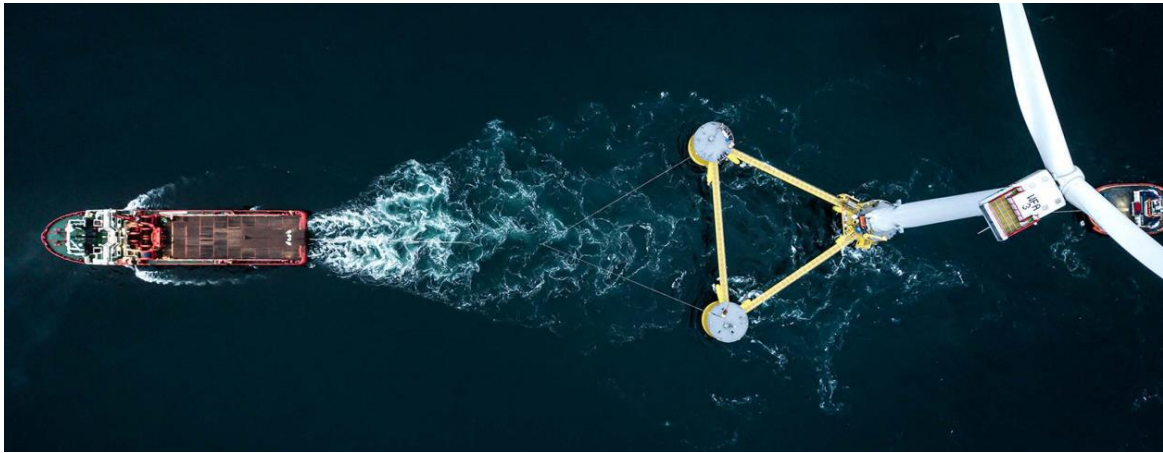




Project Erebus Outline Environmental Monitoring Plan

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Project Erebus Outline Environmental Monitoring Plan

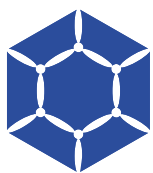
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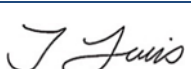
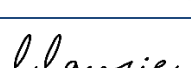
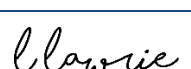
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Glossary

Abbreviation	Description
AEZ	Archaeological Exclusion Zone
AIS	Automatic Identification System
CCTV	Closed-circuit Television
ECC	Export Cable Corridor
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electromagnetic Frequency
eNGO	Environmental Non-Governmental Organisation
ES	Environmental Statement
FAD	Fish Aggregating Device
FLOW	Floating Offshore Wind
HDD	Horizontal Directional Drilling
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MBES	Multi-beam Echosounder
MCA	Maritime and Coastguard Agency
MMO	Marine Management Organisation
NGET	National Grid Electricity Transmission
NRW	Natural Resources Wales
OEMP	Outline Environmental Monitoring Plan

PWS	Private Water Supply
SAC	Special Area of Conservation
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area
TJB	Transition Joint Bay
WTG	Wind Turbine Generator

Contents

1.	Introduction	1
1.1.	Purpose of Outline Environmental Monitoring Plan.....	1
1.2.	Background.....	2
1.3.	Site Description	2
2.	General Guiding Principles	3
3.	Programme.....	4
4.	Outline Proposals for Monitoring	5
4.1.	Marine and Coastal Processes.....	5
4.1.1.	Conclusions of the Environmental Statement.....	5
4.1.2.	In-Principle Monitoring Proposals.....	5
4.2.	Subsea Noise	5
4.2.1.	Conclusions of the Environmental Statement.....	5
4.2.2.	In-Principle Monitoring Proposals.....	6
4.3.	Marine Seabed and Water Quality.....	6
4.3.1.	Conclusions of the Environmental Statement.....	6
4.3.2.	In-Principle Monitoring Proposals.....	6
4.4.	Marine and Coastal Ecology (Benthic)	6
4.4.1.	Conclusions of the Environmental Statement.....	6
4.4.2.	In-Principle Monitoring Proposals.....	6
4.5.	Fish and Shellfish	7
4.5.1.	Conclusions of the Environmental Statement.....	7
4.5.2.	In-Principle Monitoring Proposals.....	7
4.6.	Marine Ornithology	7
4.6.1.	Conclusions of the Environmental Statement.....	7
4.6.2.	In-Principle Monitoring Proposals.....	8
4.7.	Marine Mammals	9
4.7.1.	Conclusions of the Environmental Statement.....	9
4.7.2.	In-Principle Monitoring Proposals.....	10
4.8.	Commercial Fisheries (Environmental)	10
4.8.1.	Conclusions of the Environmental Statement.....	10
4.8.2.	In-Principle Monitoring Proposals.....	11
4.9.	Marine Archaeology	11
4.9.1.	Conclusions of the Environmental Statement.....	11
4.9.2.	In-Principle Monitoring Proposals.....	11

