

# EPBC Act referral



Australian Government  
Department of Agriculture, Water and the Environment

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<b>Title of proposal</b>	<b>2022/9160 - Leeuwin Offshore Wind Farm</b>
<b>Section 1</b>	
<b>Summary of your proposed action</b>	
<b>1.1 Project industry type</b>	Energy Generation and Supply (renewable)
<b>1.2 Provide a detailed description of the proposed action, including all proposed activities</b>	
<p>Leeuwin Offshore Wind Pty Ltd is proposing the construction, operation and decommissioning of the Leeuwin Offshore Wind Farm within Geopraphe Bay, off the southwest region of Western Australia. The proposed action is located approximately 130 km south of Perth between Mandurah and Bunbury, with all wind turbines to be located within Commonwealth Waters. Land-based components of the proposed action are located within the Shire of Harvey local government area. The proposed action will span Commonwealth waters, Western Australian coastal waters and land areas. Once operational the Leeuwin Offshore Wind Farm will have the capacity to generate in excess of 3.0 GW of electricity (up to 11 Terawatt-hour (TWh) of power per year). This output would be enough electricity to power approximately 3.0 million Western Australian homes and would offset an expected 6 million tonnes of CO<sub>2</sub> annually. This will support Australia's commitment to reduce greenhouse gas emissions by 26-28% by 2030, as well as the Western Australian Government's target of enhanced climate resilience and net zero greenhouse gas emission by 2050.</p> <p>The proposed action includes the installation of offshore Wind Turbine Generators (WTGs) and associated Offshore Substations (OSS) platforms, within Commonwealth Waters. The generated electricity will be brought onshore via export cables which will traverse State Waters to landfall onshore. Once onshore, electricity generated by the proposed action will be transmitted, via underground and/or overhead cables, to a substation. The electricity can then be connected into the local grid system or other power infrastructure. The proposed action is in the early development stage, and therefore many of the detailed design parameters are yet to be determined. The design process is evolving based on technical feasibility and commercial viability studies and will continue to be refined through stakeholder consultation and in response to environmental and social impacts assessments.</p> <p>A description of the key components of the proposed action are provided below. For more detail on the key features of the proposed action see Appendix A, Section 3.4 Key Components (page 27).</p> <p><b>Offshore wind assets</b></p> <ul style="list-style-type: none"><li>• Approximately 200 offshore WTGs supported by suction caissons, piled foundations or gravity bases. The WTGs will be located exclusively in Commonwealth marine waters (approximately 15 km to 70 km from the coast).</li><li>• A network of buried and/or protected (in areas where burial is not possible) subsea cables along the seabed connecting strings of the WTGs together and connecting them to the offshore transmission assets. These are known as inter-array cables.</li></ul> <p><b>Offshore transmission assets</b></p> <ul style="list-style-type: none"><li>• A number of OSS platforms to collect and transform the generated electricity for transmission to shore. The OSS will be located exclusively in Commonwealth marine waters.</li><li>• Subsea export cables to connect to the onshore power grid. The export cables will cross from Commonwealth marine waters (&gt;3nm) to State waters (&lt; 3nm), where landfall will be made.</li><li>• It is anticipated that the export cables will be buried and/or protected (in areas where burial is not possible).</li></ul> <p><b>Coastal and onshore transmission assets</b></p> <ul style="list-style-type: none"><li>• Cable landfalls (the point(s) at which the subsea cables come ashore, most likely subsurface).</li><li>• A transition joint bay (the interface between the offshore and onshore cables).</li><li>• A number of onshore substations.</li><li>• An onshore transmission system, consisting of a number of circuits (either overhead, underground or a combination of both) which transmit energy generated by the windfarm from the onshore substation(s) to the South-West Interconnected System (SWIS).</li><li>• A transmission system connection point (the interface into the SWIS).</li><li>• Temporary construction areas and access roads.</li></ul> <p>The key activities associated with the proposed action are described below.</p> <p><b>Key Construction Activities</b></p> <p><b>Onshore:</b></p> <ul style="list-style-type: none"><li>• Preparation work, including clearing and topsoil storage, for onshore construction sites and access routes.</li></ul>	



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- Establishment of temporary onshore construction sites.
- Transportation of manufactured components (foundations, towers, nacelles, blades, gearbox, generators etc).
- Onshore assemblage of key turbine tower components, then transport offshore with the nacelle and blades for final assembly.
- Excavation or tunnelling at the landfall site.
- Establishment of onshore transmission infrastructure. In underground sections this will involve excavation of cable trenches. In overhead sections, works will include installation of tower foundations and structures.
- Rehabilitation of temporary disturbance areas.

Offshore:

- Installation of navigation aids to support the construction phase.
- Marine transportation of components to the installation sites within the windfarm area.
- Seabed preparation work.
- Installation of foundations (and associated scour protection if required).
- Substructure installation onto installed foundations.
- Installation of substations and inter-array subsea cables.
- Installation of export cable(s), with trenching/protection as required
- Cable connection and commissioning at substations.
- Erection of turbines.
- Testing and commissioning.

Key Operational and Maintenance Activities

Once commissioned, the windfarm is intended to operate 24 hours a day, 365 days a year. The windfarm will operate automatically, with each turbine operating independently of the others. The operation and control of the windfarm will be monitored by means of a Supervisory Control and Data Acquisition (SCADA) system, installed at each turbine, and linked to the onshore control base. The SCADA system will enable the remote control of individual turbines or the windfarm in general and will support information transfer, storage, and the shutdown of any wind turbine in emergency circumstances.

The windfarm will be serviced and maintained throughout its life by a local operating 'base'. An ongoing programme of maintenance activities will be implemented to support the efficient operation of the windfarm. It is anticipated that this maintenance programme will result in the creation of a local service base and the creation of a significant number of new permanent jobs.

Inspections of support structures, scour protection and subsea cables will be performed on a regular basis, as will ad-hoc visits for surveillance purposes. Maintenance of WTGs is normally separated into three categories:

- Periodic overhauls
- Scheduled maintenance
- Unscheduled maintenance

Key Decommissioning Activities

Requirements for decommissioning will be established through the planning and assessment phases of the proposed action. A detailed decommissioning plan will be prepared prior to the eventual decommissioning process, in consultation with stakeholders and the relevant authorities, to ensure all approval requirements, environmental impacts, and mitigation measures are fully understood and reported.

**1.3 What is the extent and location of your proposed action?**

See Appendix B

**1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland)**

The proposed action is located in the south-west of Western Australia approximately 130 km south of Perth between Mandurah and Bunbury. The offshore WTGs and OSS platforms will be localised within Commonwealth marine waters (approximately 15 km to 70 km from the coast). The export cables will cross from Commonwealth marine waters (>3nm) to State waters (< 3nm), where landfall will be made.

Land-based components of the proposal are located within the Shire of Harvey local government area, directly north of the town of Binningup. The local governments to the north and south of the Development Envelope are the Shire of Waroona and the City of Bunbury, respectively. The project area will be refined during future stages of the project.

See Appendix A - Figure 2 Overview of proposed Leeuwin Offshore Wind Farm (page 14).

**1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?**



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The proposed Development Footprint (referred to as the Development Envelope in Appendix A) = 5,341 km<sup>2</sup> (434,421 ha), including a Disturbance Footprint of 21 km<sup>2</sup> (2,090 ha). Areas of avoidance have not been identified at this stage and will be developed in response to detailed environmental survey works.

The Disturbance Footprint includes the project infrastructure plus a significant contingency.

The Development Envelope is significantly larger than the Project Footprint to allow for flexibility to move the Project Footprint in response to key information obtained from environmental and social baseline studies. As the project progresses, disturbance footprint will be further refined in terms of its size and location.

The key features of the proposed action are discussed in detail in Appendix A, Section 3.4 Key Components, page 27.

**1.7 Proposed action location**

Other - The proposed action is located approximately 15 km to 70 km from the coast.

**1.8 Primary jurisdiction**

Western Australia

**1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?**

Yes  No

**1.10 Is the proposed action subject to local government planning approval?**

Yes  No

**1.10.1 Is there a local government area and council contact for the proposal?**

Yes  No

**1.11 Provide an estimated start and estimated end date for the proposed action**

Start Date	01/01/2026
End Date	01/01/2076

**1.12 Provide details of the context, planning framework and state and/or local Government requirements**

The proposed action spans Commonwealth Waters and Western Australian State Waters and lands so will be subject to both Commonwealth and State approvals. In line with this, the proposed action is being referred under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) for the assessment of potential impacts to Matters of National Environmental Significance (MNES) (this document).

