultural heritage values such as contemporary sites or Dreaming Places.	Partial disturbance or removal of Aboriginal archaeological objects from one archaeological site. Intrusion on one of the following values of an intangible site – aesthetic, social, religious, historic or cultural.	Complete removal of one or more Aboriginal archaeological sites or removal of numerous objects at a number of site locations. Intrusion to more than two of the following values of an intangible site – aesthetic, social, religious, historic or cultural.	Complete removal of one of a large number of Aboriginal objects or complete removal of Aboriginal sites at many locations. Disturbance/ removal of an Aboriginal archaeological/ burial site(s) of high significance to the Aboriginal community or of high scientific significance. Intrusion to multiple values (e.g. aesthetic, social, religious, historic or cultural) of more than one intangible site.	Widespread removal of Aboriginal archaeological objects and/or sites/burials across all locations. Complete destruction of numerous sites or objects of high Aboriginal significance or high scientific significance. Complete destruction of all values (e.g. aesthetic, social, religious, historic or cultural) of more than one intangible site.
Air Quality	No, or insignificant, impact to existing air quality. Local residents unlikely to notice a change in local air quality and there is unlikely to be adverse effects on human health or the environment.	Local, short term and minor exceedance of the nominated air quality criteria. Some local residents may notice a short term minor decrease in air quality, although no adverse effects on human health or the environment are predicted.	Local, long-term minor exceedance of the nominated air quality criteria OR local, short term major exceedance of the nominated air quality criteria. Local residents will notice a decrease in air quality and there may be adverse effects on the environment. Toxic or adverse effects on human health are unlikely, however some sensitive individuals may raise complaints.	Local short term and major exceedance of the nominated air quality criteria. Without mitigation, regional and local residents will experience a short term decrease in air quality and there may be toxic or adverse effects on human health or the environment. Regulator intervention is likely and sensitive individuals are likely to raise complaints.	Local long-term and major predicted exceedance of the nominated air quality criteria. Without mitigation, regional and local residents will have their existing air quality significantly decreased, and there will be toxic or adverse effects on human health or the environment. Regulator intervention is very likely and sensitive individuals are likely to raise complaints.

Aviation and radar	No change to baseline aviation routes or impact to aviation radars.	Short term or minor change from baseline aviation and navigational settings, with changes deemed acceptable and minimal.	Permanent impacts with small to medium scale changes. Moderate short -term disruption to existing aviation operations and flight paths. Impacts relevant to decision making process.	Permanent impacts with large scale changes. Considerable or long-term disruption to existing aviation operations, flight paths and/or navigational radars. Impacts of importance to decision making process.	Permanent impacts with large scale changes. Permanent and unacceptable disruption to existing aviation operations, flight paths and/or navigational radars. Impacts of critical to decision making process.
Ecology	Minimal change to existing populations, species and communities, possibly a temporary effect within the bounds of natural variability. No measurable impacts on the extent of remnant vegetation and/or habitat.	Short term (up to one year) decrease in a population or subpopulation of a threatened species or community with no effect on the viability of the population or community. Minor loss of suitable habitat for a threatened species. Local short term decrease in some non-threatened or ecologically important species resulting in a change in local species composition and/or reduction in local biological diversity, however impact only expected to be temporary with no long term reduction in viability of the species, community or its habitat. Unlikely to effect the viability of the species.	Medium-term decrease of an important population or subpopulation of a threatened species or community, however, impact only expected to be temporary with no long-term reduction in viability of the population or community. Moderate loss of suitable habitat for threatened species but not of the extent that it affects the viability of the population or community. Regional medium-decrease in a number of non-threatened or ecologically important species resulting in change in regional species composition and/or reduction in biological diversity. Possible reduction in regional viability of some populations of threatened species.	Long-term decrease of an important population or subpopulation of a threatened species or community resulting in a possible reduction in viability of the population or community. Adverse impacts to habitat critical to the survival of the threatened species by fragmenting, modifying, destroying, removing or isolating or decreasing the availability or quality of habitat to the extent that the biological diversity of the species or community may possibly decline. Regional long-term decrease in a number of non-threatened or ecologically important species resulting in significant change in regional species composition and/or reduction in biological diversity. Reduction in regional viability of some species.	Permanent decrease of an important population or subpopulation of a threatened species or community resulting in significant reduction in viability of the population or community. Adverse impacts to habitat critical to the survival of threatened species by fragmenting, modifying, destroying, removing or isolating or decreasing the availability or quality of habitat to the extent that the biological diversity of the species or community is likely to decline. Regional permanent decrease in numerous non-threatened or ecologically important species resulting in severe change in regional species composition and/or reduction in biological diversity. Reduction in regional viability of numerous species populations.