4.10.	Shipping and Navigation	11
4.10.1.	Conclusions of the Environmental Statement.....	11
4.10.2.	In-Principle Monitoring Proposals.....	12
4.11.	Onshore Geology, Hydrology and Hydrogeology.....	12
4.11.1.	Conclusions of the Environmental Statement.....	12
4.11.2.	In Principle Monitoring Proposal.....	12
4.12.	Terrestrial and Coastal Ecology and Onshore Ornithology	13
4.12.1.	Conclusion of the Environmental Statement	13
4.12.2.	In Principle Monitoring Proposal.....	13
4.13.	Onshore Archaeology.....	14
4.13.1.	Conclusion of the Environmental Statement	14
4.13.2.	In Principle Monitoring Proposal.....	14
4.14.	Traffic and Transport.....	14
4.14.1.	Conclusion of the Environmental Statement	14
4.14.2.	In Principle Monitoring Proposal.....	14
5.	Conclusions	16
6.	References.....	20

List of Tables

Table 3-1	Programme for development of the Outline Environmental Monitoring Plan	4
Table 4-1:	Species sensitivity to collision risk with offshore wind turbines and displacement (From: Furness <i>et al.</i> , 2013)	8
Table 4-2:	Key Marine Mammal Receptor densities recorded from digital aerial surveys	10
Table 5-1:	Summary of proposed monitoring.....	16

1. Introduction

This Outline Environmental Monitoring Plan (OEMP) has been prepared by MarineSpace Ltd (MarineSpace) on behalf of Blue Gem Wind Ltd ('the Applicant') following a request from Natural Resources Wales (NRW). This request was received via NRW's formal consultation response to the application for a Marine Licence and supporting Environmental Statement (ES), submitted in December 2021 by the Applicant (ORML2170), for the proposed Project Erebus Floating Offshore Wind (FLOW) development ('the Project').

1.1. Purpose of Outline Environmental Monitoring Plan

The purpose of this document is to provide a framework for ongoing environmental monitoring measures associated with Project Erebus. It is expected that the measures set out within this OEMP will form the basis of a Final EMP, the production of which is expected to be a condition of any future Marine Licence issued for the Project.

The OEMP provides a mechanism through which NRW can be assured that monitoring measures will be in place as required, through the installation, operational and decommissioning phases of the Project.

Due to the nature of the FLOW development, it may not be possible to provide detailed method statements and/or survey specifications on the precise monitoring program that will be in place, prior to the Marine Licence being granted by NRW. The OEMP, therefore, forms a basis for both initial discussions and future, more detailed discussions, after the Marine Licence is issued. Any such future discussions will aim to further develop and reinforce commitments or requirements discussed in the OEMP, while allowing refinements to be made to monitoring plans based on best available practices and technology.

The EIA topics that are the focus of this OEMP represent the key receptor groups upon which effects are predicted.

- Marine and Coastal Processes;
- Subsea Noise;
- Marine Seabed and Water Quality;
- Marine and Coastal Ecology (Benthic);
- Fish and Shellfish;
- Marine Ornithology;
- Marine Mammals;
- Commercial Fisheries (Environmental);
- Marine Archaeology;
- Shipping and Navigation;
- Onshore Geology, Hydrology and Hydrogeology;
- Terrestrial and Coastal Ecology and Onshore Ornithology;
- Onshore Archaeology and Cultural Heritage;
- Traffic and Transportation; and
- Socio-Economic.