In addition, the proponent intends to refer the proposed action to the WA Environmental Protection Authority (EPA) under the Environmental Protection Act 1986 (EP Act) in 2022. A range of secondary approvals will be required under Western Australian legislation. Further details are provided in Appendix A - Section 2 Statutory Context (pages 19-25).

**1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders**

Leeuwin Offshore Wind Pty Ltd seek to develop projects in harmony with local heritage and environment, and they strive to preserve them for the future. They believe that involving communities and stakeholders early in the development process is key to achieving this goal and is critical to developing a successful project.

Forty years of collective experience in renewable energy throughout Europe has taught them that developer that commence the stakeholder engagement process early, with a strategic long-term view, are more likely to achieve overall positive outcomes for their proposal.

Leeuwin Offshore Wind Pty Ltd is committed to genuine consultation with local communities and stakeholders at all stages of the project and in response to this is developing a Stakeholder and Community Engagement Plan. At the heart of this plan will be to identify the stakeholder groups, build relationships, gain mutual respect and make better decisions. The is the intention to involve communities and stakeholders early, to seek their input, understand their views, utilise local knowledge and expertise and build opportunities for people to get involved in the project.



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To date, Leeuwin Offshore Wind Pty Ltd has started consultation and conversations with the following:

- Commonwealth Department of Agriculture, Water and Environment (DAWE)
- Commonwealth Department of Industry, Science Energy and Resources (DISER)
- Department of Defence
- National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)
- National Offshore Petroleum Titles Administrator (NOPTA)
- Department of Jobs, Tourism, Science and Innovation (JTSI)
- Danish Trade Council
- WA Energy Minister
- Western Power
- Western Australian Museum (Marine Archaeology)
- Southern Ports Authority
- Minister for Energy
- Australian Energy Market Operator (AEMO)
- Water Corporation
- Development Western Australia
- Alcoa Corporation
- Fortescue Future Industries

Future Consultation that is planned for the immediate future includes key indigenous groups, local community groups, local councils, fisheries and State Government departments relevant to the proposed action. Consultation tools that will be used, include the following. In response to COVID restrictions remote communication options will be included to ensure that stakeholders have the opportunity to engage and be involved, for example online meetings, presentation, webinars, written submission and hard copy information packs.

- Letters
- Meetings
- Workshops
- Information sessions
- Community Reference Group
- Frequently Asked Questions
- Project webpage

**1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project**

A desktop environmental impact assessment of potential impacts to matters of national significance (MNES) was undertaken (Appendix A - Section 6 MNES Search Results page 53-96 and Section 7 MNES Discussion page 97-141). This assessment provides a preliminary evaluation of potential impact of the proposed action to marine and terrestrial MNES.

Pending the outcomes of this referral (and the planned EPA referral), environmental impact assessments will be carried out as required to satisfy all relevant Commonwealth and Western Australian legislation.

**1.15 Is this action part of a staged development (or a component of a larger project)?**

- Yes       No

**1.16 Is the proposed action related to other actions or proposals in the region?**

- Yes       No



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## Section 2

### Matters of national environmental significance

**2.1 Is the proposed action likely to have any direct or indirect impact on the values of any World Heritage properties?**

Yes  No

**2.2 Is the proposed action likely to have any direct or indirect impact on the values of any National Heritage places?**

Yes  No

**2.3 Is the proposed action likely to have any direct or indirect impact on the ecological character of a Ramsar wetland?**

Yes  No

### Wetland

The Development Envelope lies adjacent to the Peel-Yalgorup System Ramsar site (Site ID: 36) which is listed as a Wetland of International Importance under the Ramsar Convention. The proposed onshore transmission corridor site is over 3 km from the southern edge of the wetland and the offshore infrastructure component will be at least 16 km from the adjacent wetland both of which provide sizeable buffers for any potential impacts from the proposed action. The system is characterised by shallow estuaries, coastal saline lakes and freshwater marshes with the Peel and Harvey estuaries connecting to the Indian Ocean through various channels. The wetland is large and includes the Peel Inlet, Harvey Estuary, Lake McLarty, Lake Mealup and ten Yalgorup National Park wetlands. The wetland is one of the most important areas for birds in the south-west Australia, it supports a diverse range of waterbirds, invertebrates, marine and estuarine fish. Further details Appendix A, Section 4.2.5, pg 45.

### Impact

The onshore construction works may indirectly impact water quality at nearby wetlands and waterways. For example, uncontrolled surface water flows from the proposed action into the wetland could introduce nutrients, acid sulphate soils (ASS) or alter the salinity of the receiving waters. An assessment of the surface and groundwater hydrology will be required to confirm any potential impacts. Additional management measures will include soil testing for ASS and the use of sediment ponds and bunds to control any surface water flows and quality. Offshore activities have the potential to impact on bird species associated with the Ramsar wetland, this is covered in the following section.

The proposed onshore transmission corridor site is over 3 km from the southern edge of the wetland and the offshore infrastructure component will be at least 16 km from the adjacent wetland both of which provide sizeable buffers for any potential impacts from the proposed action.

The operation of the offshore wind farm has the potential to impact on bird species associated with the Ramsar wetland through collision with turbines or the alteration of flight movements or migration patterns. An alteration in the population of these species could potentially change the ecological character of the wetland. The potential impacts to bird species are covered in more detail in the following section of this referral (Section 2.4 - Species or threatened ecological community – Birds) and in Appendix A, Section 7.5.1. Migratory Wetland Species (page 121) and Section 8 Potential Impacts and Proposed Management (page 136-141).

**2.3.2 Do you consider this impact to be significant?**

Yes  No

**2.4 Is the proposed action likely to have any direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?**

Yes  No

### Species or threatened ecological community

#### Threatened Ecological Communities

A search of the PMST and the Threatened and Priority Ecological Community search (DBCA) identified four TECs that are likely to occur within the Development Envelope (DBCA, 2022).



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- Tuart Woodlands (*Eucalyptus gomphocephala*) and Forests of the Swan Coastal Plain ecological community (Critically Endangered).
- Banksia Woodlands of the Swan Coastal Plain ecological community (Endangered).
- Subtropical and Temperate Coastal Saltmarsh (Vulnerable).
- Clay Pans of the Swan Coastal Plain (Critically Endangered).

For further details see Appendix A, Section 4.2.6 (page 48) and 7.2 – Threatened Ecological Communities (page 98-103).

## Impact

Based on the desktop assessment it is highly likely that three of the above TEC occur within the Development Envelope (Tuart Woodlands, Banksia Woodlands and Coastal Saltmarsh). Field surveys will be conducted to identify the location of these TEC and to assess their structure and condition using the key diagnostic criteria and condition threshold relevant to each TEC. These surveys will inform the design of the project, particularly the placement of the onshore infrastructure to ensure that these sensitive areas are avoided (where possible).

The proposed action has the potential to directly impact the TECs through the clearing of vegetation. The scale of the land clearing is proposed to be less than 21 hectares. Where possible the disturbance footprint will be designed to utilise previously disturbed or cleared land and avoid areas of native vegetation. In addition, areas of land that are cleared for the transmission corridor will be revegetated with native vegetation. A desktop land use assessment indicates that a large portion of the Disturbance Envelope is already disturbed/cleared (e.g. KSIA, Binningup Desalination Plant, export cables connecting to Kemerton sub-station, Forrest Hwy), so revegetation works will help to rehabilitate areas of the Development Envelope that have previously been disturbed resulting in positive effect on the local ecosystem. It is envisioned that the risk of clearing to TEC can be successfully mitigated.

Onshore construction activities have the potential to impact the TECs through the introduction of weeds and pathogens. Introduced flora and pathogen can outcompete native vegetation leading to a loss of suitable habitat. Weed control and pathogen control measures will be adopted throughout the life of the project and will be detailed in the project's environmental management plans.

Potential indirect impacts may be experienced due to a reduction in water quality from uncontrolled runoff during construction activities. An assessment of surface and groundwater hydrology will be conducted and will inform the design of the project to mitigate any potential impacts to water quality.

