

SA Offshore Windfarm Project

Environmental Risk Assessment Framework

Rev 0 | 9 August 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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1 Introduction

1.1 Background

This environment risk assessment framework has been developed to ensure a consistent, robust and transparent approach is applied to the assessment of potential impacts as a result of the proposed South Australian (SA) Offshore Windfarm ('the Project'). 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 assessment.

The consequence criteria in **Section 2.6** and **Attachment A** has been developed by technical specialists and experienced environmental practitioners, and in consideration of the South Australian factors of environmental, social and economic significance¹.

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) significant impact criteria is also included in Attachment B.

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

Impacts are to be 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).

¹ Appendix 3 of 'Major Development Assessment South Australia's *Development Act 1993: A Practical Guide for Proponents*' (DPTI, 2017)

2.2 Application

The framework is to be applied at any stage of the Project where an environmental risk review is carried out, including for EIA scoping and the Major Project application.

The completion of a preliminary impact summary table will help provide clarity around the level of environmental assessment likely to be required for the Project, as well as to confirm the statutory approval pathway identified for the project.

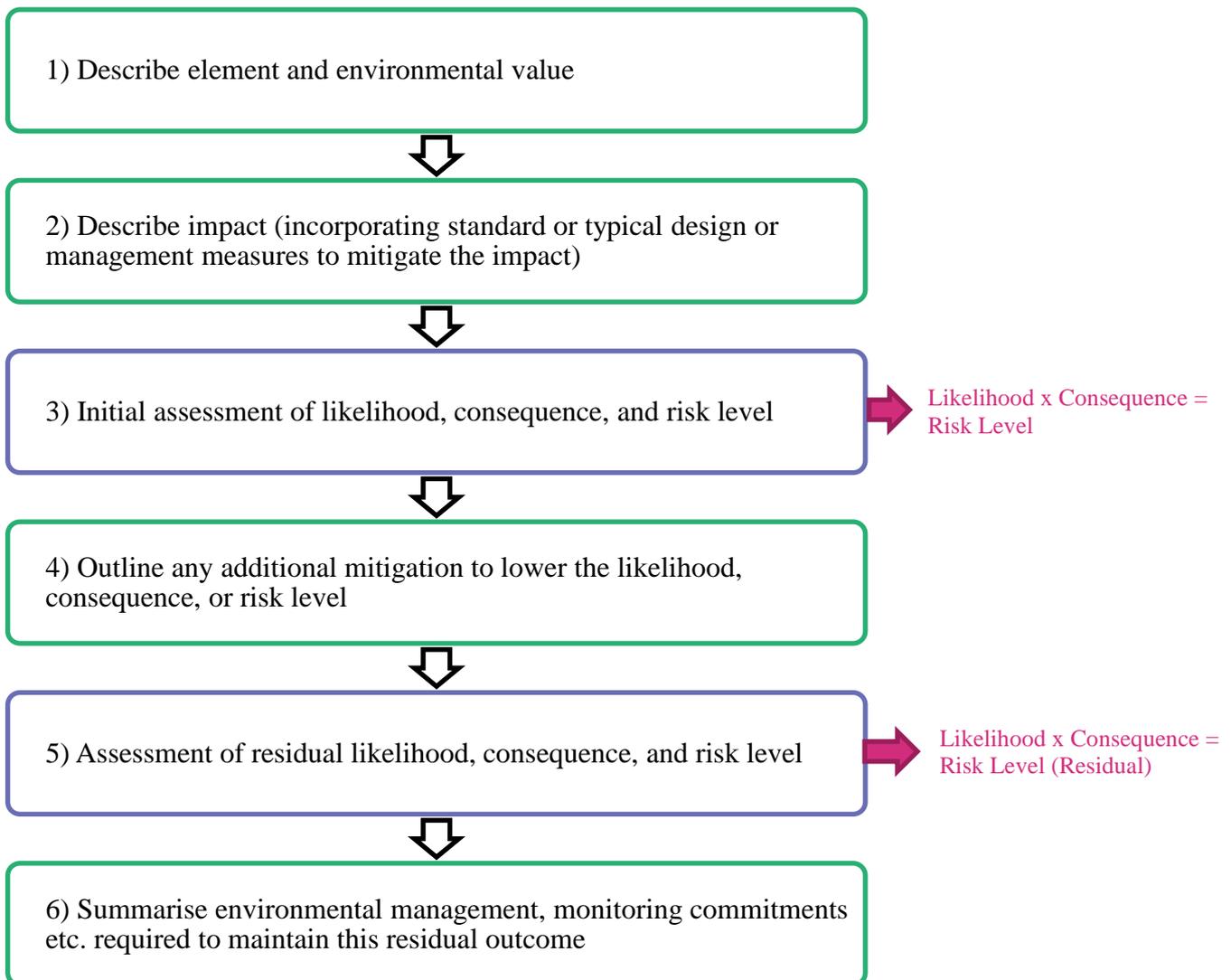


Figure 1 – Environmental impact assessment process

2.3 Risk identification

Potential impacts can be predicted by considering individual components and processes of the Project. Consideration also needs to be given to how different components and processes of the Project 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 should be considered.

2.4 Duration

Table 1 outlines the general approach to classifying timeframes. Duration is to be 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

2.5 Likelihood of impact

Table 2 is to be 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
Highly unlikely / rare	May occur only in exceptional circumstances - can be assumed not to occur during period of the Project (Probability <10%)
Unlikely	Event is unlikely to occur, but it is possible during period of the Project (Probability 10-30%)
Possible	Event could occur during period of the Project (Probability 30-70%)
Likely	Event likely to occur once or more during period of the Project (Probability 70-90%)
Almost certain	Very likely to occur as a result of the proposed Project construction and/or operations; could occur multiple times during relevant impacting period (Probability > 90%)

2.6 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 to be applied in the absence of aspect specific criteria.

Table 3 - Example significance criteria

Consequence	Criteria
Major Adverse	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.
High Adverse	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 Adverse	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 Adverse	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.
Negligible	Minimal change to the existing situation. This could include for example be 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.
Beneficial	The Project results in an improvement in the baseline situation.

2.7 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

2.8 Mitigation

Mitigation measures are to be 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.

2.9 Summary table

The structure in **Table 5** to be used as a summary of the impacts identified for the Project. A risk table is to be established in the early scoping stages of the Project, and then reviewed and refined as required at various key stages of Project development and reporting.

Note: that if an impacting process would be different in different parts of the site or for different aspects of the Project, it is to be addressed in separate rows in the table.

Table 5 - Example risk assessment table (please note – this is an example only and does not represent a completed assessment)

Risk ID	Aspect	Impact pathway	Project area	Project phase	Initial risk assessment with standard mitigation (i.e. statutory compliance) in place			Justification for risk rating	Possible additional mitigation measures	Residual risk assessment with additional mitigation in place (i.e. those actions recommended as part of the impact assessment)		
					Likelihood	Consequence	Risk rating			Likelihood	Consequence	Risk rating

Attachment A

Consequence criteria

Levels of Consequence					
Discipline	Negligible	Minor	Moderate	High	Major
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.

<p>Aviation and radar (incl. EMI)</p>	<p>No change to baseline aviation routes or impact to aviation radars.</p>	<p>Short term or minor change from baseline aviation and navigational settings, with changes deemed acceptable and minimal.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>
<p>Ecology</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>

<p>Ground conditions and contamination</p>	<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, hazards and risk (incl. EMF, Fire, Human health, etc)	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.

<p>Marine geology, oceanography and physical processes</p>	<p>No or negligible change to baseline marine geology, oceanography and physical processes. No detectable impact following disturbance.</p>	<p>Short term or temporary change to marine environment and physical processes. Temporary impact and natural recovery following disturbance.</p>	<p>Short to medium term change to marine environment and physical processes. Recovery in 1 to 2 years following disturbance.</p>	<p>Medium to long term change to marine environment and physical processes. Recovery in 3 to 10 years following disturbance.</p>	<p>Long term and possibly irreversible change to marine environment and physical processes. Potential recovery greater than 10 years following disturbance.</p>
<p>Marine water quality and sediment quality (incl. oil leaks and spills from vessels)</p>	<p>No or negligible change to marine water quality and/or sediment quality. No oil leaks or spills from vessel.</p>	<p>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.</p>	<p>Short term to medium term change to marine water quality and/or sediment quality including localised short-term changes. Changes can be reversed promptly.</p>	<p>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.</p>	<p>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.</p>

<p>Noise and vibration (incl. underwater noise)</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>
<p>Ports and harbours</p>	<p>Nil or minimal change to existing ports and harbours with impacts beneath levels of detection or within the normal bounds of variation.</p>	<p>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.</p>	<p>Permanent impacts with small to medium scale changes. Moderate short -term disruption to existing operations. Impacts relevant to decision making process.</p>	<p>Permanent impacts with large scale changes. Considerable or long-term disruption to existing operations. Impacts of importance to decision making process.</p>	<p>Permanent impacts with large scale changes. Permanent and unacceptable disruption to existing operations. Impacts of critical to decision making process.</p>

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 (incl. Tourism, Commercial fisheries, Recreational activities, etc)	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.

