



Project Seadragon

Attachment 6 – Preliminary Impact Assessment Summary



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1 INTRODUCTION

1.1 Background

This Preliminary Environmental Impact Assessment (PEIA) has been prepared to support the Flotation Energy Seadragon Offshore Windfarm (the Project) referrals. Flotation Energy has undertaken a series of preliminary desktop baseline characterisation reports to support the identification of key environmental and socio-cultural sensitivities relevant to the referral area (excluding ports). These studies have been used to inform this PEIA which follows a standardised methodology for identifying potential environmental effects and determining potential significance.

1.2 Impact Assessment Methodology

The impact assessment methodology used in this PEIA has been developed based on widely adopted best practise and industry standards, such as AS/NZS ISO 31000:2018: Risk Management – Principles and Guidelines.

An environmental effect is a change (adverse or beneficial) or risk to an environmental asset which results from components of a proposed Project. Projects may give rise to environmental effects through relatively direct cause-effect pathways, or through more complex, indirect pathways. In addition, the cumulative effect of a project in combination with other activities may need to be assessed if there is a risk of significant adverse effects.

The level of an environmental effect to an environmental asset can be considered as a combination of the likelihood and magnitude of the potential affect occurring, as well as the extent and duration of that effect on the asset. The vulnerability, sensitivity, and recoverability of the environmental asset to a given effect is also relevant.

The impact assessment methodology consists of the following steps:

1. **Establish the Context** – A description of the project and existing environment within the project boundary is provided to a sufficient level of detail to determine impact pathways.
2. **Identify Potential Environmental Effects** – identification of environmental effects (adverse or beneficial) is undertaken, including:
 - a. A brief description of potential changes or risks to environmental assets resulting from the project
 - b. Summary of available information on the likelihood and significance of such changes
 - c. Description of the sources and accuracy of this information, and associated uncertainties.
3. **Assessment of potential significance** – significance of environmental effects to specific assets is determined.
4. **Mitigation Measures** – proposed mitigation measures are identified to avoid or mitigate the main potential adverse environmental effects.



1.3 Assessment of Potential Significance

Assessment of potential significance is a key outcome of the PEIA. It provides context to the baseline studies that have been commissioned and guides the content in the referral documents. The Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (DSE, 2006) states that the potential for a significant effect on the environment should reflect the following factors:

- Significance of the environmental assets affected, in relation to:
 - character of the potentially affected environmental assets
 - geographic occurrence of the environmental assets
 - values or importance of the environmental assets, based on expert knowledge, relevant policy, and evidence of social values
- Potential magnitude, extent, and duration of adverse effects on environmental assets in the short, medium, and longer term, because of the development, operation and where relevant, decommissioning of a project potential for more extended adverse effects in space and time, because of interactions of different effects and environmental processes affecting environmental assets.

Other factors, including the likelihood of such effects, should also be considered.

Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance. A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude, and geographic extent of the impacts (DAWE, 2013).

Whether a project can have a significant effect requires consideration of the potential scope of effects and their degree of likelihood, in terms of the risk of adverse effects. For instance, an effect that may have a low likelihood may still be significant if its magnitude could be large.



2 PRELIMINARY IMPACT ASSESSMENT

2.1 Establish the Context

The context for an assessment is established through an understanding of the Project, the existing environment within the project boundary, and the ways in which these two things interact. The PEIA seeks to establish the pathways to environmental effects from activities undertaken within the referral jurisdiction, and activities undertaken outside of the referral jurisdiction which may influence the environment within the referral jurisdiction boundary.

The Project is described fully within the referral documents. The description of environmental assets within the study area are provided in the main referral applications. A justification for the study area is provided in each of the studies. A detailed description of environmental assets is also provided in the studies undertaken by Biosis and ERIAS to support the referral application, including:

- Preliminary Desktop Marine Ecology Assessment.
- Preliminary Desktop Terrestrial and Aquatic Ecology Assessment.
- Preliminary Desktop Assessment (Aboriginal Cultural Heritage).
- Preliminary Desktop Assessment (Historic Heritage).