Ground conditions and contamination	<p>Potential impacts are not important to the decision-making process. No risks to human health and/or the environment. Contamination levels may be marginally above expected background levels. Minimal to no disturbance of contaminated soils/groundwater and/or acid sulfate soils. Soils at no risk of flooding, rapid run-off and/or fragile landscapes. Limited cut and fill earthworks.</p>	<p>Potential impacts are unlikely to be of importance in the decision-making process and tend to be short term, or temporary and at a local scale. Impacts would not present a risk to human health and/or the environment. The cause would be limited to potential disturbance of minor volumes of contaminated soil/groundwater and/or disturbance to minor volumes of acid sulfate soils, that are able to be contained and treated on-site with an EPA approved Environmental Management Plan, or disposed of as prescribed waste. Contamination levels may exceed site specific risk-based environmental and/or health-based investigation levels developed in accordance with National Environment Protection Measures or other relevant guidelines, however associated impacts are easily managed. Soils are likely to be at minimal risk of erosion due to flooding, rapid run-off and/or fragile landscapes, limited vegetation clearance. Cut and fill earthworks would be minimal and are unlikely to impact the ability the Project to manage the environment in a sustainable manner.</p>	<p>Potential impacts are relevant to the decision-making process and tend to range from long term to short term and occur over medium scale or localised areas. Impacts would be limited to within the Project boundary but manageable risks to human health and/or the environment. The cause would include potential disturbance to moderate volumes of contaminated soil/groundwater and/or disturbance to moderate volumes of acid sulfate soils that are able to be treated on-site with an EPA approved Environmental Management Plan, or disposed as prescribed waste. Contamination levels are likely to exceed site specific risk-based investigation levels developed in accordance with National Environment Protection Measures or other relevant guidelines. Soils are likely to be at moderate risk of erosion and sedimentation impacts due to flooding, run-off and/or fragile landscapes and excessive vegetation clearance. Moderate scale cut and fill earthworks are likely to impact the ability of the Project to manage the environment in a sustainable manner.</p>	<p>Potential impacts are likely to be of importance to the decision-making process and tend to be permanent, or otherwise long to medium term and occur over medium scale areas. Impacts could potentially significant widespread (outside the Project boundary) risks to human health (resulting in permanent adverse health impacts) and/or the environment. The cause would include potential disturbance to large volumes of contaminated soil/groundwater and/or large volumes of acid sulfate soils. Soils are likely to be at high risk of erosion and sedimentation impacts due to flooding, run-off and/or fragile landscapes and excessive vegetation clearance. Large scale cut and fill earthworks would impact the ability of the Project to manage the environment in a sustainable manner.</p>	<p>Potential impacts are considered critical to the decision-making process and tend to be permanent, or irreversible, or otherwise long term and occur over large scale areas. Impacts would include potentially widespread (outside the Project boundary) irreversible risks to human health (potentially life-threatening) and/or environment (such as acute toxicity to receptors as defined in the National Environment Protection Measures). The cause would include potential disturbance to large volumes of contaminated soil/groundwater and disturbance to large volumes of acid sulfate soils. Soils are likely to be at very high risk of erosion and sedimentation impacts due to flooding, run-off and/or fragile landscapes and excessive vegetation clearance. Large scale cut and fill earthworks are likely to significantly change the geology and soil profile of the wider area.</p>
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Groundwater	Negligible impact at local scale or minimal change to the existing situation. No change to existing groundwater quality and/or flow (changes that are beneath levels of detection).	Impacts are recognisable or detectable but deemed acceptable. These impacts are not considered as key to decision making but are relevant when considering mitigation measures. Impacts tend to be minor, short term or temporary changes to groundwater quality and/or flow and occur at local scale. Impacts can be easily mitigated.	Impact considered relevant to decision-making process (but not likely to be key decision making issues) and tend to range from short to medium and occur over medium scale areas, or otherwise represent a significant impact at local scale. Deterioration of groundwater quality and alteration of flow in the short to medium term that can be mitigated. The quality and quantity of groundwater is changed to the extent it is unusable for its purpose without treatment and regularly exceeds water quality criteria or changes in groundwater levels and flow have an impact on groundwater users or groundwater dependant environmental receptors.	