Waste and resources	No inefficiencies in resource use and waste generated by the project is negligible.	Inefficient use of resources that will impact local resource supply and generation of some waste for a short period.	Inefficient use of resources that will impact local resource supply for a short to medium period, with impacts present at either a local or wider level. Generation of some unnecessary waste for a short-medium period.	Very inefficient use of resources that will impact local resource supply for a long period. Generation of large amounts of unnecessary waste for a long period.	Very inefficient use of resources that will impact resources supply for life of the project. Generation of large amounts of unnecessary waste for the life of the project.
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Attachment B

EPBC Significance Criteria – which apply to the Project

Matter of National Environmental Significance	Significant impact criteria
Listed threatened species and ecological communities	
Extinct in the wild species	<p>An action is likely to have a significant impact on extinct in the wild species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> • adversely affect a captive or propagated population or one recently introduced/reintroduced to the wild; or • interfere with the recovery of the species or its reintroduction into the wild.
Critically endangered and endangered species	<p>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> • lead to a long-term decrease in the size of a population • reduce the area of occupancy of the species • fragment an existing population into two or more populations • adversely affect habitat critical to the survival of a species • disrupt the breeding cycle of a population • modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline • result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat • introduce disease that may cause the species to decline; or • interfere with the recovery of the species
Vulnerable species	<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> • lead to a long-term decrease in the size of an important population of a species • reduce the area of occupancy of an important population • fragment an existing important population into two or more populations • adversely affect habitat critical to the survival of a species

	<ul style="list-style-type: none"> • disrupt the breeding cycle of an important population • modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline • result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat • introduce disease that may cause the species to decline; or • interfere substantially with the recovery of the species.
<p>Critically endangered and endangered ecological communities</p>	<p>An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> • reduce the extent of an ecological community • fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines • adversely affect habitat critical to the survival of an ecological community • modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns • cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting • cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: <ul style="list-style-type: none"> ○ assisting invasive species, that are harmful to the listed ecological community, to become established; or ○ causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or • interfere with the recovery of an ecological community
<p>Listed migratory species</p>	
	<p>An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:</p>

	<ul style="list-style-type: none"> • substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species • result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or • seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.
The Commonwealth marine environment	
	<p>An action is likely to have a significant impact on the environment in a Commonwealth marine area if there is a real chance or possibility that the action will:</p> <ul style="list-style-type: none"> • result in a known or potential pest species becoming established in the Commonwealth marine area • modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth marine area results • have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution • result in a substantial change in air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity; social amenity or human health • result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected; or • have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of an historic shipwreck.

Project Name: SA Offshore Wind Farm - Preliminary Environmental Risk Review

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ID	Aspect	Impact description	Project phase	Initial Risk				Justification for initial risk rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	EPBC Significance rating	Inherent Risk 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	Prior to European settlement, the Coorong was one of the most densely populated areas in Australia, with the Traditional Owners, the Meintangk people, who were members of the Ngarrindjeri people having lived there for thousands of years. The Coorong remains an intrinsic part of their culture, spirituality and identity. The Project site is within the area of a Native Title claim by First Nations of the South East #1 (SAD211/2017), which covers all land within the study area to a point 500m seaward of the Mean Low Water Mark and the Ngarrindjeri and Others Native Title Claim (SAD6027/1998) which covers the Coorong and Kingston district area. 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 Native Title claimants and local Aboriginal groups will be carried out to confirm cultural heritage values within the construction footprint and project areas. A 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	Prior to European settlement, the Coorong was one of the most densely populated areas in Australia, with the Traditional Owners, the Meintangk people, who were members of the Ngarrindjeri people having lived there for thousands of years. The Coorong remains an intrinsic part of their culture, spirituality and identity. The Project site is within the area of a Native Title claim by First Nations of the South East #1 (SAD211/2017), which covers all land within the study area to a point 500m seaward of the Mean Low Water Mark and the Ngarrindjeri and Others Native Title Claim (SAD6027/1998) which covers the Coorong and Kingston district area. Desktop assessments have not been able to identify culturally sensitive sites and consultation with Aboriginal representatives is required. If present, there is a risk that construction activities could temporarily restrict access to some culturally sensitive sites.	Engagement with Native Title claimants and local Aboriginal groups 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	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	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. A preliminary land use assessment indicates 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 programmes 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.	Possible	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	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest commercial airport being Mount Gambier Airport approx. 130km away. Kingston airport, owned by Kingston District Council, is located adjacent to the Project area, and is used for emergency services and handling regional flights to a number of destinations; including Adelaide and Mount Gambier. Scenic flights over the Coorong National Park form part of the local tourism industry. Scenic flights depart from Strathalbyn, north of the Coorong. However, 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.	Unlikely	Negligible	Very Low
5	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)	Possible	Moderate		Medium	Kingston airport, owned by Kingston District Council, is located adjacent to the Project area, and is used for emergency services and handling regional flights to a number of destinations; including Adelaide and Mount Gambier. Scenic flights over the Coorong National Park form part of the local tourism industry. Scenic flights depart from Strathalbyn, north of the Coorong. 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, emergency and scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during construction.	Possible	Minor	Low
6	Aviation and radar (incl. EMI)	EMI during pre-construction and construction works impacting local television and radio	Construction (incl. pre-construction)	Possible	Minor		Medium	Telstra owns a digital TV transmitter located approximately 38 km south of the Southern Ports Hwy at Mount Benson, which services the Kingston SE/Robe area. There is currently a 87.6 FM Low Powered transmitter located at Kingston SE within the Project area. LPFM or Low power FM transmitters generally range between 50-1000 watts. While the TV transmitter is a fair distance, interference to radio transmitters would need to be investigated further. Tower and blades could obstruct, reflect or refract the electromagnetic waves. The degree and nature of the interference will depend on: - The location of the wind turbine between receiver and transmitter. - Characteristics of the rotor blades. - Characteristics of receiver. - Signal frequency. - The radio wave propagation in the local atmosphere.	Technical mitigation measures on radio interference can be applied during the planning stage, siting the turbine away from line-of-sight of the broadcaster transmitter or applying appropriate construction methodologies. Future study of potential electromagnetic interferences is required to inform design and reduce impacts of radio signal.	Unlikely	Minor	Low
7	Ecology - State benthic and marine	Potential impact on South Australian listed or threatened benthic or marine species and communities, or their habitat	Construction (incl. pre-construction)	Likely	Moderate		Medium	Listed or threatened: There are nine South Australian <i>National Parks and Wildlife Act 1972</i> (NPW Act) listed Marine species known or likely to occur within the Project area. These include five whale species, three turtle species and Australian Sea Lion (<i>Neophoca cinerea</i>). Non-threatened: There are eight species listed under the <i>Fisheries Management Act 2007</i> that may be present in the Project area. These include the Southern Rock Lobster and Abalone. The Project sits within areas significant to the Southern Rock Lobster (<i>Jasus edwardsii</i>) population. The study area is also part of the southern zone of the South Australia Abalone Fishery. There are up to 26 species of seadragon and pipefish known to occur within the region. Broad-scale Seemap benthic habitat mapping identifies almost half of the study area as low profile reef with macroalgae. Areas outside the site but within the study area contain a mosaic of seagrass meadows, reefs (notably Margaret Brock and North Reefs) and unconsolidated substrate. The reefs within the study area support the most western extent of giant kelp (<i>Macrocystis angustifolia</i>) and bull kelp (<i>Durvillea potatorum</i>).	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 Construction Environmental Management Plan. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.	Possible	Minor	Low