1.2. Background

Project Erebus is a proposed FLOW development in the Celtic Sea region. It is intended to act as a Test and Demonstration project from which key learnings will be taken to support the development of larger-scale pre-commercial and commercial FLOW projects in the same region, i.e. a “stepping-stone” approach. In addition to employment and financial benefits to the local area, it aims to maximise knowledge transfer of all aspects of FLOW development, i.e., design principles, environmental effects; installation; Operation and Maintenance (O&M) and facilitate the transfer to a low carbon economy.

The project will comprise of 6 to 9 floating wind turbine generators (WTGs) with capacity ratings of 12-18 MW, and a total generating capacity of up to 100 MW. It is proposed that the WTGs will be supported by semi-submersible floating platforms with mooring systems comprised of up to 5 subsea catenary mooring lines up to 870 m in length with associated clump weights. The moorings will be secured through a range of potential foundation solutions including drag embedment anchors, driven piles, drilled piles, and/or suction piles. Up to 10 dynamic array cables with associated external cable protection are proposed.

Electricity will be transferred from the WTGs via an offshore export cable up to 49 km in length to landfall at West Angle Bay. The offshore and onshore cables will be connected at a Transition Joint Bay (TJB) onshore. This TJB will be connected to an onshore substation via an underground transmission cable (66 kV) of approximately 12.5 km length. The onshore substation will be connected to the existing 132 kV Pembroke Substation via a 132 kV onshore cable. This will connect the Project to the National Grid Electricity Transmission (NGET). Full details of the offshore and onshore project infrastructure can be found in Chapter 4; Section 4.6 and Section 4.7, respectively, of the Project Erebus ES.

1.3. Site Description

Project Erebus will be located within a 43.5 km² area approximately 35 km southwest of the Pembrokeshire coast. Elements of the project including the offshore Export Cable Corridor (ECC) fall within Welsh territorial waters or the Welsh Zone. The ECC will pass through the Skomer, Skokholm and Seas off Pembrokeshire Special Protection Area (SPA) and the West Wales Marine and Pembrokeshire Marine Special Area of Conservation (SAC).

Depths within the offshore array area range between 65-85 m below Lowest Astronomical Tide (LAT), and depths along the ECC range between approximately 70 m LAT to 0 m at the shore. Further details on the physical characteristics of the offshore array area and ECC can be found in Chapter 6 of the Project Erebus ES.

2. General Guiding Principles

Within the Project Erebus ES, the Applicant has listed both embedded (standard) and specific mitigation measures to reduce potential impacts of the proposed Project on environmental receptors. Some of these measures involve potential monitoring elements, which are designed to validate the predictions of the ES. The monitoring proposed in this OEMP is preliminary and may be subject to refinement or change following consultation with stakeholders such as NRW, JNCC, and non-governmental organisations.

The guiding principles outlined below refer to the in-principle monitoring methodologies proposed in this document, and are as follows:

- Any monitoring proposed (via relevant Marine Licence conditions) should be (a) necessary (b) relevant to the proposed development; (c) achievable; (d) deliverable; and (e) reasonable;
- Monitoring must have a clear objective(s) and seek to obtain specific data, with clear beginning and end dates, and reporting outputs/deliverables;
- Monitoring should seek to fill data gaps or uncertainty surrounding the impact of defined aspects of the Project on receptors where a significant effect is likely;
- Monitoring should seek to validate certain predictions presented in the Project Erebus ES; and
- The scope, extent, and design of monitoring methods proposed within this OEMP will be agreed upon and finalised post-consent following discussions with relevant statutory nature conservation bodies (e.g., NRW and JNCC) and review of existing documents.

3. Programme

An indicative programme related to the issue, discussion and further development of this OEMP is provided below.