Potential impacts and management measures are outlined in Appendix A, Section 7.2 - Threatened Ecological Communities (Page 98-103) and Section 8 Potential Impacts and Proposed Management (page 136-141).

## Species or threatened ecological community

### Marine Birds

The Threatened and Priority Flora Database search revealed two marine bird species that have been recorded as being within the project study area (see Figure 18).

- Southern Giant Petrel (pelagic) (*Macronectes giganteus*) - Endangered
- Shy Albatross (pelagic bird) (*Thalassarche cauta*) – Vulnerable

More information is provided in Appendix A - Section 7.5.2 Marine Bird Species (page 122).

## Impact

The albatross and petrel are pelagic birds and spend a significant portion of their lives on the open ocean, rarely venturing close to land except to breed. They are commonly found hundreds to thousands of kilometres offshore foraging in southern waters south of 25 degrees (ACAP, 2015; Bird Life International, 2008; Marchant and Higgins, 1990). Both the Shy Albatross and the Southern Giant Petrel are known to breed on remote island in the southern oceans (over 4,000 km from the proposed action). The Threatened and Priority Flora Database results revealed only two sightings of these species, this suggests that they are not a common visitor to the area. Appendix A (Figure 18) shows sightings of the Crested Tern and the Grey Plover within the Development Envelope, however these species are not listed as MNES (listed as Least Concern – LC).

The physical presence of the windfarm, and associated noise, vibrations, and artificial lighting, may cause displacement or avoidance behaviours of Albatrosses and Petrels from foraging habitats. However, based upon the vast distances that Albatrosses and Petrels are known to traverse to forage, the proposed action is unlikely to lead to a significant loss of foraging area or a decline in Albatross population.

There is a risk of collision with the WTGs, with the likelihood of collision likely to be species-specific based upon different foraging behaviours and soaring heights. Several studies have showed that some bird species will actively change their flight pattern to avoid flying in close proximity to the turbines (Exo et al., 2003; Lindeboom et al., 2011; Percival, 2001; Plonczkier & Simms, 2012), which is advantageous and may explain the low bird strike rates. Some researcher suggested that this



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adjustment of flight may impact migratory birds (Masden et al., 2009) while others suggested that this avoidance did not have an impact on bird feeding or distribution (Percival, 2001). Large pelagic seabirds (albatross, gulls, terns) are most at risk as they feed in offshore waters, and less likely to be able to evade rotors as they are slow fliers. The turbines proposed will be larger and slower than the turbines currently in use. There is building evidence to suggest that these large slower turbines result in a significant reduction of bird deaths.

The research suggests that the likelihood of impact is relatively low, however the consequence to threatened species (especially endangered and critically endangered) is high. Further research is required to identify the bird species likely to fly in the vicinity of the offshore Development Envelope, migratory pattern and altitude and to assess their potential risk of bird strike particularly those that are classified as MNES.

The potential impacts to bird species are covered in more detail in Appendix A, Section 7.5.2. Marine Bird Species (page 122) and Section 8 Potential Impacts and Proposed Management (page 136-141).

### Species or threatened ecological community

#### Terrestrial Birds

The Threatened and Priority Flora Database search revealed three species of Cockatoo that have been recorded as being within the project study area (Department of Sustainability Environment Water Population and Communities, 2012);

- Baundin's Cockatoo (*Calyptorhynchus baudinii*) - Endangered
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) - Endangered
- Forest red-tailed Black Cockatoo (*Calyptorhynchus banksia*) - Vulnerable

More information is provided in Appendix A - Section 7.5.3 Terrestrial Birds (page 122-123).

### Impact

The proposed action has the potential to directly impact these threatened species through the clearing of onshore vegetation. As discussed in the TEC section, these impacts will be mitigated by designing the footprint to utilise previously cleared lands and to avoid native vegetation, particularly the Banksia Woodlands as they are critical habitat for these threatened cockatoos. Cleared areas will be revegetated with native vegetation to reduce the risk of habitat fragmentation to these species. It is envisioned that the risk of land clearing to the threatened cockatoos can be successfully mitigated.

Potential indirect impacts may be experienced due to a reduction in water quality from uncontrolled runoff during construction activities. An assessment of surface and groundwater hydrology will be conducted and will inform the design of the project to mitigate any potential impacts to water quality. Impacts associated with the offshore wind turbines are expected to be negligible as Cockatoos are land-based birds, so the risk of turbine collision and bird mortality is highly unlikely.

The potential impacts to terrestrial bird species are covered in more detail in Appendix A, Section 7.5.3. Terrestrial Bird Species (page 122-123) and Section 8 Potential Impacts and Proposed Management (page 136-141).

### Species or threatened ecological community

#### Marine Mammals

The PMST listed 13 species of marine mammals as possibly occurring within the Study Area. A more detailed search using the Threatened and Priority Flora Database search (DBCA) identified that only three of these have been found within the Development Envelope (see Appendix A, Figure 31, page 125). One sperm whale sighting was discounted as it was a museum specimen and didn't register in the PMST search.

- Humpback Whale (*Megaptera novaeangliae*) - Vulnerable
- Southern Right Whale (*Eubalaena australis*) - Endangered
- Australia Sea-Lion (*Neophoca cinerea*) – Endangered
- Sperm Whale (*Physeter macrocephalus*)

A more detailed desktop assessment can be found in Appendix A (Section 6- MNES Results - Marine Mammals page 72-76 and Section 7.7 Threatened Marine Mammals page 126-131). These sections provide information about the likelihood of these species occurring within the Development Envelope.

### Impact

#### Cetaceans

There is a risk of vessel collision with Humpbacks during construction and decommissioning phases, however vessel collision with marine mammals can largely be mitigated by vessel speed and vessel type and considered low risk to the Humpback Whale population. Potential impacts and management measures are outlined in Appendix A, Section 7.7 Threatened Marine Mammals (page 126-131) and Section 8 Potential Impacts and Proposed Management (page 136-141).



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Underwater noise and vibration from construction, especially impact pile driving, may cause physical/auditory injury and avoidance behaviours in whales. Avoidance of the area may affect the migration of the whales when heading either to breeding or feeding grounds. Further investigations are required into the timings of aggregations and their habitat utilisation in the area to assess potential impacts. Proposed management measures are outlined in Appendix A Section 8.

Disturbance of the seabed during construction and decommissioning may cause displacement of prey species, however seabed disturbances are considered to be localised and temporary, and as the area is not considered an important feeding ground for the species, this impact is unlikely to cause long-term impacts to the populations.

#### Sea Lions

Underwater noise and vibration from construction, especially impact pile driving may cause avoidance behaviours. Australian Sea Lions are perceptive to noise and known to respond quickly to vessels therefore it is expected that they will largely avoid the area during construction activities (Osterrieder et al., 2017). Seabed disturbance may affect the foraging of Australian Sea Lions within the Development Envelope, however, the Development Envelope is located on the outer limits of their known foraging range and is not a known key foraging area. Potential impacts to this species may occur as a result of offshore activities, but with the proposed management measures outlined in Section 8 any significant impacts to this species are unlikely.

### Species or threatened ecological community

#### Marine Turtles

The PMST listed a total of four turtle species that may occur within the Study Area. A more detailed search using the Threatened and Priority Flora Database indicated that there have been sightings of two of these species within the project study area (see Appendix A, Figure 37 page 135).

- Loggerhead Turtle (*Caretta caretta*) - Endangered
- Green Turtle (*Chelonia mydas*) – Vulnerable

More information is provided in Appendix A - Section 7.9 Marine Turtles (page 134-135).

### Impact

Noise, vibrations and artificial light may cause disturbances to sea turtles in the area, these impacts are unlikely to have any long-term effect on sea turtles, and avoidance of the area would likely be temporary.

Potential impacts and management measures are outlined in Appendix A, Section 7.9 Marine Turtles (page 134-135) and Section 8 Potential Impacts and Proposed Management (page 136-141).

### Species or threatened ecological community

#### Sharks and Bony Fish

The PMST listed a total of 13 species of sharks, bony fish and mussels that may occur within the Study Area. A more detailed search using the Threatened and Priority Flora Database search from DBCA indicated that of these, only two species have been sighted within the project Study see Appendix A, Figure 36 (page 133).