8	Ecology - State terrestrial	Potential impact on South Australian species and communities, or their habitat	Construction (incl. pre-construction)	Possible	Moderate		Medium	<p>Listed or threatened: There are seven non-migratory bird species within the Project area. There are potentially a total of 27 flora and 33 fauna NPW listed threatened species known or likely within/surround the Project area including areas of work such as the Black Range substation (Option 1), Reedy-Ck-Lucindale Rd (Option 2) and the potential corridors for transmission lines from the Black Range Substation to the South East Substation.</p> <p>Non-threatened: The Coorong, and Lakes Alexandrina and Albert Wetlands System (Ramsar wetland), are adjacent to the marine boundary 20km west of the land-based section of the Project area. While the boundary does not directly intersect this region, there are several wetland features that continue along the coast that intersect with regions that are likely to be inhabited by the same species that would be present within the Ramsar site. The inland environment consists of ephemeral wetland networks which provide habitat to several species requiring freshwater habitats for foraging and breeding. Some of these high environmental values include parts of the southern extend of the Watervalley Wetlands. There is potential for the powerline corridor (Black range and Reedy Ck-Lucindale Rd) to clear, fragment and interrupt existing habitat associated with the wetlands. In addition, the existing corridor that heads south to the south east substation may require widening and may impact a number of forestry, conservation and protected 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 Construction Environmental Management Plan. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.	Possible	Minor	Low
9	Ecology - State migratory birds	Potential impact on South Australian listed migratory birds, or their habitat	Construction (incl. pre-construction)	Possible	Moderate		Medium	<p>There are potentially 23 bird species (not all migratory) of SA listed threatened species known or likely within/surround the Project area including areas of work such as the Black Range substation (Option 1), Reedy-Ck-Lucindale Rd (Option 2) and the potential corridors for transmission lines from the Black Range Substation to the South East Substation. Many of these species are already listed at a Commonwealth level under the EPBC Act, however there are 14 migratory bird species within or adjacent to the Project area that are listed on the NPW Act. There are also threatened NPW Act listed non-migratory populations known to occur within the area. There is potential for the East Asian-Australasian Flyway to be present in the Project area during the summer period. It is unlikely that construction activities would interact with any threatened and/or migratory birds however further assessment is required to plan for placement of offshore and onshore infrastructure. Marine birds may be exposed to noise impacts from piling when diving.</p> <p>The Coorong, and Lakes Alexandrina and Albert Wetlands System (Ramsar wetland), are adjacent to the marine boundary 20km west of the land-based section of the Project area. While the boundary does not directly intersect this region, there are several wetland features that continue along the coast that intersect with regions that are likely to be inhabited by the same species that would be present within the Ramsar site. The inland environment consists of ephemeral wetland networks which provide habitat to several species requiring freshwater habitats for foraging and breeding. Some of these high environmental values include parts of the southern extend of the Watervalley Wetlands. There is potential for the powerline corridor (Black range and Reedy Ck-Lucindale Rd) to clear, fragment and interrupt existing habitat associated with the wetlands. In addition, the existing corridor that heads south to the south east substation may require widening and may impact a number of forestry, conservation and protected 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 Construction Environmental Management Plan. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided. additional controls may be required on seasonality of work as to not disturb nesting and or foraging behaviour of some of these species if the areas of habitat can not be avoided.	Possible	Minor	Low
10	Ecology - EPBC listed ecological communities	Potential impact on Commonwealth listed communities, or their habitat	Construction (incl. pre-construction)	Likely	Major	Yes	Very High	<p>The EPBC listed threatened ecological community Giant Kelp Marine Forests of South East Australia have the potential to occur within the study area. The reef within the study area support the westner extent of giant kelp and bulk kelp, which are both EPBC listed. Further site surveys will be required to confirm their presence.</p> <p>There are potentially 2 Terrestrial TEC new connection Black Range substation (Option 1) that are likely and or are known in the Project area. There are 2 known TECs including Seasonal herbaceous Wetlands (freshwater) of the temperate lowland plains (Critically Endangered) and Subtropical and temperate Coastal Saltmarsh (Vulnerable).</p> <p>Within the new connection Reedy Ck- Lucindale Rd (Option 2) that are likely and or are known in the Project area. There are 1 known TECs including Seasonal herbaceous Wetlands(freshwater) of the temperate lowland plains.</p>	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 will be avoided and no-go-zones applied. If impact is unavoidable, other options will be explored such as biodiversity offsetting and other management measures. <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.</p>	Possible	Moderate	Medium
11	Ecology - EPBC migratory species (terrestrial)	Potential impact on Commonwealth listed migratory species, or their habitat	Construction (incl. pre-construction)	Possible	Moderate	Yes	Medium	<p>There are 37 EPBC listed threatened species known or likely within/surround the Project area including areas of work such as the Black Range substation (Option 1), Reedy-Ck-Lucindale Rd (Option 2) and the potential corridors for transmission lines from the Black Range Substation to the South East Substation.</p> <p>There are thirteen EPBC listed migratory bird species known or likely to occur within the Project area. There are eleven EPBC threatened listed bird species. Four of these species are listed as Critically Endangered. It is unlikely that construction activities would interact with any threatened and/or migratory birds however further assessment is required to plan for placement of offshore and onshore infrastructure. Marine birds may be exposed to noise impacts from piling when diving.</p> <p>Furthermore, The Coorong, and Lakes Alexandrina and Albert Wetlands System (Ramsar wetland), are adjacent to the marine boundary 20km west of the land-based section of the Project area. While the boundary does not directly intersect this region, there are several wetland features that continue along the coast that intersect with regions that are likely to be inhabited by the same species that would be present within the Ramsar site. The inland environment consists of ephemeral wetland networks which provide habitat to several species requiring freshwater habitats for foraging and breeding. Some of these high environmental values include parts of the southern extend of the Watervalley Wetlands. There is potential for the powerline corridor (Black range and Reedy Ck-Lucindale Rd) to clear, fragment and interrupt existing habitat associated with the wetlands. In addition, the existing corridor that heads south to the south east substation may require widening and may impact a number of forestry, conservation and protected area.</p> <p>The impact is considered to be a significant impact under the EPBC criteria because the Project is likely to modify, destroy, fragment, isolate or disturb important areas of habitat that would have an adverse impact on the marine ecosystem functioning.</p>	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. 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.	Possible	Minor	Low
12	Ecology - EPBC migratory species (marine)	Potential impact on Commonwealth listed migratory birds, or their habitat	Construction (incl. pre-construction)	Possible	Moderate	Yes	Medium	<p>There are 13 EPBC listed threatened Marine species known or likely to occur within the Project area. These include six whale species, three turtle species, Dusky Dolphin, Porbeagle and White Shark. There are also two seadragon species listed under the EPBC Act as 'marine' species, leafy seadragon (Phycodurus eques) and weedy seadragon (Phyllopteryx taeniolatus) known to occur within the region.</p> <p>The impact is considered to be a significant impact under the EPBC criteria because the Project is likely to modify, destroy, fragment, isolate or disturb important areas of habitat that would have an adverse impact on the marine ecosystem functioning.</p>	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. 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.	Possible	Minor	Low
13	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Construction (incl. pre-construction)	Almost Certain	High	No	High	<p>Commonwealth waters are outside the Project area but within the study area. Bonney Coast Upwelling is listed as a Key Ecological Feature of the Commonwealth Marine area MNES. Further design considerations of the turbine location once studies have been completed if there is potential to adjust the pile locations to avoid areas of high ecological value.</p> <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.</p> <p>Unexpected infrastructure interfaces would be identified during design development and construction planning through Dial-Before-You-Dig (DBYD) searches and ground surveys. Hard interfaces will be identified early for pro-active management and engagement with third-parties.</p> <p>Refer to 'Ports and harbours' for risk of potential impacts to existing port assets.</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.	Likely	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)	Likely	High	Yes	High	<p>The Department for Environment and Water (DEW) Acid Sulfate Soil Potential mapping (2009) shows some areas within the study area have up to and more than a 60% chance of Acid Sulfate Soils being present. Agricultural and other previous disturbance and lands uses within the study area have potentially resulted in soil contamination. 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. Spoil and excavated material is expected to be generated during construction, particularly for the underground components (cable bays and u/g cables). In line with the South Australian <i>Environment Protection (Waste to Resources) Policy 2010</i>, it is proposed that spoil and material be assessed for reuse on-site. This would require stockpiling on-site in the interim.</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 South Australian EPA <i>Guideline for stockpile management</i> (2020), which would reduce risk.	Possible	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	Minor		Medium	<p>The Department for Environment and Water (DEW) Wind Erosion Potential mapping (2009) shows some areas (mainly along the coast) have a high to extreme wind erosion potential, with most areas mapped as having a moderately low to Low wind erosion potential. Construction will require excavation and some land cover and vegetation clearance, having the potential to impact on soils, drainage patterns and surface water quality.</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.	Unlikely	Moderate	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	<p>The Department for Environment and Water (DEW) Wind Erosion Potential mapping (2009) shows some areas (mainly along the coast) have a high to extreme wind erosion potential, with most areas mapped as having a moderately low to Low wind erosion potential. Construction will require excavation and some land cover and vegetation clearance, having the potential to impact on soils, drainage patterns and surface water quality.</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.	Unlikely	Minor	Low

17	Groundwater	Impacts to ground water quality during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Moderate	Medium	The Project would be located in the Murray Groundwater Basin, with some transmission infrastructure also potentially located in the Otway Basin, both of which are classified as shallow sedimentary ground water basins. The Department for Environment and Water (DEW) Depth to Water Table mapping (2009) shows a range of water table depths within the study area, from some areas where the water table is above the surface for more than 10 months to others where the water table is greater than 200cm below the surface. 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	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.	Possible	Minor	Low
18	Groundwater	Impacts to ground water levels or flow during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Moderate	Medium	The Project would be located in the Murray Groundwater Basin, with some transmission infrastructure also potentially located in the Otway Basin, both of which are classified as shallow sedimentary ground water basins. Excavation of the landfill site (transition pit) and other onshore transmission infrastructure may also extend below the groundwater level. Local dewatering may be necessary to manage groundwater inflows to excavation. It is considered unlikely that lowering the water tables temporarily would have a long-term impact on groundwater flows however, a precautionary risk rating has been given. The Department for Environment and Water (DEW) Recharge Potential mapping (2009) shows most areas within the study area have a recharge potential of more than 60%, with few areas having less than 30%.	Appropriate management of temporary dewatering and groundwater control would be included in the CEMP, including recharge back to aquifer down gradient if required	Possible	Minor	Low
19	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	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.	Unlikely	Minor	Low
20	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	Moderate	Low	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.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/rare	High	Low
21	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	The Project is not located in a designated Bushfire Protection Area, as brought in under the Ministerial Bushfire Management Plan Amendment Report in 2006/2007. However, the DEW Last Fire mapping (2021) shows bushfires have recently occurred in the region, including the Blackford bushfire (Jan 2021) and the Kerilira bushfire (2019). Construction works may increase risk of fire and bushfire 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
22	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	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 PPE being provided to construction workers.	Highly unlikely/rare	Moderate	Low
23	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	Major	High	Offshore wind project presents unique risks to construction workers because of the nature of offshore construction (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 construction sites on and offshore will be restricted.	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
24	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	There are no Commonwealth listed heritage places or sites within the study areas or surrounds. There are a number of State-listed shipwrecks mapped in Lacedpede Bay, and surrounds, the closest being approximately 3km from the nearest turbine. There are also a number of State heritage places and local culture heritage assets mapped in the area. These are namely buildings.	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
25	Hydrology, flooding and water quality	Potential impacts to surface water quality during pre-construction and construction works (onshore)	Construction (incl. pre-construction)	Possible	High	Medium	There are a number of wetland complexes mapped in the area, some falling within the study area. Some of the wetlands in the area are mapped as Priority Wetland Complexes LUT- Lower Limestone Coast PWA - Water Allocation Plan 2010 (DEW). There are also a number of wetland of international importance outside the study area in the region, including the Coorong, and Lakes Alexandrina and Albert wetland (Ramsar site). 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 SA 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 drier periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Unlikely	High	Medium
27	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)	Almost Certain	Moderate	High	The onshore section of the Project area covers approximately 1,800 km2 and intersects various land uses zoned by the Kingston District Council. Outside of the Town of Rosetown and Kingston S.E, the majority of the Project area is within a Rural Zone, with small pockets of Conservation Zone, namely along the coastline. The construction of the Project (namely ancillary sites) would be significantly inconsistent with these planning zones. This is a precautionary risk rating. As the design of the Project progresses the Project area will be further refined and would exclude/avoid residential areas. Project infrastructure, such as the transmission line connecting to the electricity network, would look to utilise existing electricity easements or other infrastructure corridors as much as practicable.	Further assessment will identify specific land use impacts and in particular, any impacts to property. Further design development will aim to reduce land use impacts by refining the Project area and construction boundary to avoid sensitive land uses. Consultation with local council and other stakeholders will take place during detailed design, to ensure impacts are managed and appropriate consideration is given to future developments planned in the area. Management measures will be included in the CEMP, including ancillary sites to be rehabilitated to their pre-construction condition.	Likely	Minor	Medium
28	Land use	Property acquisition or tenure of land or waters during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	Currently a wide corridor is being investigated for the landfill site and 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. The landfill site would be located landward of the mean high-water mark (MHW) on land suitable to accommodate an underground joint pit. The transmission infrastructure is anticipated to be predominately above ground. Existing electricity easements and other infrastructure corridors would be utilised as much as practicable to minimise impact. Onshore ancillary infrastructure associated with the Project includes operation and maintenance facilities comprising a control room, site offices, storage facilities, and personnel facilities. These will be sited remote to the Project area. Key construction activities would be carried out within state waters, including the transport of monopile foundations by supply vessels, piling works, and seabed excavation for installation of offshore cables. For onshore construction, acquisition of freehold land is unknown. 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 consultation with the SA Government will determine key risks and impacts to acquiring access to State waters for offshore construction. The Project will be developed in accordance with the Coastal Adaptation Strategy, that applies to the Project area.	Possible	Moderate	Medium
29	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)	Almost Certain	Moderate	High	The natural landscape of Kingston District Council, being a major recreational (e.g. fishing) and recreation and tourism node (wine-making), is highly valued by the local, regional and state community. The construction equipment and activities will likely form a noticeable feature on the landscape that is currently untouched oceans views. However, potential impacts to landscape and visual amenity associated with construction phase are considered to be of a temporary nature. The site itself was selected being of the lower population density of the area, to reduce impacts as much as possible. The WTG have been indicatively placed as far off the coast (approximately as possible) to reduce visual impacts.	Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity at various viewpoints along the coastline and residential areas. Landscaping and revegetation would be used to minimise onshore impacts.	Almost Certain	Moderate	High
30	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)	Unlikely	Negligible	Very Low	At this coastal location, tides and tidal currents, waves, wave-driven currents, and wave current interaction would determine the driving condition for sediment movement. The Coorong Region is classified as microtidal with a tidal range of 0.7m from lowest to highest astronomical tide. Tides are predominantly semi-diurnal, with a single tide cycle on most days. 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.	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 wind farm and further afield (near shore).	Unlikely	Negligible	Very Low