An important part of the context is the legislative and other requirements that will apply to the project. These are listed within the relevant referral document.

2.2 Identification of Potential Environmental Effects

To understand the potential magnitude, extent and duration of an environmental effect, the pathway to each environmental effect has been identified. These pathways include:

- **Physical presence** – the presence of components of the project, such as the physical presence of vessels operating in marine waters.
- **Disturbance** – the footprint of the project may result in changes to the physical assets of processes, for example disturbance to the seabed during cable installation.
- **Noise and vibrations** – components of the project could generate noise and vibrations, which could affect ecological or social assets.
- **Atmospheric emissions** – components of the project will generate atmospheric emissions, which could affect ambient physical conditions and ecological assets.
- **Planned discharges** – the project will likely result in planned solid and liquid discharge pathways, such as those generated by construction camps and vessels.
- **Unplanned events** – whilst undertaking the project, unplanned events may occur which result in discharges, such as accidental release of fuel, or interactions, such as introduction of pest species.



Table 2-1 presents a summary of project activities against the pathways to environmental effects. Table 2-2 describes the environmental effect pathways, and how they could result in impacts to environmental assets. Table 2-2 also shows the phase of the activity in which the effects may occur using the key 'C & I' for the construction and installation phase, 'O' for the operations phase, and 'D' for the decommissioning phase.

Table 2-1 Activity-Pathway Matrix

	PHYSICAL PRESENCE	DISTURBANCE	NOISE AND VIBRATIONS	ATMOSPHERIC EMISSIONS AND DUST	PLANNED DISCHARGES	UNPLANNED EVENTS
Construction Phase Activities						
Offshore construction and shore crossing	X	X	X	X	X	X
Onshore construction		X	X	X		
Operational Phase Activities						
Monitoring and operations of the WTGs	X		X			
Offshore maintenance activities	X	X	X	X	X	X
Onshore maintenance activities		X				
Use and maintenance of onshore infrastructure and property	X					
End of design life WTG replacement		X	X			X
Decommissioning Phase Activities						
Offshore decommissioning	X	X	X	X	X	X
Onshore decommissioning	X	X	X	X		X
Support Operations						
Ancillary activities i.e., temporary site offices, laydown	X	X	X	X	X	X
Vehicle movements	X			X		X
Vessel movements	X		X	X	X	X

2.3 Assessment of Potential Significance

Using the significance criteria provided in DSE (2006) and DAWE (2013), the potential for impacts to environmental assets to be significant have been discussed. Further detail on the justification for these assessment outcomes is provided in the detailed studies undertaken for this assessment. All effects are considered in the referral documents though lesser effects are covered in less detail. This PEIA assists in determining the level of detail required in the referral based on the assessment in Table 2-2.



2.4 Mitigation Measures

The assessment of effects considers the residual effects that occur with the application of legislative requirements as a minimum. Further, industry standards are applied during the design of the Project many of which aim to avoid or minimise environmental effects. Mitigation measures are adopted within the design and implementation of the Project to further reduce environment effects and risks. They are typically specific to the environmental setting of the project and may not be defined until the final details of the Project are known.

In determining the mitigation measures included at any stage of the Project, Flotation Energy will implement the hierarchy of controls system. This is a widely accepted system to classify mitigation measures and promote adoption of the most effective mitigation measures first. The hierarchy, in order of decreasing effectiveness is, elimination/avoidance, substitution, engineering, administrative/procedural, offsetting. In an environmental context, procedural mitigation measures can include further studies which improve the accuracy of predicted effects, validate assumptions, establish baselines, monitor impacts, or reduce scientific uncertainty. Some mitigation measures are proposed in the referral documents and others will be adopted as the project detail is refined.