- Great White Shark (*Carcharodon carcharias*) - Vulnerable
- Blackstriped Dwarf Galaxias (*Galaxiella igrostriatal*) - Endangered

A more detailed desktop assessment was included in Appendix A, Section 6 - MNES Results - Sharks, Bony Fish and Mussels (page 80-84) and Section 7- Threatened Marine Sharks and Bony Fish (page 132-133) to determine the likelihood of these species occurring within the Development Envelope.

### Impact

Potential impacts to the Great White Shark species may occur as a result of offshore activities, in particular pile driving, but with the proposed management measures outlined in Appendix A, Section 7- Threatened Marine Sharks and Bony Fish (page 132-133) and Section 8 Potential Impacts and Proposed Management (page 136-141) any impacts to this species are unlikely.

### Species or threatened ecological community

#### Terrestrial Mammals

The PMST listed three species of threatened terrestrial mammals as possibly occurring within the Study Area. A more detailed search using the Threatened and Priority Flora Database search (DBCA) identified that only two of these have been found within the Development Envelope (see Appendix A, Figure 31, page 125);

- Western Ringtail Possum (*Pseudocheirus occidentalis*) -Critically endangered
- Western Quoll or Chuditch (*Dasyurus geoffroii*) -Critically endangered

A more detailed desktop assessment was included in Appendix A, Section 6 - MNES Results - Terrestrial Mammals (page 77) and Section 7.6 Threatened Terrestrial Mammals (page 123-124) to determine the likelihood of these species occurring within the Development Envelope.





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### Impact

The proposed action has the potential to directly impact these threatened species through the clearing of onshore vegetation. As discussed in the TEC section, these impacts will be mitigated by designing the footprint to utilise previously cleared lands and to avoid native vegetation, particularly the Banksia Woodlands and Tuart Woodlands as they are critical habitat for these threatened terrestrial mammals.

Cleared areas will be revegetated with native vegetation to reduce the risk of habitat fragmentation to these species. It is envisioned that the risk of land clearing to the threatened mammals can be successfully mitigated.

Potential indirect impacts may be experienced due to a reduction in water quality from uncontrolled runoff during construction activities. An assessment of surface water hydrology will be conducted and will inform the design of the project to mitigate any potential impacts to water quality.

Potential impacts and management measures are outlined in Appendix A, Section 7.6 Threatened Terrestrial Mammals (page 123-124) and Section 8 Potential Impacts and Proposed Management (page 136-141).

### Species or threatened ecological community

#### Terrestrial Flora

The PMST listed 15 species of threatened flora as possibly occurring within the Study Area. A more detailed search using the Threatened and Priority Flora Database search (DBCA) identified that 3 species have recorded observations within the Development Envelope. A further 4 species were found just outside of the Development Envelope but have been included to ensure a conservative approach see Appendix A, Figure 17 (page 105) .

- Tall Donkey Orchid (*Diuris drummondii*) - Vulnerable
- Glossy Leafed/Warty Hammer Orchid (*Drakaea elastica*) - Endangered
- Dwarf Hammer Orchid (*Drakaea micrantha*) - Vulnerable
- King Spider/Grand Spider Orchid (*Caladenia huegelii*) - Endangered
- Carbunup King Spider Orchid (*Caladenia procera*) - Critically Endangered
- Dwarf Bee Orchid (*Diuris micrantha*) – Vulnerable
- Austrostipa bronwenae - Endangered

A more detailed desktop assessment was included in Appendix A, Section 6 (page 85-87) and Section 7.3 (page 104-105).

### Impact

The proposed action has the potential to directly impact these threatened species through the clearing of vegetation. As discussed in the TEC section, these impacts will be mitigated by designing the footprint to utilise previously cleared lands and to avoid native vegetation. Vegetation surveys will be conducted to map all threatened flora within the Development Envelope and to ascertain their structure and condition. Cleared areas will be revegetated with native vegetation to reduce the risk of habitat fragmentation. It is envisioned that the risk of land clearing to threatened flora can be successfully mitigated.

Onshore construction activities have the potential to impact the threatened flora through the introduction of weeds and pathogens. Introduced flora and pathogen can outcompete native vegetation leading to a loss of suitable habitat. Weed control and pathogen control measures will be adopted throughout the life of the project and will be detailed in the project's environmental management plans.

Potential indirect impacts may be experienced due to a reduction in water quality from uncontrolled runoff during construction activities. An assessment of surface water hydrology will be conducted and will inform the design of the proposed action to mitigate any potential impacts to water quality.

Potential impacts and management measures are outlined in Appendix A, Section 7.3 Threatened Flora Species (page 104-105) and Section 8 Potential Impacts and Proposed Management (page 136-141).

#### 2.4.2 Do you consider this impact to be significant?

Yes  No

#### 2.5 Is the proposed action likely to have any direct or indirect impact on the members of any listed migratory species or their habitat?

Yes  No

### Migratory species

#### Migratory Birds

The proposed action is approximately 1 km from the southern section of the Peel-Yalgorup Wetland System. This wetland



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supports a large number of migratory bird species. Of the 19 MNES species identified as being within the project study area (Threatened and Priority Flora Database search, DBCA) 11 are migratory wetland species see Appendix A, Figure 18 (page 107).

- Curlew Sandpiper (*Calidris ferruginea*) – Critically Endangered
- Eastern Curlew (*Numenius madagascariensis*) – Critically Endangered
- Australasian Bittern (*Botaurus poiciloptilus*) – Endangered
- Greater San Plover (*Charadrius leschenaultia*) - Vulnerable
- Common Sandpiper (*Actitis hypoleucos*)
- Glossy Ibis (*Plegadis falcinellus*)

More information is provided in Appendix A - Section 6.1 MNES - Results - Birds (page 54-71) and Section 7.5.1 Migratory Wetland Species (page 121).

### Impact

The operation of the offshore wind farm has the potential to impact on these species through collision with turbines or the alteration of flight movements or migration patterns. The majority of studies investigating bird mortality resulting from turbine collision have recorded relatively low levels of mortality (e.g. Winkelman 1992a, 1992b, Painter et al. 1999, Erickson et al. 2001). However, in the context of threatened species (with low population numbers) even low levels of mortality could impact a population. These studies acknowledge that the collision risk depends on a range of factors including weather, time of year, bird species, proximity to bird congregations, size and number of turbines, rotor speed, presence of lights associated with the turbine and alignment of turbines (Hüppop et al., 2006a, Winkelman 1992c, Thelander et al. 2003). Several studies have suggested that future planning of offshore wind farms should avoid bird aggregation areas as they pose a higher risk of bird mortality (Fox and Petersen, 2019).

When migrating north and south these wetland species typically fly along the coast or inland (as opposed to flying out to sea) as they can access stop over sites to rest and feed (Alerstam, 1978). Some species follow preferred pathways that related to important stopover locations that provide food. Some migratory birds do fly offshore but fly at high altitudes (above turbine height), however they do fly at lower altitudes during take-off and landing and during poor weather (Drewitt & Langston, 2008; Newton, 2007).

Whilst in Australia these wetland species are typically not known to feed offshore, they prefer to forage in coastal areas, where they inhabit sheltered embayments, estuaries and lagoons. They also occur around terrestrial wetlands near coastal lakes and swamps, or further inland at salt-lakes (Marchant & Higgins 1993). The turbines are proposed to be located at least 15-20km offshore, it is unlikely that these wetland species will be at risk as they are less likely to fly offshore, however further investigation is required to ensure that the potential risks are fully understood.

Potential impacts and management measures are outlined in Appendix A, Section 7.5.1 Migratory Wetland Species (page 121) and Section 8 Potential Impacts and Proposed Management (page 136-141).

#### 2.5.2 Do you consider this impact to be significant?

Yes       No

#### 2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

Yes       No

#### 2.6.1 Is the proposed action likely to have any direct or indirect impact on the Commonwealth marine environment?

Yes       No

#### 2.6.2 Describe the nature and extent of the likely impact on the whole of the environment

The offshore Development Envelope, in which the WTGs and OSS will be installed lies exclusively within Commonwealth marine waters (i.e. >3nm from the coast). There may be impacts to Commonwealth Waters for example a loss of benthic habitat due to construction activities. Reduced marine water quality due to dredging and dredge spoil removal. Reduced marine water quality due to chemical/hydrocarbon spills from support vessels. Introduction of marine pests.