31	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	<p>Water quality - Seagrass meadows are a good indicator of water quality; previous monitoring of quality of the seagrass meadows within the Coorong found a number of drains were impacted by an excess of nutrient runoff (Wear et al 2006). Overall, soluble and total nutrient levels are relatively low throughout Coorong, with impact on seagrass meadows potentially a result of the recovery time of Posidonia species during episodic high rainfall events. Pressures that may result in increased nutrients within the area include discharge from agricultural drains, urban stormwater and septic tank leakage. Construction/decommissioning activities are likely to increase these levels.</p> <p>Turbidity/sediments - Modelling will be required to assess turbidity generated by construction and decommissioning activities. Pile driving or dredging to install cabling in clean sands is expected to generate a short-term, low intensity sediment plume. Any blasting of rock will also release sediments into the water column, creating a temporary turbid plume. It is likely that the plume would dissipate rapidly and would be unlikely to impact on adjacent light sensitive habitats or impede fauna vision.</p> <p>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.</p> <p>If trenching is required there may be significant disturbance to the seabed and will likely increase turbidity of the water and reduce clarity dependent on the method of trenching deployed. The water quality will be impacted with in the immediate region and potentially further a field dependent on the strength of the current movements. Adjacent to the site is the Giant Kelp TEC, this community may become impacted by increased turbidity and have residual effects of smothering in the wider region.</p>	A marine pollution risk assessment will be undertaken to inform the development of spill management strategies for the CEMP. Standard chemical storage, handling and maintenance procedures will be required. Further studies are required to understand the benthic substrates. Where possible look to minimise disturbance of the seabed where possible and apply methods that would minimise the dispersion of the sediment. Also controls should be in place to limit works if the currents will move the sediment outside the Project area.	Unlikely	Moderate	Low
32	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	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, with the nearest town being Kingston SE. Area surrounding Kingston SE is largely rural and therefore it is expected that noise impacts may be minimal further afield. 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
33	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	Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, with boating only limited to recreational fishing and crayfishing in the area, indicating that background noise levels are likely to also be low. Port Adelaide is the closest main port, located approximately 300 km to the north west. 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. This work would inform stop work distance and be implemented in general accordance with the Underwater Piling Noise Guidelines (Government of South Australia, 2012) and other internationally best practice guidelines. 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
34	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Construction (incl. pre-construction)	Likely	Moderate	Medium	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 Adelaide Port, about 300 km by road north west of the Project area. There are other ports in the area including Port Giles on the eastern side of Yorke Peninsula, located approximately 500 km north west of Kingston SE. 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	Moderate	Medium
35	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Minor	Low	Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, with boating only limited to recreational fishing and crayfishing in the area. Risks to shipping and navigation are expected to be low due to the short term nature and minor change in shipping routes expected during construction. Desktop assessment indicates that no existing shipping channels that interfere with the Project area, however there are some cargo ships using the surrounding study area to travel to Ports situated in north west, including Port Adelaide. Changes to navigation and shipping routes would be acceptable and vessel would easily adapt with minimal impact.	A future study of shipping and navigation routes, including engagement with local fisheries and port operators, would inform of any requirements to minimise impacts during construction.	Highly unlikely/rare	Negligible	Very Low
36	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	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. Opportunities for this would be further explored throughout the planning and development process.	Highly unlikely/rare	Negligible	Very Low
37	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)	Likely	Moderate	Medium	Although residential displacement and access to community facilities is unlikely to be impacted, the community's access to recreational and open space will be restricted during construction. Kingston SE is a major recreational node and popular tourist destination along the south coast of South Australia. The beaches at Kingston SE, including Wyomi Beach and Pink Beach are utilised by local residents and tourists for recreational activities such as swimming, kite/wind surfing, surfing, sailing, boating and fishing. The rocky outcrops of the continental shelf are frequently used for recreational rock lobster fishing from November to June each year. Considering the recreational assets of the Project area are highly valued by the community this may cause frustration and angst among the local residents. However, construction is expected to take 24 months and therefore these impacts to access will be short term.	Consultation with PIRSA is required to understand the importance of the study area to the Southern Rock Lobster, how the construction of wind towers might affect the population, and whether any compensation might be required if access is impacted. Further, a Stakeholder Engagement Plan will be developed to manage the construction phases of the project. Consultation would occur with the community regarding construction activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. 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 Construction Environmental Management Plan. Further stages of design will consider staging construction to avoid the peak fishing season (e.g. November-June) where feasible. Where usual accesses are impeded, an alternate access route will be provided if it is safe to do so.	Likely	Minor	Medium
38	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	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 Kingston SE 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 a positive note, construction works would also bring more people to the town for work and therefore could 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
39	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	Moderate	Medium	The traffic generated during site establishment and construction could cause temporary delays due to insufficient road capacity, particularly during the delivery of large plant and equipment. The road links and intersections within the study area will be assessed to determine whether they can accommodate the additional traffic generated during construction (including heavy vehicles, haulage vehicles and staff access). There may be an increased risk of road accidents due to a higher level of traffic (including slow moving vehicles) on the road. Given limited detail of construction schedule and timing, a precautionary initial risk rating was given.	A Traffic Management Plan is likely to be required to mitigate impacts to the road transport network. The TMP will be prepared in consultation with local road managers, Council and business and property owners.	Likely	Minor	Medium