Table 2-2 Environmental Effects and Potential Significance of Environmental Effects

ENVIRONMENTAL ASSET	ENVIRONMENTAL EFFECT PATHWAY	ENVIRONMENTAL EFFECT DESCRIPTION	RELEVANT PROJECT PHASES			POTENTIAL SIGNIFICANCE		
			C & I	O	D			
Offshore Environment								
Physical Environment	Physical and coastal processes	No	Physical presence	Presence of the project will change localised coastal processes	✓	✓	✓	Potentially Significant Depending on the method of cable installation in coastal environments, there may be disruptions to varying degrees. This will be adequately mitigated and following the proper legislation to lower the impact. Therefore, the impact is potentially significant.
	Water and sediment quality	Yes	Physical presence	Presence of the project will increase turbidity / suspended sediments, and change the sediment make up on a localised scale	✓	✓	✓	Potentially Significant Environmental effects changing water quality and sediment quality will be on-going for the duration of the project and may affect MNES on a localised scale. Therefore, the impact is potentially significant.
		Disturbance	Trenching etc will disturb sediments and change water quality	✓		✓	Unlikely to be significant During construction and decommissioning, the sediment quality and water quality will be disturbed, however this disturbance is short-lived, localised to the area, and will settle and therefore, is unlikely to be significant.	
		Planned discharges	Routine discharges from vessels (e.g., sewage) causing decline in water quality.	✓	✓	✓	Unlikely to be significant Routine discharges from vessels throughout the entire project phases are likely to have minimal impact and be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.	
		Unplanned events	Fuel or chemical spills from refuelling incidents, vessel collisions, incorrect storage or transport of hazardous materials deteriorating water and sediment quality.	✓	✓	✓	Unlikely to be significant Accidental and unplanned events throughout the entire project phases are unlikely to occur and therefore would have minimal impact as well as be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.	
Offshore Air Quality and Noise	No	Noise and vibrations	Noise from project will change ambient noise levels	✓	✓	✓	Unlikely to be significant It is not expected that the noise generated throughout the project will have a significant impact on the local environment, therefore is unlikely to be significant.	
		Atmospheric emissions and dust	Emissions will change localised air quality	✓	✓	✓	Potentially Significant During construction, cable laying, and decommissioning dust levels will potentially impact the local air quality and give rise to local dust issues, therefore are potentially significant.	
Benthic and intertidal quality	No	Disturbance	Habitat change / destruction from disturbance	✓		✓	Unlikely to be significant During construction and decommissioning, the sediment quality and water quality will be disturbed, however this disturbance is short-lived, localised to the area, and will settle so therefore, is unlikely to be significant.	



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				C & I	O	D		
		Physical presence	Creation of habitat for benthic fauna through colonisation of seabed infrastructure		✓		Potentially Significant Environmental effects changing benthic and intertidal quality will be on-going for the duration of the project and may affect MNES on a localised scale. Therefore, the impact is potentially significant.	
		Planned discharges	Vessel and chemical discharges will change water quality & sediment quality close to discharge location	✓	✓	✓	Unlikely to be significant Routine discharges from vessels throughout the entire project phases are likely to have minimal impact and be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.	
		Unplanned Events	Introduction or spread of invasive marine species from contaminated hulls or ballast water discharges causing competition, predation or displacement of native fauna and flora.	✓	✓	✓	Unlikely to be significant Effects from introduced marine species can be long-term and wide-spread, however legislative requirements are well developed will be in place to manage the associated risks. Therefore, is unlikely to be significant.	
Marine Ecology	Fish and marine invertebrates	Yes	Physical presence	Reduction in subsea habitat availability causing displacement of species.		✓		Potentially Significant The presence of the infrastructure during the operational period may result in the localised displacement of species, as this will occur throughout the entire operational period there is potential significance.
			Disturbance	Direct mortality of benthic fauna during installation.	✓	✓	✓	Potentially Significant Direct mortality of benthic fauna during installation may occur, however it will depend on the number of pin piles required and the duration of installation activities. The impact is likely to be highly localised to the area of installation and recoverable, therefore is potentially significant.
				Re-suspension of sediment in the water column creating turbid plumes causing decline in water quality, reduced light availability, and smothering of benthic fauna.				Potentially Significant Environmental effects changing water quality and sediment quality will be on-going for the duration of the project and may affect MNES on a localised scale with the potential to smother benthic fauna, therefore are potentially significant.
				Scour and changes to seabed and sediment transport and deposition processes resulting in habitat alterations.				Unlikely to be significant Any impacts will be localised and temporary and are not expected to affect MNES as there are relevant water quality guidelines to follow to prevent significant impact, therefore is unlikely to be significant.
				Subsea cables emitting EMF causing avoidance behaviours or disrupting communication or navigational signals of fish or invertebrates.				Potentially Significant MNES are known to use the project area for important behaviours, such as foraging and migration, however the cables would be buried which reduces the emissions of EMF, therefore is potentially significant to fish and invertebrates.
				Noise and vibrations	Injury / mortality Change in behaviour	✓	✓	✓