Potential impacts and management measures are outlined in Appendix A, Section 8 Potential Impacts and Proposed Management (page 136-141).

#### 2.6.3 Do you consider this impact to be significant?

Yes       No



Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

<b>2.7 Is the proposed action likely to be taken on or near Commonwealth land?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>2.9 Is the proposed action likely to have any direct or indirect impact on a water resource from coal seam gas or large coal mining development?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>2.10 Is the proposed action a nuclear action?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>2.11 Is the proposed action to be taken by a Commonwealth agency?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>2.12 Is the proposed action to be undertaken in a Commonwealth Heritage place overseas?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>2.13 Is the proposed action likely to have any direct or indirect impact on any part of the environment in the Commonwealth marine area?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>2.13.1 Describe the nature and extent of the likely impact on the whole of the environment</b> <p>The offshore Development Envelope abuts the Geographe Marine Park (see Appendix A, Figure 3, page 21). The park protects extensive seagrass meadows, which are important nursery habitat for many species including juvenile rock lobsters (CoastWise, 2001). The proposed action will not involve any activities within the Commonwealth Marine Park.</p> <p>There may be indirect impacts to Commonwealth Marine for example a reduction in marine water quality due to dredging and dredge spoil removal in adjacent areas. Reduced marine water quality due to chemical/hydrocarbon spills from support vessels. Introduction of marine pests.</p> <p>Potential impacts and management measures are outlined in Appendix A, Section 8 Potential Impacts and Proposed Management (page 136-141).</p>
<b>2.13.2 Do you consider this impact to be significant?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No



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## Section 3

### Description of the project area

#### 3.1 Describe the flora and fauna relevant to the project area

##### Flora and Vegetation

Much of the land within the onshore Development Envelope has been cleared of native vegetation as part of historic land development for agricultural, residential, and related land uses i.e., Binningup Desalination Plant, transmission corridors for the Kemerton sub-station, Forrest Hwy. There are remnant vegetation communities found in mosaic patches throughout the Development Envelope that include the following vegetation types. Coastal dune vegetation exists along a coastal strip, extending inland for up to approximately 1 km. East of the dunes is vegetation typical of the 'Bassendean vegetation complex', which is likely to include *Eucalyptus marginata*, WA Sheoak (*Allocasuarina fraseriana*), *Banksia* and *Melaleuca* species. Sedgeland may occur in moister areas between the Holocene dunes.

The proposed cable corridor intersects with the northern portion of the proposed Kemerton Strategic Industrial Area (KSIA). Flora and vegetation surveys of the KSIA identified a total of 28 vegetation communities including the TEC listed *Banksia* Woodlands of the Swan Coastal Plain, Tuart woodlands (*Eucalyptus gomphocephala*) and Forests of the Swan Coastal Plain (DEE, 2016; Development WA, 2021).

A desktop assessment indicates that it is highly likely that the Leeuwin Development Envelope does include areas of the following TECs; *Banksia* Woodlands, Tuart Woodlands TEC's and Subtropical and Temperate Coastal Saltmarsh. It is also highly likely that several threatened orchid species may occur within Development Envelope including *Drakaea elastica* (EPBC Act Endangered) and *Drakaea micrantha* (see Appendix A, Figure 17 page 105) however field surveys will be required to confirm this.

Further details of terrestrial flora and communities are provided in Appendix A, Section 4.2.6. Flora and Vegetation (page 48), Section 6 MNES Results - Flora (page 85-87), Section 7.2 Threatened Ecological Communities (page 98-103) and Section 7.3 Threatened Flora Species (page 104-105).

##### Fauna

The literature review identified a number of faunal species that may potentially occur in the area including the Western Ringtail Possum, Western Quoll or Chuditch, Baundin's Cockatoo Carnaby's Cockatoo, Forest red-tailed Black and a vast array of wetland birds associated with the nearby Peel Yalgorup wetland. Appendix A, Section 7 provides details of the species likely to occur in the area. A literature review revealed no information about EPBC-listed subterranean fauna in the vicinity of the Development Envelope. There is the potential of other subterranean fauna to occur due to the presence of coastal limestone karst and cave systems in the area. Further field studies will be conducted to capture a base line of actual species and communities found within the development envelope.

#### 3.2 Describe the hydrology relevant to the project area (including water flows)

##### Ground Water

The onshore components of the proposed action lies within the Swan Coastal Plain which is underlain by unconfined groundwater that resides in a variety of aquifers, including quartz or calcareous sand, limestone, and a range of mixed sediments (Semenuk and Semenuk, 2006). The depth to groundwater in the superficial aquifer is typically shallow, with the water table normally within 5 to 10 m of the ground surface. Seasonally, the depth to groundwater may vary by up to 2 m, but changes in groundwater levels are more usually less than 1 m (DEC, 2009; Rockwater Pty Ltd, 2009). Groundwater flows in a westerly or south-westerly direction, discharging to coastal lake systems, to the Leschenault Inlet or to the ocean. Groundwater is mostly circumneutral in pH and fresh to slightly brackish, with salinities ranging from approximately 500 to 2,000 mg/L total dissolved solids.

##### Surface Water

The onshore Development Envelope straddles the catchment divide between the Harvey River catchment (north of Binningup) and the larger Collie River catchment (south of Binningup). The area contains no major natural drainage lines. However directly north and south of the project are wetlands that parallel much of the coastline. These wetlands are biologically productive and provide habitat for a range of flora and fauna species.

Further investigation will be conducted to understand surface and groundwater hydrology in the area. This information will be used to inform the design of the project and establish appropriate management measures to prevent impacts to these water sources.

Further details about the hydrology are provided in Appendix A, Section 4.2.1 Climate and Hydrology (page 41).

#### 3.3 Describe the soil and vegetation characteristics relevant to the project area

##### Offshore



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Geographe Bay is a wide relatively shallow embayment with average water depth of around 30 m (Appendix A, Figure 6). The majority of the seafloor is covered by unconsolidated sediments that have been deposited over older clay layers. The coastal waters within the Development Envelope (off Binningup Beach) are predominantly sandy seabed with sparsely distributed seagrass (Southern Ports, 2017). There is also a series of discontinuous limestone ridges that run parallel to the coast (Galaiduk, Radford and Harvey, 2018). Typically, benthic habitat in the region includes fine to medium sand with dense seagrass meadows of *Posidonia sinuosa*, broken up by sandy depressions ranging in size from meters to hectares. These seagrass meadows maintain sediment stability and serve as a nursery for juvenile fish and crustacea (CoastWise, 2001).

Benthic habitat mapping in the Binningup area, in the vicinity of the proposed cable crossing, found sponges, ascidians, Bryozoa, hydroids, hard corals, macroalgae and seagrasses, with macroalgal assemblages comprising *Ecklonia*, *Sargassum*, *Caulerpa*, *Scythothalia*, *Epiphytes* and *Codium*. Sparse seagrass meadows occur approximately 1 km offshore, primarily consisting of *Posidonia angustifolia*, with sporadically distributed *P. coriacea* and *Amphibolis* spp (Water Corporation, 2008). The Western Rock Lobster (*Panulirus cygnus*) occurs within the area, which plays an important functional role in the coastal ecosystem processes (MacArthur, Hyndes and Babcock, 2007).

#### Onshore

The Swan Coastal Plain is a low lying coastal plain. The onshore Development Envelope mostly overlies the Yalgorup Plain, a Pleistocene to Holocene landform consisting of fossiliferous limestone, aeolian limestone and quartz sand (Semeniuk, 1995) extending inland some 5 to 6 km from the Holocene estuarine lagoons and aeolian barrier ridges along the coast. The Yalgorup Plain has generally low to undulating relief of about 4 to 10 m, with some relict dune ridges up to 15 m high. Superficial soils within the Development Envelope are expected to comprise sands or loamy sands derived from fluvial or aeolian sediments transported from the Darling Scarp or deposited during successive periods of marine incursion. The Acid Sulphate Soil Risk Map for the Swan Coastal Plain was accessed and geospatial data overlaid with the project location (see Appendix A, Figure 9, page 44). These data suggest that parts of the onshore cable corridor may be underlain by acid sulphate soils and further soil assessment will need to be undertaken prior to any ground disturbance.

Further details about the landforms and soil are provided in Appendix A, Section 4.2.3 Landforms and Soils (page 42-44).