Table 3-1 Programme for development of the Outline Environmental Monitoring Plan

Date	Activity
December 2021	Inclusion of initial monitoring proposals within Project Erebus ES.
June 2022	Receipt of comments from key stakeholders (NRW, JNCC, NGOs), including reference to need to develop an OEMP pre-consent award.
August 2022	Submission of OEMP to NRW as part of ongoing Marine Licence determination process.
October 2022	Updating OEMP with any further comments received from NRW (JNCC/NGOs).
Q4 2022	Potential award of Project Erebus Marine Licence (and S.36 consent).
Q2 2023 – 2024	Further refinement of monitoring proposals set out within the OEMP and production of FINAL EMP (expected to be a specific Marine Licence condition).
Q1 – Q2 2024	Issue of detailed technical specifications for monitoring to relevant contractors.
Q3 2024 – 2025	Appointment of selected monitoring contractors and commencement of pre-construction, installation and O&M phase monitoring studies.

4. Outline Proposals for Monitoring

This section outlines the in-principle monitoring proposals for key receptor groups identified within the Project Erebus ES. It should be recognised that the proposed monitoring strategies outlined below represent a preliminary list of possible monitoring practices, and may change following consultation, as knowledge and understanding of the interactions between the Project and the surrounding environment develops.

4.1. Marine and Coastal Processes

4.1.1. Conclusions of the Environmental Statement

Large sandwave features are present in several locations along the ECC and within central/northern sections of the offshore array area. The ES has determined that tidal currents and large waves associated with Atlantic storms are sufficiently energetic to mobilise the sandy sediments at the seabed, even at depths found within the offshore array area. As a result, it was determined that there are no predicted significant effects on receptors within this group, and very low potential for measurable cumulative effects with interactions with other projects.

4.1.2. In-Principle Monitoring Proposals

Multi-beam echosounder (MBES) surveys of the ECC and/selected parts of the offshore array area are proposed to assess potential scour and changes in bathymetry within the offshore consent boundary. The focus of these surveys would be on areas of enhanced ecological significance, such as areas of external cable protection close to Turbot Bank, and at sandwaves along the ECC that may be subject to levelling prior to installation of the export cable. The exact scope, specification and spatial extent of these surveys will be decided through consultation with NRW and JNCC as it is not possible to define these accurately at this stage of development (for example, exact locations of potential external cable protection will only be known following more detailed cable engineering studies and the actual installation process). It is currently proposed that these surveys would be conducted pre-construction (within 12 months of construction works) and post-construction (1, 5, and 10 years after commissioning of the Project).

If open cut trenching is required at the landfall site (as opposed to the current preferred base case of HDD), beach profile monitoring will be performed pre-construction and post-construction to collect data on potential morphological changes to the beach profile.

4.2. Subsea Noise

4.2.1. Conclusions of the Environmental Statement

Subsea noise will be generated via the installation process, with the most significant potential source of subsea noise coming from installation of piles (if required) and also any potential UXO detonation/deflagration. The potential effect of such subsea noise on sensitive receptors, in particular marine mammals and fish, has been assessed in detail and presented within the Project Erebus ES. No significant effects, (in EIA terms), are predicted.

Operational noise of the FLOW array is anticipated to be negligible, with no significant effects on any receptor groups identified within the Project Erebus ES.

4.2.2. In-Principle Monitoring Proposals

With respect to potential construction phase noise, the assessment of these potential subsea noise emissions presented in the Project Erebus ES has been based on an extensive database of empirical data from similar events on multiple UK Offshore Wind Farm projects. Therefore, no additional monitoring of these noise emissions is proposed.

In terms of potential operational noise, it is proposed that baseline monitoring of pre-construction subsea noise levels within the offshore array area will be conducted. Monitoring of subsea noise in the operational phase within the offshore array will also be undertaken in Year 1, Year 2, and Year 5 to gather information on potential background noise levels from the movement of the moorings and semi-submersible floating platforms. Such operational phase data will be valuable in terms of developing the knowledge base of potential impacts on FLOW projects which can then be used in the consenting phases of future, pre-commercial and commercial-scale FLOW projects in this region.

4.3. Marine Seabed and Water Quality

4.3.1. Conclusions of the Environmental Statement

No significant effects (in EIA terms) on marine seabed and water quality receptors or Water Framework Directive (WFD) waterbodies have been predicted within the Project Erebus ES. The assessment also found very low potential for significant cumulative effects from interactions with other planned projects.