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				C & I	O	D	
		Planned discharges	Drilling fluids and cements released into the marine environment will reduce water quality through chemical toxicity, increased turbidity and smothering effects. Sessile invertebrates and those which rely on localised habitats (such as nearshore fish species) will be most affected.	✓			Unlikely to be significant Any impacts will be localised and temporary and are not expected to affect MNES, therefore is unlikely to be significant.
			Cements discharged to the marine environment can harden, resulting in a change in sediment structure and a change in habitat for marine fauna.	✓			Unlikely to be significant Any effects will be localised and temporary and are not expected to affect MNES and be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.
		Unplanned events	Spills				Unlikely to be significant Accidental and unplanned events throughout the entire project phases are unlikely to occur and therefore would have minimal impact as well as be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.
			Introduction or establishment of invasive marine species from contaminated hulls or ballast water discharges causing competition, predation or displacement of native fauna and flora.	✓	✓	✓	Unlikely to be significant Effects from introduced marine species can be long-term and wide-spread, however legislative requirements are well developed and will be in place to managed associated risks, therefore is unlikely to be significant.
Offshore ornithology	Yes	Physical presence	Physical presence of wind turbines which present a collision risk to bird species present in the array area		✓		Potentially Significant Environmental effects will be on-going for the duration of the project and may affect FFG Act listed or MNES, therefore are potentially significant.
			Barrier effect due to the presence of turbines		✓		
			Potential change in habitat / prey availability	✓	✓	✓	
			Creation of roosting habitat or foraging opportunities		✓		
			Presence of vessels which disturb and displace birds	✓	✓	✓	
		Unplanned Events	Surface pollution				Unlikely to be significant Accidental and unplanned events throughout the entire project phases are unlikely to occur and therefore would have minimal impact as well as be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.
Marine mammals and megafauna	Yes	Physical presence	Interruption to biologically important activities (e.g., great white shark and southern right whale).	✓	✓	✓	Potentially Significant Environmental effects will be during construction (piling) and on-going for the duration of the project and may affect MNES, therefore are potentially significant.
			Lighting from vessels, construction and operation infrastructure disrupting navigational cues of turtles, or causing aggregations of invertebrates.	✓	✓	✓	Potentially Significant Although MNES are found within the project area, those which may be affected by light emissions are not typically undertaking important behaviours. Environmental effects have the potential to be significant, depending on final project design.