### 3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area

There are no outstanding natural features relevant to the proposed action.

### 3.5 Describe the status of native vegetation relevant to the project area

Much of the land within the onshore Development Envelope has been cleared of native vegetation as part of historic land development for agricultural, residential, and related land uses i.e., Binningup Desalination Plant, transmission corridors for the Kemerton sub-station, Forrest Hwy.

There are remnant vegetation communities found in mosaic patches throughout the Development Envelope that include the following vegetation types. Coastal dune vegetation exists along a coastal strip, extending inland for up to approximately 1 km. East of the dunes is vegetation typical of the 'Bassendean vegetation complex', which is likely to include *Eucalyptus marginata*, WA Sheoak (*Allocasuarina fraseriana*), *Banksia* and *Melaleuca* species. Sedgeland may occur in moister areas between the Holocene dunes. A desktop assessment indicates that it is highly likely that the Leeuwin Development Envelope does include areas of the following TECs; *Banksia* Woodlands, Tuart Woodlands TEC's and Subtropical and Temperate Coastal Saltmarsh.

It is also highly likely that several species of threatened orchid species may occur within the Development Envelope including *Drakaea elastica* (EPBC Act Endangered) and *Drakaea micrantha* (EPBC Act Vulnerable) (see Figure 17, page 105 of this report) and the following reference (Development WA, 2021). Field surveys will be required to confirm the presence of these species and community groups.

A Threatened and Priority Flora Database search (DBCAs) identified that seven species of threatened flora species occur within, or just outside of the Development Envelope. Six of the seven species are orchids that are endemic to the south-west of Western Australia. These orchids have been listed as threatened due to the fragmentation of populations and the continuing decline in the extent of occurrence, area of occupancy and the quality of habitat (DEC, 2009).

A more detailed desktop assessment is provided in Appendix A, Section 6 - MNES Results - Flora (page 85-87) and Section 7.3 Threatened Flora Species (page 104-105).

### 3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area

#### Offshore

The proposed action will span Commonwealth waters and Western Australian coastal waters within Geographe Bay. Geographe Bay is a wide relatively shallow embayment with average water depth of around 30 m. Appendix A, Figure 6



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(page 39) provides a map of the proposed action in Geographe Bay overlaid with the bathymetry. The majority of the seafloor is covered by unconsolidated sediments that have been deposited over older clay layers. The coastal waters within the Development Envelope (off Binningup Beach) are predominantly sandy seabed with sparsely distributed seagrass (Southern Ports, 2017). There is also a series of discontinuous limestone ridges that run parallel to the coast (Galaiduk, Radford and Harvey, 2018).

#### Onshore

The onshore area in the vicinity of the proposed landfall north of Binningup is relatively low-lying coastal plain with undulating relief of between 4-10 m. Superficial soils within the Development Envelope are expected to comprise sands or loamy sands derived from fluvial or aeolian sediments transported from the Darling Scarp or deposited during successive periods of marine incursion.

### 3.7 Describe the current condition of the environment relevant to the project area

#### Offshore

The coastal waters within the Development Envelope (off Binningup Beach) are predominantly sandy seabed with sparsely distributed seagrass (Southern Ports, 2017). There is also a series of discontinuous limestone ridges that run parallel to the coast (Galaiduk, Radford and Harvey, 2018). The available literature suggests that the benthic communities in this area are relatively low in species abundance and diversity. This pattern may be explained by the prevailing strong winds and highly mobile seabed. The offshore area receives a large volume of shipping traffic from the nearby port of Bunbury (10 km south). Impacts of these activities on the offshore environment are not known. Further field investigations are required to capture a baseline of environmental conditions within the proposed area.

#### Onshore

Much of the land within the onshore Development Envelope has been cleared of native vegetation as part of historic land development for agricultural, residential, and related land uses i.e., Binningup Desalination Plant, transmission corridors for the Kemerton sub-station, Forrest Hwy. There are remnant vegetation communities found in mosaic patches throughout the Development Envelope. Coastal dune vegetation exists along a coastal strip, extending inland for up to approximately 1 km, however these areas have been highly disturbed due to recreational four-wheel driving and camping (evident by extensive 4wd tracks throughout this area). The Acid Sulphate Soil Risk Mapping suggest that parts of the onshore cable corridor may be underlain by acid sulphate soils and further soil assessment will need to be undertaken prior to any ground disturbance (see Appendix A, Figure 9, page 44). Further field investigations are required to capture a baseline of environmental condition within the proposed area.

### 3.8 Describe any Commonwealth Heritage places or other places recognised as having heritage values relevant to the project

#### Underwater Cultural Heritage

Cultural heritage database searches indicated that there is one wreck (the Thermoni II) within the Development Envelope, the exact location of the wreck is not certain and due to its age (<56 years old) it is not protected by the UCH Act. There are two other listings outside of the Development Envelope; the Lass of Geraldton which is protected and the other the Lena which is not protected but is a popular tourist attraction. Consideration will be made when designing the location of offshore infrastructure to avoid the Lena and the Lass of Geraldton wrecks. Initial consultation has begun with the Western Australian Museum (Maritime Archaeology) to identify wrecks. This process will be continued and refined as the project progresses.

#### State Register of Heritage Places

There are 15 places listed on the State Register of Heritage Places within the study area, including the following. These sites are not classified as MNES and will be addressed in great detail during the State assessment.

- First Windmill Site (farming)
- Binningup Park Site (urban park)
- Binningup War Memorial
- Depression Sustenance Worker's Camp Site (historic)
- Pead's Cottage

### 3.9 Describe any Indigenous heritage values relevant to the project area

A preliminary desktop search of Aboriginal Heritage Information System (AHIS) data base found no registered Aboriginal heritages sites within the onshore Development Envelope, however a number of 'other heritage places' (Site IDs: 4884, 5803, 5804, 5805, 5806 and 5807) are listed in the AHIS database. These sites have been assessed as not meeting criteria set out in Section 5 of the Aboriginal Heritage Act 1972. However, the sites cannot be discounted as not having some local cultural or heritage importance. There are no World Heritage properties or National Heritage Places within the onshore Development Envelope. An indigenous heritage assessment and consultation with Aboriginal representative is required to identify areas and specific sites that hold cultural value.



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**3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area**

Offshore

The seabed of the referral area is Crown Land.

Onshore

The majority of the proposed onshore development envelope is classified as freehold land. There are areas of reserve land, however it is envisioned that as the onshore development envelope is refined it will avoid these areas.

**3.11 Describe any existing or any proposed uses relevant to the project area**

Onshore

The onshore Development Envelope lies entirely within the Shire of Harvey and much of the land has been cleared and subject to some form of land development. Current land use in the area includes general farming, grazing, desalination plant, mineral processing industries, sand extraction, forestry plantations, infrastructure, municipal services (landfill, wastewater treatment), rural and semi-rural residential, native vegetation and wetland conservation. In addition, there is a Western Power electricity transmission corridor and substation (Kemerton). The project design will seek to utilise these previously developed areas for the disturbance footprint as opposed to disturbing any natural ecosystems. The sheltered beaches near Binningup and Myalup are used by local residents and tourists for recreational activities such as camping, four-wheel driving, swimming, surfing, boating and fishing. Beach launching is commonly practiced along the coast with launching ramps located at Binningup Beach and Myalup, both popular beach fishing location due to 4WD access. There are no boat launching ramps in the Development Envelope.

Approximately one third of the proposed onshore cable corridor overlaps with the proposed Kemerton Strategic Industrial Area (KSIA) which is currently being assessed under the EPBC Act (EPBC Reference Number 2021/8883). The KSIA propose to further develop this area to become an industry hub for the southwest.

Offshore

There are a number of commercial fisheries located within or adjacent to the Development Envelope, notably Australia's most valuable fishery, the Western Rock Lobster. Other significant commercial fisheries in the region include the Southwest Beach Seine, Commercial Crab, Abalone, Octopus, and various marine and estuarine finfish fisheries. The region also hosts trawl fisheries including the Western Deepwater Trawl Fishery, Offshore Demersal Fishery and Southwest Trawl Managed Fishery. The offshore area receives a large volume of shipping traffic from the nearby port of Bunbury (10 km south). In addition, local residents use the offshore area for fishing, diving and boating.