4.3.2. In-Principle Monitoring Proposals

No monitoring for seabed and water quality is proposed during any phase of the proposed Project Erebus.

4.4. Marine and Coastal Ecology (Benthic)

4.4.1. Conclusions of the Environmental Statement

The impacts of the proposed FLOW development on benthic marine and coastal ecology were assessed in the Project Erebus ES as minor adverse effect, even under worst-case scenarios. The EIA assessment concluded, therefore, that there were no significant effects (in EIA terms), and no significant cumulative effects with other projects or plans on benthic ecology.

4.4.2. In-Principle Monitoring Proposals

Even though no significant effects were predicted, it is proposed that marine and coastal benthic ecology monitoring be performed. Surveys will be performed pre-construction (within 12 months of construction works) and post-construction (1, 5, and 10 years after completion), and will consist of benthic grab and drop-down video (DDV) surveys of selected parts of the offshore array area and ECC. These surveys will be planned and undertaken in conjunction with the MBES (and potentially Side Scan Sonar) surveys detailed in Section 4.1.

As with the MBES surveys, these benthic ecology surveys will also focus on key areas of interest agreed in consultation with NRW and JNCC, which may include sandwave areas along the ECC, areas of the ECC in close proximity to Turbot Bank, landfall and shallow sub-tidal areas, and locations within the offshore array.

4.5. Fish and Shellfish

4.5.1. Conclusions of the Environmental Statement

The Project Erebus ES identified no areas of unique habitat or active spawning grounds within the offshore array, the ECC, or the wider study area. The assessment considered loss of habitat (temporary and long-term), sediment suspension and deposition, fish aggregating device (FAD) effects, and electromagnetic frequency (EMF) effects. Overall, the potential impact on fish and shellfish from the proposed development were assessed as negligible to minor adverse effects.

The estimated area of Electromagnetic Field (EMF) impact across the entire Project (assuming 4 m radius of impact for all cables) was determined to be 0.010 km³ (see Section 10.6.3 of the ES). Even when additional cables for future projects were considered as part of the cumulative assessment, the EMF effect was determined to be negligible in the context of the wider study area.

4.5.2. In-Principle Monitoring Proposals

No significant impacts have been identified via EMF effects. Therefore, no specific ongoing monitoring is proposed.

4.6. Marine Ornithology

4.6.1. Conclusions of the Environmental Statement

The Project Erebus ES provided a detailed assessment of potential impacts on seabird, within breeding and non-breeding seasons, including assessment of potential cumulative and transboundary effects.

Specific impacts assessed included disturbance/displacement of seabirds due to the presence of the WTGs; collision risk from the WTGs; disturbance/displacement from vessel activity or underwater noise; indirect impacts (e.g. effects on habitats and prey); the aggregating effects of WTGs; entanglement from ghost fishing gear (and potential impact on diving birds); and the attraction of nocturnal seabirds to lighting on Project infrastructure.

The key species scoped in for assessment in the ES are listed in Table 4-1. Further details are available in Chapter 11 of the ES.

Table 4-1: Species sensitivity to collision risk with offshore wind turbines and displacement (From: Furness *et al.*, 2013)

Species	Scientific name	Collision Risk Modelling	Displacement Analysis
Northern fulmar	<i>Fulmarus glacialis</i>	Scoped out	Scoped out
Manx shearwater	<i>Puffinus puffinus</i>	Included	Included
Balearic shearwater	<i>Puffinus mauretanicus</i>	Scoped out	Scoped out
European storm-petrel	<i>Hydrobates pelagicus</i>	Scoped out	Scoped out
Northern gannet	<i>Morus bassanus</i>	Included	Included
Herring gull	<i>Larus argentatus</i>	Included	Scoped out
Great black-backed gull	<i>Larus marinus</i>	Included	Scoped out
Lesser black-backed gull	<i>Larus fuscus</i>	Included	Scoped out
Black-legged kittiwake	<i>Rissa tridactyla</i>	Included	Included
Atlantic puffin	<i>Fratercula arctica</i>	Scoped out	Included
Common guillemot	<i>Uria aalge</i>	Included	Included
Razorbill	<i>Alca torda</i>	Scoped out	Included

The assessment was informed by 24 months of site-specific Digital Aerial Survey (DAS) data as well as tracking and monitoring data from a number of long-running programmes coordinated and managed by academic institutions. The assessment concluded that all effects on marine ornithology were determined to be minor or negligible for key identified species, i.e., non-significant in EIA terms. These conclusions remain valid even when non-identified birds are accounted for.