40	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	Early works activities will require the use of energy and water and there will be some waste products (including general waste) generated. Given the limited construction details, such as resource and waste management during works, means a precautionary initial risk rating was given. There would be limited wastewater produced during early works activities.	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. 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. All waste will be managed and disposed/recycled in accordance with applicable South Australian 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 area's at the site during early works (as required). There will be no waste disposed onsite and waste generation/disposal will be managed in	Unlikely	Minor	Low
Operation and maintenance (incl. testing and commissioning)												
41	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	Prior to European settlement, the Coorong was one of the most densely populated areas in Australia, with the Traditional Owners, the Meintangk people, who were members of the Ngarrindjeri people having lived there for thousands of years. The Coorong remains an intrinsic part of their culture, spirituality and identity. The Project site is within the area of a Native Title claim by First Nations of the South East #1 (SAD211/2017), which covers all land within the study area to a point 500m seaward of the Mean Low Water Mark and the Ngarrindjeri and Others Native Title Claim (SAD6027/1998) which covers the Coorong and Kingston district area. 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 Native Title claimants and local Aboriginal groups will be carried out to confirm cultural heritage values within the construction footprint and project areas. A 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.	Unlikely	Moderate	Low
42	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	Prior to European settlement, the Coorong was one of the most densely populated areas in Australia, with the Traditional Owners, the Meintangk people, who were members of the Ngarrindjeri people having lived there for thousands of years. The Coorong remains an intrinsic part of their culture, spirituality and identity. The Project site is within the area of a Native Title claim by First Nations of the South East #1 (SAD211/2017), which covers all land within the study area to a point 500m seaward of the Mean Low Water Mark (MLWM) and the Ngarrindjeri and Others Native Title Claim (SAD6027/1998) which covers the Coorong and Kingston district area. It is unknown whether any culturally sensitive sites exist in the Project area, however the Project has the potential to alter landforms permanently and this may impact on the Aboriginal cultural value of the area. This is a precautionary risk rating due the unknown existing environment and the potential long-term impact the Project could have if culturally sensitive landforms are identified within the Project area.	Engagement with Native Title claimants and local Aboriginal groups 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	Moderate	Medium
43	Air quality	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)	Highly unlikely/rare	Negligible		Very Low	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.	Operation will need to comply with EPA performance requirements, and any standards and licences for air emissions. Air quality monitoring programmes and equipment could be used determine when activities need to be altered to reduce emissions.	Highly unlikely/rare	Negligible	Very Low
44	Aviation and radar (incl. EMI)	Interference to civil and military radar during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/rare	Negligible		Very Low	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest commercial airport being Mount Gambier Airport approx. 130km away). However, Kingston airport, owned by Kingston District Council, is located adjacent to the Project area, and is used for emergency services. Further, Scenic flights over the Coorong form part of the local tourism industry.	A future radar impact assessment would inform of any requirements to minimise impacts during operation.	Highly unlikely/rare	Negligible	Very Low
45	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	Kingston airport, owned by Kingston District Council, is located adjacent to the Project area, and is used for emergency services and handling regional flights to a number of destinations; including Adelaide and Mount Gambier. Scenic flights over the Coorong National Park form part of the local tourism industry. Scenic flights depart from Strathalbyn, north of the Coorong. Obstruction to scenic flight paths could be possible due to the Wind Turbine Generators (WTGs) and would be further investigated and determined.	A future study of scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during operation.	Possible	Minor	Low
46	Aviation and radar (incl. EMI)	EMI during operation and maintenance impacting local television and radio	Operation and maintenance (incl. testing and commissioning)	Possible	Minor		Low	Interference to local television and radio is not expected during operation. 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
47	Ecology - State benthic and marine	Potential impact on South Australian benthic or marine species and communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	High		High	The Project area potentially intersects with marine species habitat, migration routes and feeding areas. The turbine structures may impact migration patterns and feeding grounds, resulting in habitat displacement and altered movement patterns. Further, responses to electrical fields can include behavioural changes (attacking on the source of the field), physiological changes, and effects to the ability to orientate. Listed or threatened: There are nine South Australian <i>National Parks and Wildlife Act 1972</i> (NPW Act) listed Marine species known or likely to occur within the Project area. These include five whale species, three turtle species and Australian Sea Lion (<i>Neophoca cinerea</i>). Non-threatened: There are eight species listed under the <i>Fisheries Management Act 2007</i> that may be present in the Project area. These include the Southern Rock Lobster and Abalone. The Project sits within areas significant to the Southern Rock Lobster (<i>Jasus edwardsii</i>) population. The study area is also part of the southern zone of the South Australia Abalone Fishery. There are up to 26 species of seadragon and pipefish known to occur within the region. Broad-scale Seemap benthic habitat mapping identifies almost half of the study area as low profile reef with macroalgae. Areas outside	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. 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. Laying of unshielded cables directly on the seafloor will be avoided as priority. This will need to consider exposure and sensitivity of receptors most be exposed to EMF (i.e. benthic invertebrates such as lobsters, abalone and crabs, and demersal (bottom living fish) and marine fauna living overlying water column (e.g. most sharks, fish, marine mammals).	Likely	Moderate	Medium
48	Ecology - State terrestrial	Potential impact on South Australian species and communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate		Medium	The Project area is likely to be transverse by migratory bird species, including species listed under the EPBC Act. There is risk of birds colliding with WTG rotors, resulting in injury or death. Birds may also avoid areas near the rotors, resulting in habitat displacement and altered movement patterns. At most risk are large pelagic seabirds, which feed in offshore waters and, being slow fliers, may be unable to evade the moving rotors. For shorebirds, as the WTGs will be located offshore, the Project will avoid nearshore areas commonly frequented by shorebirds. There are seven non-migratory bird species within the Project area. Once the wind farm is operational a few impact risk remain including with the collision/ entanglement risk with powerlines, maintenance clearing and bush fire risk. Additional terrestrial dominate EPBC listed species are also present from the coastal reaches of the site in land. A number of these migratory bird species may move out along the coast as they migrate before coming inland. The turbines may interfere with migratory paths and behaviour. The Project area is likely to be traversed by migratory bird species, including species listed under the EPBC Act. There is risk of birds colliding with WTG rotors, resulting in injury or death. Birds may also avoid areas near the rotors, resulting in habitat displacement and altered movement patterns.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to WTG tower height and flight paths of critically endangered or threatened birds and their relative movement patterns.	Possible	Minor	Low
49	Ecology - State migratory birds	Potential impact on South Australian listed migratory birds, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	High		High	The Project area is likely to be transverse by migratory bird species, including species listed under the EPBC Act. There is risk of birds colliding with WTG rotors, resulting in injury or death. Birds may also avoid areas near the rotors, resulting in habitat displacement and altered movement patterns. At most risk are large pelagic seabirds, which feed in offshore waters and, being slow fliers, may be unable to evade the moving rotors. For shorebirds, as the WTGs will be located offshore, the Project will avoid nearshore areas commonly frequented by shorebirds. There are 14 migratory bird species within or adjacent to the Project area that are listed on the NPW Act. There is potential for the East Asian-Australasian Flyway to be present in the Project area during the summer period. Additional terrestrial dominates EPBC listed species are also present from the coastal reaches of the site in land. A number of these migratory bird species may move out along the coast as they migrate before coming inland. The turbines may interfere with migratory paths and behaviour. Once the wind farm is operational a few impact risk remain including with the collision/ entanglement risk with powerlines, maintenance, clearing and bush fire risk.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to WTG tower height and flight paths of critically endangered or threatened birds and their relative movement patterns.	Likely	Moderate	Medium
50	Ecology - EPBC listed ecological communities	Potential impact on Commonwealth listed communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	High	Yes	High	The EPBC listed threatened ecological community Giant Kelp Marine Forests of South East Australia have the potential to occur within the study area. The reef within the study area support the western extent of giant kelp and bulk kelp, which are both EPBC listed. Further site surveys will be required to confirm their presence. Turbine tower operation may pose some impact to these communities. There is the potential for the TEC Giant Kelp Marine Forests of South East Australia to occur within the study area. Further site investigations are required to determine if the ecological community occurs and if so, whether it may be disturbed. It is most likely to occur around the Margaret Brock Reef area where conditions are most suited to the presence of giant kelp. Currently no turbines are planned in this location. Margaret Brock Reef is at the further western range of the TEC and forms only a small area of the total extent of the community. Provided turbines and cabling can avoid direct disturbance to habitat likely to support the TEC, the action is unlikely to have a	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. 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.	Likely	Moderate	Medium

51	Ecology - EPBC migratory species (terrestrial)	Potential impact on Commonwealth listed migratory species, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	Major	Yes	High	The Project area is likely to be transverse by migratory bird species, including species listed under the EPBC Act. There is risk of birds colliding with WTG rotors, resulting in injury or death. Birds may also avoid areas near the rotors, resulting in habitat displacement and altered movement patterns. At most risk are large pelagic seabirds, which feed in offshore waters and, being slow fliers, may be unable to evade the moving rotors. For shorebirds, as the WTGs will be located offshore, the Project will avoid nearshore areas commonly frequented by shorebirds. There are 13 migratory bird species in the project area that are listed on the EPBC Act. There are also 11 threatened EPBC listed non-migratory populations known to occur within the area. Furthermore, The Coorong, and Lakes Alexandrina and Albert Wetlands System (Ramsar wetland), are adjacent to the marine boundary and within 20km of the land-based section of the Project area. While the boundary does not directly intersect this region, there are several wetland features that continue along the coast that intersect with regions that are likely to be inhabited by the same species that would be present within the Ramsar site. The inland environment consists of ephemeral wetland networks which provide habitat to several species requiring freshwater habitats for foraging and breeding. Some of these high environmental values include parts of the southern extend of the Watervally Wetlands. There is potential for the powerline corridor (Black range and Reedy Ck-Lucindale Rd) to clear, fragment and interrupt existing habitat associated with the wetlands. In addition, the existing corridor that heads south to the south east substation may require widening and may impact a number of forestry, conservation and protected area.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to WTG tower height and flight paths of critically endangered or threatened birds and their relative movement patterns.	Unlikely	Major	Medium
52	Ecology - EPBC migratory species (marine)	Potential impact on Commonwealth listed migratory birds, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	Major	Yes	Very High	The Project area potentially intersects with marine species habitat, migration routes and feeding areas. The turbine structures may impact migration patterns and feeding grounds, resulting in habitat displacement and altered movement patterns. Further, responses to electrical fields can include behavioural changes (attacking on the source of the field), physiological changes, and effects to the ability to orientate. There are 13 EPBC listed threatened Marine species known or likely to occur within the Project area. These include six whale species, three turtle species, Dusky Dolphin, Porbeagle and White Shark. There are also two seadragon species listed under the EPBC Act as 'marine' species, leafy seadragon (<i>Phycodurus eques</i>) and weedy seadragon (<i>Phyllopteryx taenialatus</i>) known to occur within the region. The impact is considered to be a significant impact under the EPBC criteria because the Project is likely to modify, destroy, fragment, isolate or disturb important areas of habitat that would have an adverse impact on the marine ecosystem functioning.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. 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. Laying of unshielded cables directly on the seafloor will be avoided as priority to minimise exposure and sensitivity of benthic invertebrates such as lobsters, abalone and crabs and demersal (bottom living fish) and marine fauna living overlying water column (e.g. most sharks, fish, marine mammals).	Likely	High	High
53	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Operation and maintenance (incl. testing and commissioning)	Almost Certain	High	No	High	The operation of the Project is likely to have impact on Commonwealth Marine Areas and associated industries such as fisheries. Commonwealth waters are outside the Project area but within the study area. Bonney Coast Upwelling is listed as a Key Ecological Feature of the Commonwealth Marine area MNES.	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. Laying of unshielded cables directly on the seafloor will be avoided as priority to minimise exposure and sensitivity of benthic invertebrates such as lobsters, abalone and crabs and demersal (bottom living fish) and marine fauna living overlying water column (e.g. most sharks, fish, marine mammals).	Likely	Moderate	Medium
54	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor		Low	After construction, operational impacts to existing infrastructure will remain unchanged. Refer to 'Ports and harbours' for risk of potential impacts to existing port assets.	Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during operation.	Unlikely	Minor	Low
55	Ground conditions and contamination	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during operation and maintenance leading to potential risks to public health and the environment	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor		Low	Operation of the Project is not expected to change ground conditions or generate risks related to contamination.	A contamination assessment would establish baseline indicators of material at site, which would be used to inform management and disposal of spoil. Spoil from any maintenance earthworks would be reused on-site where possible or disposed of in accordance with South Australian EPA <i>Guideline for stockpile management</i> (2020), which would reduce risk.	Unlikely	Negligible	Very Low
56	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)	Possible	Minor		Low	Operation of the Project has the potential to result in contamination of soils due to any spills and leaks of fuel, oils and other hazardous materials. The potential for contamination as a result of operation and general maintenance activities is considered to be low and manageable.	An OEMP (Operational Environment Management Plan) would establish management measures 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	Negligible	Low
57	Groundwater	Impacts to ground water quality during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate		Medium	The Project would be located in the Murray Groundwater Basin, with some transmission infrastructure also potentially located in the Otway Basin, both of which are classified as shallow sedimentary ground water basins. The Department for Environment and Water (DEW) Depth to Water Table mapping (2009) shows a range of water table depths within the study area, from some areas where the water table is above the surface for more than 10 months to others where the water table is greater than 200cm below the surface. Shallower water depths, and those above the surface, have a higher risk of local ground water quality being impacted during maintenance. Local ground water quality may deteriorate through turbidity, salinity, colour, odour, temperature, nutrients or pollutants such as chemicals and materials required during maintenance. However deep excavation extending below regional groundwater level is unlikely to occur during operation and therefore risks of impact is low. Further investigation to ground-truth water depths and quality	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 during the operation phase. Early installation of drainage controls and erosion and sedimentation monitoring during early project stages would assist in managing and mitigating impacts to land processes during operation and maintenance. Standard construction/maintenance management measures in accordance with the SA EPA requirements. Maintenance during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Possible	Minor	Low
58	Groundwater	Impacts to ground water levels or flow during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	Moderate		Medium	The Project would be located in the Murray Groundwater Basin, with some transmission infrastructure also potentially located in the Otway Basin, both of which are classified as shallow sedimentary ground water basins. Lowering of water table is not required during operation. Further, it is unlikely that there would be changes to infiltration during operation, thereby groundwater flow and distribution are unlikely to be impacted. Further investigation to ground-truth water depths and quality and local uses of groundwater will be undertaken.	Appropriate management of temporary dewatering and groundwater control would be included in the OEMP, including recharge back to aquifer down gradient if required	Possible	Minor	Low
59	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)	Possible	Moderate		Medium	The storage and handling of dangerous goods and hazardous materials have the potential to impact operational workers and the surrounding environment if leaks and spills occur, resulting in the potential contamination of air, soils, surface water, and/or groundwater.	Standard management measures such as storage of dangerous goods in accordance with the relevant guidance would be included in the OEMP and would reduce potential risks.	Unlikely	Minor	Low
60	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	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 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.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/rare	High	Low
61	Human health, Hazards and risks (incl. EMF, Fire, Human health, etc)	Potential for fire and increased bushfire risk during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate		Low	The Project is not located in a designated Bushfire Protection Area, as brought in under the Ministerial Bushfire Management Plan Amendment Report in 2006/2007. However, the DEW Last Fire mapping (2021) shows bushfires have recently occurred in the region, including the Blackford bushfire (Jan 2021) and the Kerilira bushfire (2019). Operational and maintenance works may increase risk of fire and bushfire from accidental ignition from equipment, fuels and chemicals.	Standard management measures 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
62	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	Climate induced risks include increased dust generation during drier 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 maintenance workers.	Highly unlikely/rare	Moderate	Low
63	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	Offshore wind project presents unique risks to construction workers because of the nature of offshore construction (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 construction sites on and offshore will be restricted.	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 maintenance workers.	Unlikely	Moderate	Low