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## Section 4

### Measures to avoid or reduce impacts

#### 4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

Below is a list of proposed management measures to mitigate potential impacts. Appendix A, Section 8 Potential Impacts and Proposed Management (page 136-141) provides further detail on these measures;

- Turbines located at least 15 – 20 km offshore so risk to shore birds and terrestrial birds negligible.
- The proposed turbines are designed to be large and slow which are known to reduce bird mortality.
- Design measures to reduce risk of bird mortality (number of turbines, turbine height, location, distance between turbine)
- Bird surveys to identify bird species at risk, migratory routes and altitude.
- Vegetation surveys will be conducted to characterise existing conditions, species and TEC present in the vicinity of the proposed action.
- The scale of the land clearing is proposed to be 21 hectares.
- A large portion of the Development Envelope has been cleared/disturbed (e.g. Binningup Desalination Plant, export cables connecting to Kemerton sub-station, Forrest Hwy). Where possible the placement of the onshore corridor and infrastructure will utilise these areas and avoid areas of native vegetation and habitat crucial to support threatened and priority flora and fauna species.
- Specific weed and pathogen controls protocols will be included in the Construction Environmental Management Plan.
- Rehabilitation and landscaping works will utilise locally occurring native vegetation.
- Pre-construction and construction activities will be managed to prevent any significant impact on nearby wetlands and waterways.
- An assessment of the surface and groundwater hydrology will be required to confirm any potential impacts to the Ramsar wetland.
- Management measures will include soil testing for ASS and the use of sediment ponds and bunds to control any surface water flows and quality.
- High resolution benthic habitat mapping to identify critical habitats.
- The location of OWF foundations designed to ensure minimal overlap with seagrass meadows.
- Refine development footprint to avoid Key Ecological Features.
- Pile driving is only one of the options to install WTGs. Suction caissons and gravity bases are presented as options and do not require pile driving.
- Ensure construction timing avoid peak seasons/periods during which the species will cross or inhabit the study area (as defined by their BIAs and baseline survey data).
- Investigate and implement relevant underwater noise mitigation strategies such as bubble curtains.
- Apply controls during pile driving operations consisting of, but not limited to marine mammal observers, pre-start watch, soft-start and shut-down procedures if a listed animal is detected inside the defined mitigation zone.
- Investigate use of Passive Acoustic Monitoring during night-time construction operations.
- Identify suitable location for dredge spoil.
- Limit vessel speeds within BIAs.
- Subsea cable design and appropriate depth of burial should be considered to reduce the effect EMFs. The voltage on the copper conductors within the cable is blocked by a grounded metallic covering on the cable.
- Reduce vessel speeds within the study area and during key season/periods for marine fauna such as humpback whale migration etc.
- To avoid vessel strike maintain a look out for cetaceans, especially during peak migration/foraging seasons, warn other vessels in the vicinity using all appropriate means of communication if cetaceans have been sighted, reducing vessel speed in areas where cetaceans have been sighted; and consider course alterations away from sightings.
- All vessels employed during the proposed action will be required to meet rigorous Australian and international maritime laws to minimise the risk of chemical or hydrocarbon spills to the environment.
- Any hazardous spill must be reported to the Joint Rescue Coordination Centre (JRCC) Australia (Harmful Substances Report [POLREP]), such that an immediate assessment and response can be arranged.
- An oil spill response plan will be developed for the proposed action.
- All vessels will adhere to the Australian Ballast Water Management Requirements (Department of Agriculture Water and the Environment, 2020) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Convention) to reduce the risk of introduce marine pests.
- All vessels will utilise the Quick Ballast Water (DBW) Risk Assessment Tool (DAWR, 2018).
- All vessels will utilise the Vessel Check Risk Assessment Tool (DPIRD).

#### 4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

Leeuwin Offshore Wind Pty Ltd takes its environmental responsibilities extremely seriously and is committed to adopting best





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practice in environmental management for this project. They will comply with all environmental laws, rules and regulations relevant to the project. They are committed to consult and work with all key stakeholders to fully identify all potential impacts and to design robust management strategies to avoid potential impacts and where impacts cannot be avoided mitigation measures will be developed to minimize impacts. The proposed action will be managed in alignment with Recovery Plans, Conservation Management Plans, Conservation Advices, Threat Abatement Programs and Commonwealth Marine Bioregional Plans that are relevant to MNES that occur in the referral area.

Specific outcomes that are proposed to be achieved by the project include;

- No significant impacts to Peel Yalgorup Ramsar site, EPBC Act listed threatened species, TECs or migratory species, or the Commonwealth marine area.
- No destruction, modification or fragmentation of habitats considered critical or important to the survival of an EPBC Act listed threatened or migratory species.
- No substantial adverse impacts to underwater heritage features within the referral area.
- No invasive marine species are introduced as a result of the proposed action.
- No substantial changes to the marine hydrological regime or water quality as a result of the proposed action.



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## Section 5

### Conclusion on the likelihood of significant impacts

#### 5.1 You indicated the below ticked items to be of significant impact and therefore you consider the action to be a controlled action

- World Heritage properties
- National Heritage places
- Wetlands of international importance (declared Ramsar wetlands)
- Listed threatened species or any threatened ecological community
- Listed migratory species
- Marine environment outside Commonwealth marine areas
- Protection of the environment from actions involving Commonwealth land
- Great Barrier Reef Marine Park
- A water resource, in relation to coal seam gas development and large coal mining development
- Protection of the environment from nuclear actions
- Protection of the environment from Commonwealth actions
- Commonwealth Heritage places overseas
- Commonwealth marine areas

#### 5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

Significant matters identified above.



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## Section 6

### Environmental record of the person proposing to take the action

#### 6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Explain in further detail

Yes, Copenhagen Energy (Leeuwin Offshore Wind Pty Ltd) has a satisfactory record of responsible environmental management. The proposed action is being developed by Leeuwin Offshore Wind Pty Ltd, which is a wholly owned subsidiary of Copenhagen Energy. The senior management team of Copenhagen Energy have more than 40 years' experience developing renewable energy projects onshore and offshore in Denmark, Germany and United Kingdom. These projects have been managed to comply with all environmental and safety laws, rules and regulations relevant to these countries.

See Appendix A - Section 3.3 Proponent Environmental Management (page 27) , and Appendix B - Copenhagen Energy's Offshore Wind Environmental Policy.

#### 6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application

There are no such proceedings

#### 6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes  No

#### 6.3.1 If the person taking the action is a corporation, provide details of the corporation's environmental policy and planning framework

The proposed action is being developed by Leeuwin Offshore Wind Pty Ltd, which is a wholly owned subsidiary of Copenhagen Energy.

Leeuwin Offshore Wind Pty Ltd takes its environmental responsibilities extremely seriously. Sustainable development and environmental stewardship are the driving force behind the company's core values and mission. The company's mission is to accelerate the development of green energy projects all over the world with the goal of zero CO2 emissions to combat the global climate crisis. While pushing new frontiers for offshore wind power the company is focused on adopting best practice in environmental management for this project.

The senior management team of Copenhagen Energy have more than 40 years' experience developing renewable energy projects onshore and offshore in Denmark, Germany and United Kingdom. These projects have been managed to comply with all environmental and safety laws, rules and regulations relevant to these countries and jurisdictions. This track history is especially relevant as these countries lead the world in their regulation and management of environmental impacts from offshore wind. Copenhagen Energy is conscious that Australia's offshore wind industry is in its infancy and is focused on transferring this best practice to the ensure the success of this new industry.

The team's project experience has included Natura 2000 areas, which are conservation and protection areas established by the European Commission to protect core breeding and resting sites for rare and threatened species and natural habitat. This previous experience is highly relevant to this project in light of the Ramsar wetland in the vicinity of the proposed action which also includes rare and threatened species and habitat. Copenhagen Energy have the experience and knowledge to manage the environmental and social impacts associated with this project. They are committed to consult and work with all key stakeholders to fully identify all potential impacts and to design robust management strategies to avoid potential impacts, and where impacts cannot be avoided mitigation measures will be developed to minimize impacts.

Neither Leeuwin Offshore Wind Pty Ltd or Copenhagen Energy have been involved in any cases of environmental misconduct or accidents (presently or in the past).

Please see Appendix B - Copenhagen Energy's Offshore Wind Environmental Policy, for more details on the company's environmental management ethos.