Impact is considered important to the decision-making process. Impacts tend to be permanent, ranging long term to medium term, and occur over medium scale areas. Medium term loss of groundwater quality and/or changes to levels, flow and natural recharge rates that can be mitigated only over the medium-term. The quality and quantity of groundwater is changed to the extent it is unusable for its purpose without significant treatment and regularly exceeds water quality criteria or changes in groundwater levels and flow have a significant impact on groundwater users or groundwater dependent environmental receptors.	Impact is considered critical to the decision-making process. Impacts tend to be permanent or irreversible, long term and occur over large scale areas e.g. the Murray Darling system. Long-term, major irreversible change to groundwater quality and/or levels and aquifer water levels or water quality to the extent that it is unusable for the purpose it has been protected for i.e. protection of aquatic ecosystems, recreation and aesthetics or industrial use or has significant and irreversible impact to groundwater users or groundwater dependant environmental receptors.
Human health, hazard and risk	No injury to the public is expected. Injury to workers requiring on-site treatment may be experienced, however unlikely to result in lost time. No fines or prosecutions expected. Unlikely risk of electromagnetic interference experienced by nearby sensitive receivers, fire or other hazards.	Moderate level of injury requiring offsite medical treatment and short term, however can be easily managed (i.e. spill and leaks can be easily isolated). Fines or prosecutions possible. Minor risk of electromagnetic interference experienced by nearby sensitive receivers, fire or other hazards. Risks can be easily mitigated.	Injury requiring hospitalisation or resulting in a temporary disability are likely and may result in investigations being conducted with some short time loss. Fines or prosecutions possible. Large risk of electromagnetic interference experienced by nearby sensitive receivers, fire or other hazards. Risks can be mitigated.	Member of the public or site workers suffer irreversible disability or serious injuries requiring long term hospitalisation. Fines and prosecutions likely. Large risk of electromagnetic interference experienced by sensitive receivers, fire or other hazards.	Death or serious injury to the public or site workers and the wider community. Fines and/or prosecutions incurred or expected. Significant risk of electromagnetic interference, fire or other hazards experienced by the wider region.
Historical heritage (incl. shipwrecks)	No or negligible impacts to heritage values.	Impacts to local heritage, but are acceptable.	Heritage values at a national or state level may be partially impacted, but not sufficient enough to remove heritage values.	Heritage values at a national or state level may be significantly impacted, but not sufficient enough to remove heritage values.	Heritage values of a site on the national, state or local heritage register will be removed.

Hydrology, flooding and water quality	No or negligible change to shoreline, intertidal and/ or benthic profiles. No or negligible change to hydrological regimes, flooding, water quality and regional productivity.	Short term or temporary change to shoreline, intertidal and/or benthic profiles including, localised short term or temporary change to hydrological regimes, flooding, water quality and regional productivity.	Short to medium term moderate change to shoreline, intertidal and/or benthic profiles including, localised short to medium term moderate change to hydrological regimes, flooding, water quality and regional productivity.	Medium to long term significant change to shoreline, intertidal and/or benthic profiles including, medium to long term significant change to hydrological regimes, flooding, water quality and regional productivity.	Long term irreversible change to shoreline, intertidal and/or benthic profiles including, long term irreversible change to hydrological regimes, flooding, water quality and wider productivity.
Land use	No impact on existing land uses and does not require any property acquisition. The Project element complies with all relevant legislative requirements and is consistent with government strategic planning studies.	Potential short term disruption to existing land use. Temporary limited access to properties but properties still able to be used for existing purpose. Minimal property acquisition that results in no land use changes. The Project element has minor inconsistencies with local planning policies.	Land use changes that would result in some inconsistencies with local planning policies. Moderate property acquisition that results in minimal land use changes. Temporary disruption of access to properties resulting in land use changes.	Land use changes that would result in significant inconsistencies with local planning policies. Major property acquisition required that results in some land use changes. Permanent disruption of access to properties resulting in some land use changes.	The Project cannot comply with all relevant legislative requirements and land use changes result in extensive conflict with state and local planning policies. Extensive property acquisition that results in significant land use changes. Permanent disruption of access to properties resulting in complete land use changes.