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				C & I	O	D		
		Noise and vibrations	Noise from construction or operation of equipment/vessels causing avoidance behaviour (by predator and prey species) or physical injury or death, masking of communications or behavioural responses.	✓	✓	✓	Potentially Significant MNES are known to use the project area for important behaviours, such as foraging, however it is expected that application of the hierarchy of controls will lower this impact to potentially significant.	
		Planned discharges	Change in water quality leading to avoidance behaviour. Injury not likely (vessel discharges mainly and shoreline HDD drilling discharges possibly)	✓	✓	✓	Unlikely to be significant Any effects will be localised and temporary and are not expected to affect MNES and be adequately managed through standard mitigations and local legislature, therefore is unlikely to be significant.	
		Unplanned Events	Entanglement of species in dropped objects causing injury or death.	✓	✓	✓	Unlikely to be significant Any environmental effects will impact individuals only, with no population-level effects expected, therefore is unlikely to be significant.	
			Ingestion of dropped objects by species leading to illness or death.	✓	✓	✓	Unlikely to be significant Any environmental effects will impact individuals only, with no population-level effects expected, therefore is unlikely to be significant.	
Socio-Economic Environment	Commercial fisheries	No	Physical presence	Reduced access to commercial fishing areas or decline in abundance of fisheries species, leading to loss of livelihoods; displacement of fisheries to alternate fishing ground; obstruction of regular fishing vessel transit routes; fishing gear entanglement risk	✓	✓	✓	Potentially significant Due to the requirement for safety zones around construction activities and throughout the operations, this may result in temporary loss or restricted access to the fishing grounds within the operational area.
	Shipping and navigation	No	Physical presence	Disruption to navigation in the project area; increased pressure on search and rescue services; vessel collision risk	✓	✓	✓	Potentially significant Shipping and navigation vessels may be displaced from their existing routes due to the activities occurring throughout all phases of the project. This could impact fishing and recreational vessels within the presence of the site and lead to increased traffic densities in certain areas, increasing the risk of vessel collision.
	Military and aviation	No	Physical presence	Restricted access to project area by civil and military aviation and interference with radar and communication systems	✓	✓	✓	Unlikely to be significant The impacts of the project are unlikely to cause any significant impact to military and aviation operations because the project will comply with all applicable legislation relating to civil and military aviation (including stakeholder consultation), therefore is unlikely to be significant.
	Seascape, landscape and visual	No	Physical presence	Impacts of turbines on landscape and seascape and visual receptors	✓	✓	✓	Potentially significant Indirect, temporary and short and long-term impacts upon visual receptors especially during the construction and installation phase with vessels and navigational lighting being seen 24/7. These can cause potential significance on the local environment.
	Marine archaeology and cultural heritage	Yes	Disturbance	Disruption of heritage value	✓			Unlikely to be significant The impacts of the project are unlikely to cause any significant impact marine archaeology and cultural heritage sites because the project will undertake pre-construction surveys to determine the presence and significance of these sites and will seek to avoid them or mitigate the impact, therefore is unlikely to be significant.



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				C & I	O	D		
Other sea users	No	Physical presence	Restricted access to and disruption to activities in project area	✓	✓	✓	Potentially significant Due to the requirement for safety zones around construction activities and throughout the operations, this may result in temporary loss or restricted access to the area that may benefit other marine users.	
Socioeconomics	No	Physical presence	Job creation, investment in local / regional / national economy and development of supply chain	✓	✓	✓	Potentially significant All phases of this project will have significant impact to the socioeconomics of the region. The impact on tourism and recreation by deterring visitors through disruption in the local area will be the main cause for potentially significant impact.	
Onshore Environment								
Physical Environment	Soils, geology, and hydrology	Disturbance	Change to groundwater	✓		✓	Potentially significant The pollution of surface water due to sediment disturbance and/or accidental spills during construction could impact the quality of the groundwater, resulting in a potentially significant impact.	
			Change to hydrology		✓		Potentially significant There could potentially be interaction within streams and water tables that could cause modifications to the natural drainage patterns seen onshore, resulting in a potentially significant impact and increase of flood risk.	
			Soils will be disturbed and redistributed during levelling and clearing, increasing erosion potential, and changing natural drainage patterns.		✓		Unlikely to be significant Although there may be instances of contamination and erosion of soil, these will be mitigated and adequately managed through local legislation and standard practices, therefore is unlikely to be significant.	
			Unplanned events	Pollution of watercourses	✓		✓	Unlikely to be significant Effects from pollution are unlikely due to the inherent mitigation measures in place to manage the associated risks, therefore is unlikely to be significant.
Air quality, noise, and vibration	No	Noise and vibration	Change to ambient physical environment	✓	✓	✓	Unlikely to be significant It is not expected that airborne noise generated from the project will have a significant impact onshore, therefore is unlikely to be significant.	
			Atmospheric emissions and dust	Dust will be generated by the construction site, which could impact local air quality.	✓	✓	✓	Potentially Significant During construction, cable laying, and decommissioning dust levels will potentially impact the local air quality and give rise to local dust issues, therefore are potentially significant.
Terrestrial Ecology	Vegetation	Yes	Disturbance	Vegetation clearance will be required, reducing the total area of native vegetation	✓	✓	✓	Potentially Significant The level of impact on local vegetation is dependent on the cable route selected as well as the methods of installation and timing of construction. However, best practice will be used during the project and appropriate mitigation will reduce the level of impacts. The current level of uncertainty of the cables route means impacts may potentially be significant.