4.6.2. In-Principle Monitoring Proposals

Even though no significant effects on marine ornithology were predicted within the Project Erebus ES, monitoring of key bird species is proposed to be undertaken in the operational phase of the Project. This monitoring will aim to validate the assessments presented in the ES for key species and will also add to the existing knowledge base collated to date via DAS and review of data from other monitoring programmes.

The precise type, duration, and methodologies of the proposed monitoring outlined below may be refined or amended through consultation with statutory nature conservation bodies (SNCBs), such as NRW and JNCC, and other key stakeholders, including environmental non-governmental organisations (eNGOs).

Proposed monitoring of ornithological receptors will focus on the following elements:

- Potential collisions between birds and WTGs;
- Avoidance behaviour of birds around WTGs;
- Flight height distributions around WTGs;
- Effects on survival and productivity of regional breeding colonies; and
- Attraction to floating platforms.

Potential collisions with WTGs may be monitored through collision sensors in WTG blades or cameras mounted on WTG structures. Additional DAS may be performed at intervals throughout the operational phase (years 1, 2 and 5) to monitor avian distribution across the offshore array area (and relevant buffer) and to allow comparison with the 24-months of data collected at the EIA phase (2019-2021).

Radar presents an option to monitor avian activity, as it can provide accurate monitoring of nocturnal activity and of activity in adverse weather conditions (e.g., high winds, rain). This methodology can integrate with pre-consent DAS data (2019-2021) to validate and improve avian activity estimates. Radar has been used previously for estimates of flight intensities and altitudes, as well as collision and avoidance rates for marine birds with offshore wind farms (Hüppop *et al.*, 2006; Desholm *et al.*, 2006; Plonczkier and Simms, 2012). Fijn *et al.* (2015) demonstrated the use of vertically mounted marine surveillance radar in monitoring magnitude and variation of low-altitude flight activity, including daily, monthly, and seasonal patterns. This type of monitoring could be useful for species that fly at dawn/dusk or nocturnally and whose flight heights may interact with WTG structures or fall within the rotor swept area.

Further monitoring methods, such as bird tagging or colony counts may also be used, and the Applicant is committed to continuing previous collaboration with academics, including providing input or support to regional-scale strategic studies that may be developed as to further understanding of FLOW interactions within the Celtic Sea region.

4.7. Marine Mammals

4.7.1. Conclusions of the Environmental Statement

The Project Erebus ES provided a detailed assessment of potential impacts on marine mammals. It utilised data from 24-months of site-specific DAS and literature reviews of existing data to determine the baseline and to assess potential impacts of the proposed Project. The Project Erebus ES concluded that all effects associated with the construction, O&M and decommissioning phases of the Project were negligible or minor adverse (non-significant in EIA terms). No pathway was considered to be significant, and the assessment of cumulative effects also concluded that any cumulative effects would be negligible to minor significance in a worst-case scenario.

The key species scoped in for assessment in the ES are listed in Table 4-2. From this, it can be noted that Common dolphin were the species recorded in the highest density in the Study Area. Further details are available in Chapter 12 of the ES.

Table 4-2: Key Marine Mammal Receptor densities recorded from digital aerial surveys

Species	Scientific name	Density (#/km ²)
Common dolphin	<i>Delphinus delphis</i>	1.61
Harbour porpoise	<i>Phocoena phocoena</i>	0.4
Bottlenose dolphin	<i>Tursiops truncatus</i>	0.063
Risso's dolphin	<i>Grampus griseus</i>	0.0112
Minke whale	<i>Balaenoptera acutorostrata</i>	0.0112
Grey seal	<i>Halichoerus grypus</i>	Grid cell specific

4.7.2. In-Principle Monitoring Proposals

The DAS proposed to be undertaken as part of the ornithological monitoring will also be reviewed to detect the presence/absence, density and spatial distribution of marine mammals present within the offshore array area and relevant buffer.