#### 6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes  No



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## Section 7

### Information sources

#### Reference source

Reference used in the preparation of this referral include Commonwealth, State and publicly available studies. A full reference list is provided in Appendix A, Section 10 References (page 145-149).

#### Reliability

All sources are accredited government sources or peer reviewed studies.

#### Uncertainties

This referral was prepared based on a desktop assessment of publicly available information. Some of these sources are not recent (older than 10yrs). Spatial mapping tools were used to identify MNES, there are inherent uncertainties attached to these databases as they only presents the data that has been documented to date. So it is possible that MNES are present but not captured in the databases. This reinforces the need to conduct detailed field surveys to confirm the presence or absence of MNES within the Development Envelope. It is also highlights the need for stakeholder consultation to gather local knowledge about MNES.



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## Section 8

### Proposed alternatives

Do you have any feasible alternatives to taking the proposed action?

Yes  No

#### 8.0 Provide a description of the feasible alternative

The Leeuwin OWF site was selected as the preferred offshore windfarm location following an initial site selection study of the entire WA coastline. The site selection study evaluated alternative windfarm locations based upon a ranking system that included consideration of a range of engineering, environmental, social and design constraints, including the following factors:

- Wind strength.
- Extreme weather and cyclone risk.
- Risk of seismic activity.
- Presence of conservation areas or other protected environmental features.
- Presence of threatened species or ecological communities.
- Potential for interaction with migratory species and marine fauna.
- Benthic communities: presence of seagrass, coral, rocky outcrops, or other important habitat features.
- Environmental quality: biodiversity, degree of ecosystem alteration.
- Coastal landforms: susceptibility to erosion.
- Bathymetry and water depth: implications for establishment and maintenance of infrastructure.
- Onshore and offshore substrate and soil conditions.
- Potential presence of acid sulphate soils.
- Water quality.
- Presence of Aboriginal sites or cultural values.
- Presence of other heritage features (shipwrecks, etc).
- Potential for conflict with other land / water uses:
  - Tourism.
  - Recreation.
  - Fisheries/aquaculture.
  - Shipping.
  - Defense: army/naval restricted zones.
- Potential for cumulative impacts with other coastal developments.
- Potential presence of unexploded ordnance.
- Access to / linkage with other infrastructure and/or industrial users.
- Proximity to a large port
- Access roads.
- Viable connection to the grid.
- Distance to industry that have a drive to decarbonise.

The Leeuwin OWF site was selected as the preferred site for initial development based upon its:

- Highly wind velocities and consistency with mean wind speeds greater than 8.3 m/s (at 100 m elevation).
- Shallow bathymetry, with water depths ranging from 18 - 45 m.
- Good access to existing port infrastructure at Bunbury and Kwinana.
- Suitable electricity substation located 8km from the landfall at Kemerton that would allow electricity transmission into the SWIS.
  - Proximity to a skilled workforce.
  - Proximity to existing and future residential and industrial energy users.
  - Low risk of extreme weather or cyclones.
  - Potential to make use of infrastructure alignments established for other existing projects, thereby avoiding some environmental disturbance.

A range of possible alignments for subsea cables and substations and for transition areas to onshore facilities were assessed. Key considerations in the identification of the preferred (and chosen) layout included:

- Land access considerations.
- Environmental values.
- Proximity to existing and future power infrastructure and industrial activity.
- Potential for cumulative impacts with other coastal developments.

A feasibility assessment was conducted, in consultation with Western Power, to determine the best substation location(s) to provide efficient connection to the SWIS grid. The assessment highlighted two options (Kemerton and Lanwehr); however, Lanwehr was excluded from this referral as the onshore cable route passed over the Peel-Yalgorup Ramsar wetland. At present the Kemerton terminal and power station is being referred. The cable route avoids the Ramsar wetland, and it also



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offers a shorter cable route to the substation (approximately 8 km from the coast) which reduces the onshore disturbance footprint.

**8.1 Select the relevant alternatives related to your proposed action**

- Timeframes
- Locations
- Activities

**8.25 Do you have another alternative?**

- Yes
- No



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**Section 9**

**Person proposing the action**

**9.1.1 Is the person proposing the action an organisation or business?**  
 Yes       No

**Organisation**

**Organisation name (as registered for ABN/ACN)**  
**Business name**  
**ABN**  
**ACN** 656719907  
**Business address** Unit 2, 95 Hay St, Subiaco, 6008, WA, Australia  
**Postal address**  
**Main Phone number** +61 8 6218 0900  
**Fax**  
**Primary email address** nah@copenhagen-energy.com  
**Secondary email address**

**9.1.2 I qualify for exemption from fees under Regulation 5.23(1)(ii) of the EPBC Regulations because I am:**  
 Small business  
 Not applicable

**9.1.2.1 You must provide the date/income year that you became a small business entity:**  
 01/11/2021

**9.1.2.2 I would like to apply for a waiver of full or partial fees under Regulation 5.21A of the EPBC Regulations**  
 Yes       No

**9.1.3 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)**

**First name** Jasmin  
**Last name** Bejdic  
**Job title** CEO  
**Phone**  
**Mobile** +45 3111 1759  
**Fax**  
**Email** jb@copehagen-energy.com  
**Primary address** Thorvaldsensvej 2, 5.th, 1871 Frederiksberg, Denmark,  
 1871, Frederiksberg, Denmark  
**Address**

**Declaration: Person proposing the action (To be signed by the person at 9.1.3)**

I, \_\_\_\_\_, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity.

Signature: ..... Date: .....

I, \_\_\_\_\_, the person proposing the action, consent to the designation of \_\_\_\_\_ as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:.....Date: .....

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small business entity and confirm that I qualify for a small business exemption.

Signature:.....Date: .....



Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

**Proposed designated proponent**

**9.2.1 Is the proposed designated proponent an organisation or business?**  
 Yes       No

**Organisation**

**Organisation name (as registered for ABN/ACN)**  
**Business name**  
**ABN**  
**ACN** 656719907  
**Business address** Unit 2, 95 Hay St, Subiaco, 6008, WA, Australia  
**Postal address**  
**Main Phone number** +61 8 6218 0900  
**Fax**  
**Primary email address** nah@copenhagen-energy.com  
**Secondary email address**

**9.2.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)**

**First name** Jasmin  
**Last name** Bejdic  
**Job title** CEO  
**Phone** +45 3111 1759  
**Mobile** +45 3111 1759  
**Fax**  
**Email** jb@copenhagen-energy.com  
**Primary address** Thorvaldsensvej 2, 5.th, 1871 Frederiksberg, 1871,  
 Frederiksberg, Denmark  
**Address**

**Declaration: Proposed Designated Proponent**

I, \_\_\_\_\_, the  
 proposed designated proponent, consent to the designation of  
 myself as the proponent for the purposes of the action described in this EPBC Act Referral.

**Signature:** ..... **Date:** .....





Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

**Referring party (person preparing the information)**

**9.3.1 Is the referring party an organisation or a business?**  
 Yes       No

**Organisation**

**Organisation name (as registered for ABN/ACN)**  
**Business name**  
**ABN**  
**ACN** 656719907  
**Business address** 95 Hay St, Subiaco, 6008, WA, Australia  
**Postal address**  
**Main Phone number** +45 3111 1759  
**Fax**  
**Primary email address** jb@copehagen-energy.com  
**Secondary email address**

**9.3.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)**

**First name** Jasmin  
**Last name** Bejdic  
**Job title** CEO  
**Phone** +45 3111 1759  
**Mobile**  
**Fax**  
**Email** jb@copehagen-energy.com  
**Primary address** Thorvaldsensvej 2, 5. th., 1871 Frederiksberg, 1871, Frederiksberg, Denmark  
**Address**

**Declaration: Referring party (person preparing the information)**

I, \_\_\_\_\_, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

**Signature:** ..... **Date:** .....



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<b>Appendix A</b>	
<b>Attachment</b>	
<b>Document Type</b>	<b>File Name</b>
action_area_images	App C Leeuwin Offshore Windfarm PDD.pdf
action_area_images	App D_DAWA_Referral_Response_Table.pdf
supporting_tech_reports	App A MNES Supporting Document.pdf
supporting_tech_reports	App A MNES Supporting Document_v2.pdf
corp_env_policy_docs	App B CE Environmental Policy.pdf

<b>Appendix B</b>
<b>Coordinates</b>
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