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				C & I	O	D			
		Unplanned events	Fire Introduced species				Unlikely to be significant Effects from both fires and introduced species can be long-term and wide-spread, however inherent mitigation measures will be in place to manage the associated risks, therefore is unlikely to be significant.		
Terrestrial ecology and ornithology	Yes	Physical presence	Change in habitat Light	✓	✓	✓	Unlikely to be significant The level of impact on local ornithology is dependent on the cable route selected as well as the methods of installation and timing of construction. However, best practice will be used during the project and appropriate mitigation will reduce the level of impacts, therefore there is unlikely to be a significant impact.		
		Disturbance - cars and machinery	Change in habitat Injury / mortality	✓	✓	✓	Unlikely to be significant The level of impact on local ornithology is dependent on the cable route selected as well as the methods of installation and timing of construction. However, best practice will be used during the project and appropriate mitigation will reduce the level of impacts, therefore there is unlikely to be a significant impact.		
		Noise and vibrations	Noise from construction machinery and plant causes avoidance behaviour by native species	✓	✓	✓	Unlikely to be significant It is not expected that airborne noise generated from the project will have a significant impact onshore, therefore is unlikely to be significant.		
			Interruption of biologically important activities (such as nesting or roosting) could occur	✓			Unlikely to be significant With the inclusion of new structures in the surrounding area, the opportunity for species increases for additional roosting and foraging opportunities, therefore is unlikely to be significant.		
		Atmospheric emissions and dust	Dust impacts to fauna	✓		✓	Potentially Significant During construction, cable laying, and decommissioning dust levels will potentially impact the local air quality and give rise to local dust issues, therefore are potentially significant.		
		Unplanned events	Fire Spills Introduced species	✓	✓	✓	Unlikely to be significant Effects from both fires, accidental spills, and introduced species can be long-term and wide-spread, however inherent mitigation measures will be in place to manage the associated risks, therefore is unlikely to be significant.		
Socio-Economic Environment	Landscape and visual	No	Physical presence	Impacts of onshore infrastructure on landscape (and potentially landscape depending on location of onshore infrastructure) and visual receptors		✓	✓	✓	Potentially significant Indirect, temporary and short and long-term impacts upon visual receptors especially during the construction and installation phase with vessels and navigational lighting being seen 24/7. Along with onshore cabling and the potential impact with native flora and fauna on wild land. These can cause potential significance on the local environment.
	Terrestrial archaeology and cultural heritage	Yes	Disturbance	Disruption of heritage		✓	✓	✓	Unlikely to be significant The impacts of the project are unlikely to cause any significant impact to terrestrial archaeology and cultural heritage sites, therefore is unlikely to be significant.



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				C & I	O	D	
Land use and other users	No	Physical presence	Landowners	✓	✓	✓	<p>Unlikely to be significant</p> <p>All phases of this project may have a minor impact on localised land; however, the impact will be minimal, mitigated, and localised, therefore the significance of the impact is unlikely.</p>
Traffic and access	No	Physical presence	Disruption to traffic and access in the project area	✓	✓	✓	<p>Unlikely to be significant</p> <p>The impacts of the project are unlikely to cause any significant impact local traffic and access for an extended period of time, therefore is unlikely to be significant.</p>