Landscape and visual	Minimal change to the existing visual amenity and/or landscape character of the area. Views tend to be of lower quality and where visual amenity is not a key feature or important to the viewer. Project would form only a small part of the view and would barely be noticeable.	Impacts are noticeable and tend to be short term, or temporary and at a local scale. Views are of high quality to a feature or landscape that are of local significance and a noticeable reduction in the visual amenity of the view and/or landscape character value is experienced by local receptors and recreational users of the coastline. Project is noticeable but would not alter the overall balance of elements that comprise the existing view. Impacts are still important in determining appropriate environmental management measures.	Impacts tend to range from long term to short term and occur over medium scale or localised areas. Views are of high quality to a feature or landscape that are of regional or localised significance and receptors are moderately sensitive. A noticeable reduction of the in the visual amenity of the view and/or landscape character value is experienced. Impacts are particularly important in determining appropriate environmental management measures.	Impacts tend to be permanent, or otherwise long to medium term and occur over medium scale areas. Views are of high quality to a feature or landscape that are of state significance and receptors are high to moderately sensitive. The Project would likely form a noticeable feature or element of the view which is readily apparent to the receptor.	Impacts tend to be permanent, or irreversible, or otherwise long term and occur over large scale areas. Views are of high quality to a feature or landscape that are of national significance and receptors are extremely sensitive and a substantial part of the view and /or landscape character value is altered.

Marine geology, oceanography and physical processes	No or negligible change to baseline marine geology, oceanography and physical processes. No detectable impact following disturbance.	Short term or temporary change to marine environment and physical processes. Temporary impact and natural recovery following disturbance.	Short to medium term change to marine environment and physical processes. Recovery in 1 to 2 years following disturbance.	Medium to long term change to marine environment and physical processes. Recovery in 3 to 10 years following disturbance.	Long term and possibly irreversible change to marine environment and physical processes. Potential recovery greater than 10 years following disturbance.
Marine water quality and sediment quality (incl. oil leaks and spills from vessels)	No or negligible change to marine water quality and/or sediment quality. No oil leaks or spills from vessel.	Short term or temporary change to marine water quality and/or sediment quality including localised short-term changes. No oil leaks or spills from vessel.	Short term to medium term change to marine water quality and/or sediment quality including localised short-term changes. Changes can be reversed promptly.	Medium to long term change to marine water quality and/or sediment quality. Increased sedimentation and/or change to sediment movement, wave patterns current and water quality due to dredging. Medium to long-term change to water quality as a result of oil leaks and spillage. Remediation required. Risk of prosecution and/or fine.	Long term change to marine water quality and/or sediment quality. Increased concentration of sediments and turbidity in the Project area including port area. Significant changes to sedimentation of seafloor. Long term changes to wave patterns current and water quality. Irreversible damage to marine environment and potential risk to human health due to spillage. Remediation required. Risk of prosecution and/or fine.