64	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)	Unlikely	Moderate	Low	There are no Commonwealth listed heritage places or sites within the study areas or surrounds. There are a number of State-listed shipwrecks mapped in Lacedpede Bay and surrounds, the closest being approximately 3km from the nearest turbine. There are also a number of State heritage places and local culture heritage assets mapped in the area. These are namely buildings.	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
65	Hydrology, flooding and water quality	Potential impacts to surface water quality during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	There are a number of wetland complexes mapped in the area, some falling within the study area. Some of the wetlands in the areas are mapped as Priority Wetland Complexes LUT- Lower Limestone Coast PWA - Water Allocation Plan 2010 (DEW). There are also a number of wetland of international importance outside the study area in the region, including the Coorong, and Lakes Alexandrina and Albert wetland (Ramsar site). 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	High	Medium
66	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)	Highly unlikely/rare	Negligible	Very Low	The onshore section of the Project area covers approximately 1,800 km2 and intersects various land uses zoned by the Kingston District Council. Around half of the onshore project area is zoned for Conservation/Protection, currently used for general farming and regional open space. Changes to land use would occur during construction, and as such there would be no further land use impacts during operation.	Not Applicable	Highly unlikely/rare	Negligible	Very Low
67	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	Currently a wide corridor is being investigated for the landfill site and 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. The landfill site would be located landward of the mean high-water mark (MHW) on land suitable to accommodate an underground joint pit. The transmission infrastructure is anticipated to be predominately above ground. Existing electricity easements and other infrastructure corridors would be utilised as much as practicable to minimise impact. Any acquisition or tenure changes would occur during construction, and as such there would be no further changes during operation.	Not Applicable	Highly unlikely/rare	Negligible	Very Low
68	Landscape & visual	Potential adverse impacts during operation and maintenance 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	Although onshore infrastructure is adjacent to some existing infrastructure the offshore WTGs will create permanent change to the landscape character and visual amenity of Kingston SE. The natural landscape of Kingston District Council, being a major recreational (e.g. fishing) and recreation and tourism node (wine-making), is highly valued by the local, regional and state community. The WTGs will likely form a noticeable feature on the landscape that is currently untouched oceans views. The site itself was selected being of the lower population density of the area, to reduce impacts as much as possible. The WTG have been indicatively placed as far off the coast (approximately as possible to reduce visual impacts). The landscape character of the surrounding area holds ecological, scientific and social significance to the community. Accordingly, impacts to landform is considered to be significant. Potential impacts to the local landscape are considered to be of permanent nature due to the expected long duration of the project lifespan (up to 60 years in operation phase).	Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity at various viewpoints along the coastline and residential areas. Landscaping and revegetation would be used to minimise onshore impacts.	Almost Certain	High	High
69	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	Minor	Low	At this coastal location, tides and tidal currents, waves, wave-driven currents, and wave current interaction would determine the driving condition for sediment movement. The Coorong Region is classified as microtidal with a tidal range of 0.7m from lowest to highest astronomical tide. Tides are predominantly semi-diurnal, with a single tide cycle on most days. The permanent marine structures (e.g. turbine foundations, array spacing and sea bed cable connections) could alter local hydrodynamic processes. These impacts are likely to be associated with localised scour in the immediate vicinity of the structures, and potentially scour around cables could occur if care is not taken to secure adequate protection during and after laying. The presence of the windfarm is unlikely to be significant in the far-field with only small influences in the near field. It is expected that localised scour would be more pronounced during operation due to the permanent nature of turbine structures and cables.	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 wind farm and further afield (near shore).	Possible	Minor	Low
70	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	Water quality - Seagrass meadows are a good indicator of water quality; previous monitoring of quality of the seagrass meadows within the Coorong found a number of drains were impacted by an excess of nutrient runoff (Wear et al 2006). Overall, soluble and total nutrient levels are relatively low throughout Coorong, with impact on seagrass meadows potentially a result of the recovery time of Posidonia species during episodic high rainfall events. Pressures that may result in increased nutrients within the area include discharge from agricultural drains, urban stormwater and septic tank leakage. Operation and maintenance activities may increase these levels. Turbidity/sediments - Operational activities should not create any plumes, therefore there is unlikely to be an operational impacts on turbidity/sediment. 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.	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.	Possible	Minor	Low
71	Noise and vibration	Noise and/or vibration from operation and maintenance activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors (onshore)	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	Maintenance of the onshore substation, landfill 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, with the nearest town being Kingston SE. Area surrounding Kingston SE is largely rural and therefore it is expected that noise impacts may be minimal further afield.	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
72	Noise and vibration	Underwater noise and/or vibration from operation and maintenance activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species (offshore)	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, with boating only limited to recreational fishing and crayfishing in the area, indicating that background noise levels are likely to also be low. Port Adelaide is the closest main port, located approximately 300 km to the north west. 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 very 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	Major	High
73	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	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 Adelaide Port, about 300 km by road north west of the Project area. There are other ports in the area including Port Giles on the eastern side of Yorke Peninsula, located approximately 500 km north west of Kingston SE. 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
74	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, with boating only limited to recreational fishing and crayfishing in the area. Risks to shipping and navigation are not expected during operation, and will be very limited during maintenance activities. Desktop assessment indicates that no existing shipping channels that interfere with the Project area, however there are some cargo ships using the surrounding study area to travel to Ports situated in north west, including Port Adelaide. Any changes to navigation and shipping routes would be acceptable and vessel would easily adapt with minimal impact.	A future study of shipping and navigation routes, including engagement with local fisheries and port operators, would inform of any requirements to minimise impacts during operation and maintenance.	Highly unlikely/rare	Negligible	Very Low

75	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	Operation and maintenance 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. Opportunities for this would be further explored throughout the planning and development process.	Highly unlikely/rare	Negligible	Very Low
76	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 operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	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 beaches at Kingston SE, including Wyomi Beach and Pink Beach are utilised by local residents and tourists for recreational activities, including fishing. The rocky outcrops of the continental shelf are frequently used for recreational rock lobster fishing from November to June each year. Considering the recreational assets of the Project area are highly valued by the community this may cause frustration and angst among the local residents. On a positive note, operation works would also bring more people to the town for work and therefore could contribute to the local economy of the area.	A Stakeholder Engagement Plan will be developed for all the phases of the Project. Consultation would occur with the community regarding maintenance and operational activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a Project OEMP. Further stages of design will consider staging maintenance activities to avoid the peak fishing season (e.g. Nov-June) where feasible. Where usual accesses are impeded, an alternate access route will be provided if it is safe to do so.	Likely	Moderate	Medium
77	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	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 actual decrease in access or amenity for recreational activities the community may still perceive negative operational stage impacts and decide not to travel to the Kingston SE 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
78	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	Negligible	Very Low	Operation and maintenance will generate negligible operational traffic. Existing road networks will accommodate any additional traffic generated.	A Traffic Management Plan will be prepared in consultation with local road managers, Council and business and property owners.	Unlikely	Negligible	Very Low
79	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)	Possible	Minor	Low	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.	Opportunities to minimise the generation of waste and the resources/materials sent to landfill include imbedding the waste hierarchy into overarching project planning to maximise resource efficiency. All waste will be managed and disposed/recycled in accordance with applicable South Australian 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 area's at the site during operation and maintenance (as required). There will be no waste disposed onsite or offshore.	Unlikely	Minor	Low