It is also proposed that monitoring of loading on mooring lines may be undertaken in the operational phase of the proposed Project. The proposed monitoring method for this may be via load cells attached to mooring lines or via ROV surveys across the offshore array. However, the final monitoring arrangements will be agreed in consultation with the SNCBs post consent but prior to the commencement of works.

The Applicant will also liaise and/or support where possible any regional-scale strategic studies on interactions between marine mammals and FLOW arrays, as project development in the Celtic Sea continues.

Further details on marine mammal management can be found within ES Vol 3 Appendix 12.3, the Draft Marine Mammal Mitigation Plan.

4.8. Commercial Fisheries (Environmental)

4.8.1. Conclusions of the Environmental Statement

The Project Erebus ES concluded that the offshore array area is of relatively low importance for commercial fishing activity compared with other areas within the region. Static gear usage within the offshore array area was low/infrequent and only moderate activity by mobile vessels (beam and otter trawls) was present in the area. There was a higher density of static gear fishing in the nearshore region through which the ECC passes, but no long-term loss of fishing grounds was predicted in this area. The assessment considered loss of access to fishing grounds, displacement of fishing activity, increased steaming times, and snagging risks. The effects of all pressures were

assessed as negligible or minor adverse, even under worst-case scenarios. No significant cumulative effects were identified either.

4.8.2. In-Principle Monitoring Proposals

No significant impacts on commercial fisheries have been identified. Therefore, no specific ongoing monitoring is proposed.

4.9. Marine Archaeology

4.9.1. Conclusions of the Environmental Statement

The Project Erebus ES identified potential impacts on marine archaeological features that had been identified via a combination of desk-based review and review of project-specific geophysical data collected in 2020 and 2021 (this review identified 17 high value sites, 6 medium value sites, 20 low value sites, and 4 negligible value sites). Potential impacts during the construction and operational phases were predicted to vary, resulting in negligible, minor adverse, and moderate adverse effects on receptors. However, with standard mitigation measures proposed, the resulting residual effects were predicted to be minor adverse or negligible for all features.

4.9.2. In-Principle Monitoring Proposals

During the construction phase, standard mitigation measures will include avoidance of known sites of significance and identification/protection, where practicable, of additional archaeological sites. This will be achieved by the use of Archaeological Exclusion Zones (AEZs).

Following the construction phase, it is proposed that the operational phase MBES (and possibly Side Scan Sonar) surveys planned in Years 1, 5 and 10, includes scope to undertake detailed surveys of any project-specific AEZs. These surveys will aim to demonstrate the success of the AEZs, i.e., if successful, these surveys should show no evidence of damage to the features covered by the AEZ and/or any evidence of installation activity within the AEZ.

4.10. Shipping and Navigation

4.10.1. Conclusions of the Environmental Statement

The Project Erebus ES concluded that the majority of commercial shipping routes pass clear of the proposed Project. The potential effects on shipping and navigation assessed within the ES were:

- Vessel-to-vessel collision due to presence of Project-related vessels;
- Displacement of vessels from the offshore array area;
- Vessel contact with offshore Project structures; and
- Snagging and damage to anchors and/or fishing gear on offshore Project structures.

The significance of these effects will be reduced through the implementation of standard and specific mitigation measures, such as safety zones during construction/maintenance, marker buoys, and Aids to Navigation (discussed in Section 16.4.7 of the ES), resulting in effects of broadly acceptable or tolerable significance.

4.10.2. In-Principle Monitoring Proposals

Even though no significant effects (in EIA terms) were predicted by the Project Erebus ES, noting that this would be the first FLOW project in the Celtic Sea region, it is proposed that monitoring of shipping traffic be undertaken during construction and up to 3 years post-construction via automatic identification system (AIS). This may be achieved by the installation of a specific marine radar upon one of the floating platforms.