Noise and vibration (incl. underwater noise)	Minimal change to the existing situation and impacts are likely to be beneath levels of detection (at or below background). Noise and vibration from construction or operational activities are unlikely to result in impact and/or annoyance to sensitive receivers and/or local species.	Impacts are noticeable but acceptable and tend to be short term, or temporary (less than one week) and at a local scale and are relevant in determining standard environmental management measures. Noise levels are unlikely to exceed relevant guidelines and threshold criteria (at background + 5dB). Minor sensitivity of environmental receptors to impacts, with regular noise events that would cause minor annoyance. Noise and vibration from construction or operational activities which leads to a temporary (less than one week) disturbance of significant or non-significant species.	Impacts tend to range from long term to short term and occur over medium scale or localised areas and are important in the development of environmental management measures. Noise levels exceed relevant guidelines and threshold criteria (background + 10dB). Moderate sensitivity of environmental receptors to impacts, with regular noise events that would cause moderate annoyance and could be readily mitigated by the receptor (i.e. closing windows). Noise and vibration from construction or operational activities that result in temporary threshold shift or disruption to habitat, which leads to short term (less than five years) disappearance of non-significant species.	Impacts tend to be permanent, or otherwise long to medium term and occur over medium scale areas. High to moderate sensitivity of environmental receptors to impacts, with regular noise events that would cause significance annoyance / disturbance and could not be readily managed by the receptor (i.e. closing windows). Noise levels exceed relevant guidelines and threshold criteria (background + 20dB). Noise and vibration from construction or operational activities that result in mortality or permanent threshold shift (hearing damage) which leads to mortality or permanent disappearance of non-significant species or damage. Impacts may result in temporary threshold shift or disruption to habitat, leading to short term disappearance (less than five years) of nationally and state significant species or long term (greater than five years) disappearance of non-significant species.	Impacts tend to be permanent, or irreversible, or otherwise long term and occur over large scale areas. Very high sensitivity of environmental receptors to impacts, with regular noise events exceeding relevant guidelines and threshold criteria (background + 40 + 60 dB). Noise and vibration from construction or operational activities that leads to mortality and/or permanent or long-term (greater than five years) disappearance of nationally and state significant fauna.
Ports and harbours	Nil or minimal change to existing ports and harbours with impacts beneath levels of detection or within the normal bounds of variation.	Impacts are recognisable, but acceptable within the decision making process. Impacts tend to be short term, temporary or result in minor disturbance to existing operations.	Permanent impacts with small to medium scale changes. Moderate short -term disruption to existing operations. Impacts relevant to decision making process.	Permanent impacts with large scale changes. Considerable or long-term disruption to existing operations. Impacts of importance to decision making process.	Permanent impacts with large scale changes. Permanent and unacceptable disruption to existing operations. Impacts of critical to decision making process.

Shipping and navigation	No change to baseline shipping routes or navigational setting.	Short term or minor change from baseline shipping and navigational setting, with changes deemed acceptable and vessels able to adapt with minimal impact.	Long-term or moderate shift from baseline conditions leading to a partial loss or alteration to lower use navigable routes from baseline conditions i.e. shipping routes and channels used by small and medium sized vessels using coastal routes.	Major alteration or loss of strategically important shipping lanes and navigational port approaches.	Total loss or very major alteration to internationally important shipping lanes.
Socio-economic	No change to the socio-economic environment. Impacts are likely to be beneath detection levels.	Impacts are noticeable but acceptable and tend to be short term, or temporary and at a local scale. The socio-economic environment is changed (i.e. decreased amenity and way of life) and people who live and work in the area (or its surrounds) may become annoyed by impacts associated with the project. It is expected that the community can/will adapt to changes over time and positive or negative economic impacts are easily managed or absorbed.	Impacts tend to range from long term to short term and occur over medium scale or localised areas. The socio-economic environment is changed (i.e. decreased amenity and way of life) and people who live and work in the area (or its surrounds) may be moderately annoyed by impacts associated with the project. It is expected that the community has some capacity to adapt and cope with change. Moderate or medium term impacts (positive or negative) to the economy may not be easily absorbed.	Impacts tend to be permanent, or otherwise long to medium term and occur over large or medium scale areas. The socio-economic environment is damaged and people no longer want to live and work in the area (or its surrounds). The community has limited capacity to adapt and cope with change. The negative public perception of the project is difficult to manage. Major or medium term impacts (positive or negative) to the economy may not be easily absorbed.	Impacts are permanent and occur over large scale areas. The socio-economic environment is damaged, and people no longer want to live and work in the area (or its surrounds). The community is highly sensitive to change and has limited capacity to adapt. The negative public perception of the project is difficult to manage. Major impacts (positive or negative) to the economy would not be easily absorbed.
Traffic and transport (onshore)	No detectable change in a local transport operational setting.	Short term changes in a local transport operational setting. Impacts may cause initial annoyance to road users, but it is considered likely that they will adapt.	Long term but limited changes to transport operational setting that are able to be managed. Impacts likely to cause initial annoyance to road users but it is considered likely that they will adapt.	Long term, significant changes to the functioning of the transport network beyond the project area.	Long and short term changes resulting in significantly heightened road safety risk from road accidents and significant changes to the functioning of the transport network at a regional scale.