Decommissioning (and site rehabilitation)

80	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	Low	Prior to European settlement, the Coorong was one of the most densely populated areas in Australia, with the Traditional Owners, the Meintangk people, who were members of the Ngarrindjeri people having lived there for thousands of years. The Coorong remains an intrinsic part of their culture, spirituality and identity. The Project site is within the area of a Native Title claim by First Nations of the South East #1 (SAD211/2017), which covers all land within the study area to a point 500m seaward of the Mean Low Water Mark and the Ngarrindjeri and Others Native Title Claim (SAD6027/1998) which covers the Coorong and Kingston district area. It is not likely Aboriginal sites and objects would be affected during decommissioning as all ground disturbance activities would occur during site establishment and construction work.	Engagement and site walkovers with Native Title claimants and local Aboriginal groups will be carried out to confirm cultural heritage values within the project areas. A Cultural Heritage Management Plan (CHMP) will be prepared to outline measures for the management and protection of Aboriginal cultural heritage.	Unlikely	Moderate	Low
81	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)	Possible	Moderate	Medium	Prior to European settlement, the Coorong was one of the most densely populated areas in Australia, with the Traditional Owners, the Meintangk people, who were members of the Ngarrindjeri people having lived there for thousands of years. The Coorong remains an intrinsic part of their culture, spirituality and identity. The Project site is within the area of a Native Title claim by First Nations of the South East #1 (SAD211/2017), which covers all land within the study area to a point 500m seaward of the Mean Low Water Mark and the Ngarrindjeri and Others Native Title Claim (SAD6027/1998) which covers the Coorong and Kingston district area. Desktop assessments have not been able to identify culturally sensitive sites and consultation with Aboriginal representatives is required. If present, there is a risk that decommissioning activities could temporarily restrict access to some culturally sensitive sites.	Engagement with Native Title claimants and local Aboriginal groups 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
82	Air quality	Generation of air emissions and dust from decommissioning impacting on sensitive receptors and local air quality	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	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. A preliminary land use assessment indicates 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 programmes 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
83	Aviation and radar (incl. EMI)	Interference to civil and military radar during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/rare	Negligible	Very Low	Interference to aircraft or radars is not expected during decommissioning. Where necessary, changes to flight routes will have been established during earlier phases of the Project.	A future radar impact assessment would inform of any requirements to minimise impacts during decommissioning.	Highly unlikely/rare	Negligible	Very Low
84	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during decommissioning	Decommissioning (and site rehabilitation)	Possible	Minor	Low	Obstruction to scenic flight paths could be possible during de-construction of the Wind Turbine Generators (WTGs) and would be further investigated and determined. As scenic flights 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
85	Aviation and radar (incl. EMI)	EMI during decommissioning impacting local television and radio	Decommissioning (and site rehabilitation)	Possible	Minor	Low	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
86	Ecology - State benthic and marine	Potential impact on South Australian benthic or marine species and communities, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	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. Listed or threatened: There are nine South Australian <i>National Parks and Wildlife Act 1972</i> (NPW Act) listed Marine species known or likely to occur within the Project area. These include five whale species, three turtle species and Australian Sea Lion (<i>Neophoca cinerea</i>). Non-threatened: There are eight species listed under the <i>Fisheries Management Act 2007</i> that may be present in the Project area. These include the Southern Rock Lobster and Abalone. The Project sits within areas significant to the Southern Rock Lobster (<i>Jasus edwardsii</i>) population. The study area is also part of the southern zone of the South Australia Abalone Fishery. There are up to 26 species of seadragon and pipefish known to occur within the region. Broad-scale Seemap benthic habitat mapping identifies almost half of the study area as low profile reef with macroalgae. Areas outside the site but within the study area contain a mosaic of seagrass meadows, reefs (notably Margaret Brock and North Reefs) and unconsolidated substrate. The reefs within the study area support the most western extent of giant kelp (<i>Macrocystis angustifolia</i>) and bull kelp (<i>Durvillea potatorum</i>).	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 in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Minor	Low
87	Ecology - State terrestrial	Potential impact on South Australian species and communities, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Decommissioning works are not expected to have a large impact on terrestrial species. The risk rating is precautionary until further assessment on decommissioning methods are developed. Listed or threatened: There are seven non-migratory bird species within the project area. There are potentially a total of 27 flora and 33 fauna NPW listed threatened species known or likely within/surround the Project area including areas of work such as the Black Range substation (Option 1), Reedy-Ck-Lucindale Rd (Option 2) and the potential corridors for transmission lines from the Black Range Substation to the South East Substation. Non-threatened: The Coorong, and Lakes Alexandrina and Albert Wetlands System (Ramsar wetland), are adjacent to the marine boundary. While the boundary does not directly intersect this region, there are several wetland features that continue along the coast that intersect that are likely to be inhabited by the same species that would be present within the Ramsar site. The inland environment consists of ephemeral wetland networks which provide habitat to several species requiring freshwater habitats for foraging and breeding. Removal of supporting infrastructure on land is mostly above ground and will have likely have minimal impact on the species present.	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 in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Minor	Low

88	Ecology - State migratory birds	Potential impact on South Australian listed migratory birds, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate		Medium	There are 13 migratory bird species in or within the Project area that are listed on the NPW Act. There are also threatened NPW Act listed non-migratory populations known to occur within the area. There is potential for the East Asian-Australasian Flyway to be present in the Project area during the summer period. It is unlikely that decommissioning activities would interact with any threatened and/or migratory birds however further assessment is required to plan for placement of offshore and onshore infrastructure. Marine birds may be exposed to noise impacts from piling when diving. Desktop studies do not identify impacts that would have a significant impact on migratory species under the EPBC significance criteria. Decommissioning is not expected to substantially modify or fragment species distribution, result in increase invasive species or	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 in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Minor	Low
89	Ecology - EPBC listed ecological communities	Potential impact on Commonwealth listed communities, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Yes	Medium	The EPBC listed threatened ecological community Giant Kelp Marine Forests of South East Australia have the potential to occur within the study area. The reef within the study area support the westner extent of giant kelp and bulk kelp, which are both EPBC listed. Further site surveys will be required to confirm their presence. The impact is considered to be a significant impact under the EPBC criteria because the Project is likely to modify, destroy, fragment, isolate or disturb important areas of habitat that would have an adverse impact on the marine ecosystem functioning. Decommissioning may impact new communities that have formed around the base of the turbines and along the underground cable networks in the seabed. On land Rehabilitation work should include native vegetation communities that were originally cleared and or the historic vegetation communities and ensure habitat is suitable for species the would inhabit the region also weed/ pest control will be required to ensure the success of the rehabilitation efforts.	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 in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided. 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 cable, as these will likely be removed during decommissioning.	Possible	Minor	Low
90	Ecology - EPBC migratory species (terrestrial)	Potential impact on Commonwealth listed migratory species, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Yes	Medium	There are thirteen EPBC listed migratory bird species known or likely to occur within the Project area. There are eleven EPBC threatened listed bird species. Four of these species are listed as Critically Endangered. It is unlikely that decommissioning activities would interact with any threatened and/or migratory birds however further assessment is required to plan for placement of offshore and onshore infrastructure. Marine birds may be exposed to noise impacts from piling when diving. Desktop studies do not identify impacts that would have a significant impact on migratory species under the EPBC significance criteria. Decommissioning is not expected to substantially modify or fragment species distribution, result in increased invasive species or seriously disrupt the lifecycle. There are a total of 37 EPBC listed threatened species known or likely within the Project area including areas of work such as the Black Range substation (Option 1), Reedy-Ck-Lucindale Rd (Option 2) and the potential corridors for transmission lines from the Black Range Substation to the South East Substation. On land Rehabilitation work should include native vegetation communities that were originally cleared and or the historic vegetation communities and ensure habitat is suitable for species that would inhabit the region also weed/ pest control will be required to ensure	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 in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided. 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 cable, as these will likely be removed during decommissioning.	Possible	Minor	Low
91	Ecology - EPBC migratory species (marine)	Potential impact on Commonwealth listed migratory birds, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Yes	Medium	There are 13 EPBC listed threatened Marine species known or likely to occur within the Project area. These include six whale species, three turtle species, Dusky Dolphin, Porbeagle and White Shark. There are also two seadragon species listed under the EPBC Act as 'marine' species, leafy seadragon (<i>Phycodurus eques</i>) and weedy seadragon (<i>Phyllopteryx taeniolatus</i>) known to occur within the region. The impact is considered to be a significant impact under the EPBC criteria because the Project is likely to modify, destroy, fragment, isolate or disturb important areas of habitat that would have an adverse impact on the marine ecosystem functioning.	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, as these will likely be removed during decommissioning.	Possible	Minor	Low
92	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Decommissioning (and site rehabilitation)	Possible	Moderate	No	Medium	Commonwealth waters are outside the Project area but within the study area. Bonney Coast Upswelling is listed as a Key Ecological Feature of the Commonwealth Marine area MNES. At present, no direct physical disturbance of the Commonwealth marine area is proposed, however indirect impacts may potentially occur as a result of spills, cable removal, the introduction of pest species or changes to hydrodynamics. With appropriate controls in place, these impacts are considered to be a low risk, which is localised. They are unlikely to have a 'substantial' or 'persistent' adverse impact on the Commonwealth marine environment. Impacts to Commonwealth Marine Areas is expected to be Not Significant.	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 in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Minor	Low
93	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Minor		Low	Unexpected infrastructure interfaces would be identified earlier in the Project.	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
94	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	Refer to 'Ports and harbours' for risk of potential impacts to existing port assets The Department for Environment and Water (DEW) Acid Sulfate Soil Potential mapping (2009) shows some areas within the study area have up to and more than a 60% chance of Acid Sulfate Soils being present. Agricultural and other previous disturbance and lands uses within the study area have potentially resulted in soil contamination. The potential for Acid Sulfate Soils and contaminated land within the construction footprint would be ascertained much earlier during the Project. Spoil and excavated material is expected to be generated during decommissioning, particularly for the underground components (cable bays and u/g cables). In line with the South Australian <i>Environment Protection (Waste to Resources) Policy 2010</i> , it is proposed that spoil and material be assessed for reuse on-site. This would require stockpiling on-site in the interim.	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 SA 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 South Australian EPA <i>Guideline for stockpile management</i> (2020), which would reduce risk.	Unlikely	Moderate	Low
95	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)	Likely	Minor		Medium	The Department for Environment and Water (DEW) Wind Erosion Potential mapping (2009) shows some areas (mainly along the coast) have a High to extreme wind erosion potential, with most areas mapped as having a moderately low to Low wind erosion potential. Decommissioning will require excavation and some land cover and vegetation clearance, having the potential to impact on soils, drainage patterns and surface water quality.	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 DEMP 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
96	Groundwater	Impacts to ground water quality during decommissioning	Decommissioning (and site rehabilitation)	Likely	Moderate		Medium	Refer to 'Hydrology, flooding and water quality' for potential impacts to fresh water resources environment The Project would be located in the Murray Groundwater Basin, with some transmission infrastructure also potentially located in the Otway Basin, both of which are classified as shallow sedimentary ground water basins. 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.	Early installation of drainage controls and erosion and sedimentation monitoring during decommissioning 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 DEMP.	Possible	Minor	Low
97	Groundwater	Impacts to ground water levels or flow during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Moderate		Low	The Project would be located in the Murray Groundwater Basin, with some transmission infrastructure also potentially located in the Otway Basin, both of which are classified as shallow sedimentary ground water basins. Decommissioning activities are unlikely to impact the groundwater table, as onshore works will likely be highly limited.	Appropriate management of temporary dewatering and groundwater control would be included in the DEMP, including recharge back to aquifer down gradient if required	Unlikely	Minor	Low
98	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	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 management measures such as storage of dangerous goods in accordance with the relevant guidance would be included in the DEMP and would reduce potential risks.	Unlikely	Minor	Low
99	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	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 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.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/rare	High	Low
100	Human health, Hazards and risks (incl. EMF, Fire, Human health, etc)	Potential for fire and increased bushfire risk during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Moderate		Low	The Project is not located in a designated Bushfire Protection Area, as brought in under the Ministerial Bushfire Management Plan Amendment Report in 2006/2007. However, the DEW Last Fire mapping (2021) shows bushfires have recently occurred in the region, including the Blackford bushfire (Jan 2021) and the Kerilira bushfire (2019). Decommissioning works may increase risk of fire and bushfire from accidental ignition from equipment, fuels and chemicals.	Standard 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
101	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	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 DEMP and would reduce the impact on the Project, including adequate training and PPE being provided to construction workers.	Highly unlikely/rare	Moderate	Low

102	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	Offshore wind project presents unique risks to construction workers because of the nature of offshore construction (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 construction sites on and offshore will be restricted.	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	Moderate	Low
103	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	Heritage impacts are unlikely during the decommissioning phase. There are no Commonwealth listed heritage places or sites within the study areas or surrounds. There are a number of State-listed shipwrecks mapped in Lacedpede Bay, and surrounds, the closest being approximately 3km from the nearest turbine. There are also a number of State heritage places and local culture heritage assets mapped in the area.	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
104	Hydrology, flooding and water quality	Potential impacts to surface water quality during decommissioning	Decommissioning (and site rehabilitation)	Possible	High	Medium	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 SA 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	Unlikely	High	Medium
105	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)	Unlikely	Minor	Low	The onshore section of the Project area covers approximately 1,800 km2 and intersects various land uses zoned by the Kingston District Council. Around half of the onshore project area is zoned for Conservation/Protection, currently used for general farming and regional open space. Changes to land use would occur during construction, and as such there would be no further land use impacts during decommissioning. 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.	Management measures will be included in the DEMP, including ancillary sites to be rehabilitated to their pre-construction condition.	Highly unlikely/rare	Minor	Very Low
106	Land use	Property acquisition or tenure of land or waters during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Minor	Low	Issues relating to land acquisition and tenure will have been addressed during earlier stages of the Project. Decommissioning activities are unlikely to have an impact.	Consultation with the state government and local councils will be required during planning and executing of the decommissioning phase.	Highly unlikely/rare	Minor	Very Low
107	Landscape & visual	Potential adverse impacts during decommissioning on visual and/or landscape values experienced from public open space (coast) or residential areas	Decommissioning (and site rehabilitation)	Almost Certain	High	High	Decommissioning would have similar impacts to those identified during construction i.e. temporary. Although onshore infrastructure is adjacent to some existing infrastructure, the offshore WTGs will create permanent change to the landscape character and visual amenity of Kingston. The natural landscape of Kingston District Council, being a major recreational (e.g. fishing) and recreation and tourism node (wine-making), is highly valued by the local, regional and state community. The WTGs and construction equipment will likely form a noticeable feature on the landscape that is currently untouched oceans views. Potential impacts to landscape and visual amenity are associated with decommissioning works are likely to be of short duration.	Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity at various viewpoints along the coastline and residential areas. Landscaping and revegetation would be used to minimise onshore impacts.	Possible	Minor	Low
108	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	At this coastal location, tides and tidal currents, waves, wave-driven currents, and wave current interaction would determine the driving condition for sediment movement. The Coorong Region is classified as microtidal with a tidal range of 0.7m from lowest to highest astronomical tide. Tides are predominantly semi-diurnal, with a single tide cycle on most days. Decommissioning equipment is unlikely to alter local hydrodynamic processes. Further, it is unlikely to be significant in the far-field with only minor and temporary influences related to localised scour in the near field.	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 wind farm and further afield (near shore).	Unlikely	Negligible	Very Low
109	Marine water quality and sediment quality	Potential impacts to marine water and sediment quality during decommissioning	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Water quality - Seagrass meadows are a good indicator of water quality; previous monitoring of quality of the seagrass meadows within the Coorong found a number of drains were impacted by an excess of nutrient runoff (Wear et al 2006). Overall, soluble and total nutrient levels are relatively low throughout Coorong, with impact on seagrass meadows potentially a result of the recovery time of Posidonia species during episodic high rainfall events. Pressures that may result in increased nutrients within the area include discharge from agricultural drains, urban stormwater and septic tank leakage. Decommissioning activities may increase these levels. 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 (Yewen 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.	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.	Possible	Minor	Low
110	Noise and vibration	Noise and/or vibration from decommissioning activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors	Decommissioning (and site rehabilitation)	Possible	Minor	Low	Decommissioning 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.	Further noise modelling and monitoring would identify areas where noise and vibration may exceed acceptable levels for sensitive receptors. Mitigation strategies include use of noise suppression devices, noise barriers where appropriate and limiting time frames for noisy works.	Unlikely	Negligible	Very Low
111	Noise and vibration	Underwater noise and/or vibration from decommissioning activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, with boating only limited to recreational fishing and crayfishing in the area, indicating that background noise levels are likely to also be low. Port Adelaide is the closest main port, located approximately 300 km to the north west. 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	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	High	Medium
112	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	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 decommissioning activities. The nearest port is Adelaide Port, about 300 km by road north west of the Project area. There are other ports in the area including Por Giles on the eastern side of Yorke Peninsula, located approximately 500 km north west of Kingston SE. 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	Moderate	Low
113	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during decommissioning	Decommissioning (and site rehabilitation)	Possible	Minor	Low	Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, with boating only limited to recreational fishing and crayfishing in the area. Risks to shipping and navigation are expected to be low due to the short term nature and minor change in shipping routes expected during decommissioning. Desktop assessment indicates that no existing shipping channels that interfere with the Project area, however there are some cargo ships using the surrounding study area to travel to Ports situated in north west, including Port Adelaide. Changes to navigation and shipping routes would be acceptable and vessel would easily adapt with minimal impact.	A future study of shipping and navigation routes, including engagement with local fisheries and port operators, would inform of any requirements to minimise impacts during decommissioning.	Highly unlikely/rare	Negligible	Very Low
114	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	Decommissioning works are 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. Opportunities for this would be further explored throughout the planning and development process.	Highly unlikely/rare	Negligible	Very Low
115	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)	Likely	Moderate	Medium	Although residential displacement and access to community facilities is unlikely to be impacted, the community's access to recreational and open space will be restricted during decommissioning. Kingston SE is a major recreational node and popular tourist destination along the south coast of South Australia. The beaches at Kingston SE, including Wyomi Beach and Pink Beach are utilised by local residents and tourists for recreational activities such as swimming, kite/wind surfing, surfing, sailing, boating and fishing. The rocky outcrops of the continental shelf are frequently used for recreational rock lobster fishing from November to June each year. Considering the recreational assets of the Project area are highly valued by the community this may cause frustration and angst among the local residents. 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 the community regarding activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. 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. Decommissioning activities should be staged to avoid the peak fishing season (e.g. Nov-June) where feasible. Where usual accesses are impeded, an alternate access route will be provided if it is safe to do so.	Likely	Minor	Medium

116	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	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 actual decrease in access or amenity for recreational activities the community may still perceive negative impacts and decide not to travel to the Kingston SE 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
117	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)	Likely	Moderate	Medium	Decommissioning activities may lead to several disruptive oversized loads on the road network, therefore decommissioning timelines and traffic route options will need to be assessed.	A Traffic Management Plan is likely to be required to mitigate impacts to the road transport network. The TMP will be prepared in consultation with local road managers, Council and business and property owners.	Likely	Minor	Medium
118	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Decommissioning (and site rehabilitation)	Likely	High	High	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 wind farm and reuse resources already established.	Opportunities to minimise the generation of waste and the resources/materials sent to landfill include imbedding the waste hierarchy into overarching project planning to maximise resource efficiency. Project resources would be utilised and reused, where possible, in other parts of the Project or reused through other channels. Where practicable, efficiency in the uses of water and energy should be considered during the decommissioning phase. All waste will be managed and disposed/recycled in accordance with applicable South Australian regulations.	Possible	Moderate	Medium