Monitoring of the position of WTGs near or beyond excursion limits, as well as position tracking in the event of either a partial or full breakout, may also be undertaken, using location monitoring devices (GPS based) integrated with AIS transponders.

4.11. Onshore Geology, Hydrology and Hydrogeology

4.11.1. Conclusions of the Environmental Statement

The Project Erebus ES provided a detailed assessment of the potential effects on the onshore geology hydrology and hydrogeology. The Project Erebus ES concluded that all effects associated with the construction, operation and maintenance, and decommissioning phases of the Project were negligible or minor adverse (non-significant in EIA terms).

One private water supply (PWS) has been identified at risk from the Proposed Development; PWS01 South Studdock Farm is in hydraulic continuity with the construction zone. Additional mitigation measures including monitoring activities have been proposed to ensure that all effects associated with the construction phase of the Project were minor adverse (non-significant in EIA terms).

4.11.2. In Principle Monitoring Proposal

The following monitoring measures will be implemented to minimise the likelihood and consequence of any impacts on South Studdock PWS01:

- Enabling works for onshore export cable installation is within 250 m PWS buffer to be overseen full time by a suitably qualified environmental engineer;
- An appropriate Water Quality Monitoring Plan (WQMP) will be designed for the PWSs identified as being at risk of water quality deterioration, which will include details of a comprehensive sampling programme; and
- Frequent communication and liaison with relevant PWS property owners while the onshore export cable installation is within the 250 m buffer. The Contractor will provide a nominated person as point of contact.

Additionally, in the event that a PWS is affected by activities associated with the onshore export cable installation works, contingency supply arrangements will be ready for implementation under these circumstances. This will include ensuring that alternative sources of drinking water and water for general use will be provided should it be required.

Sampling frequency of PWS source extraction point will be increased while the onshore export cable installation is within the 250 m PWS buffer. This will involve daily sampling and will include in-situ testing via multiparameter probes which provides 'instantaneous' results. The sampling results and

in-situ probe results will be monitored daily to ensure any deterioration of the PWS is identified quickly and ensure contingency supply arrangements are implemented if required.

4.12. Terrestrial and Coastal Ecology and Onshore Ornithology

4.12.1. Conclusion of the Environmental Statement

The ES Chapter details the findings of extensive ecological and ornithological studies undertaken for the onshore cable corridor of the Proposed Development. The baseline surveys were undertaken between 2020 and 2021. The onshore red line boundary does overlie the Angle Peninsula Coast SSSI boundary, but the northern HDD alignment interacts only with the intertidal area of West Angle beach, the coast path and car park at West Angle, not within habitats where there is a risk of habitat loss or fragmentation that may impact chough. The southern HDD appears to overlie Angle Peninsula Coast SSSI boundary however the exit point for the HDD alignment is outside the SSSI boundary and no surface works are proposed within the SSSI. Embedded mitigation is proposed to avoid potential impacts from the Proposed Development on the features associated with these sites, and effects are assessed as negligible and are therefore not considered significant in EIA terms.

Desk study, external data and field studies for the onshore site identified all the habitats and more sensitive areas within the Survey Area. Further study of the vegetation present was completed by National Vegetation Classification survey. Ornithological studies included breeding bird and wintering bird surveys. Protected species surveys identified areas where both badger and otter were found to be active and confirmed that bats were not using identified potential features for roosting.

Mitigation measures are proposed to ensure compliance with protected species legislation prior to and during construction, as well as to ensure enhancement of the hedgerow and field margin habitats. Dormice are presumed to be present within all hedgerows along the onshore cable corridor and a Dormouse Mitigation Strategy (Volume 3, Technical Appendix: 20.6) is presented to ensure their protection throughout the Proposed Development operational lifetime.

4.12.2. In Principle Monitoring Proposal

Best practice measures are proposed that aim to prevent, reduce or offset potential impacts on the ecological and ornithological receptors present at the Proposed Development site. It is proposed that such measures be incorporated into the CEMP and any Species Protection Plans (in addition to the Dormouse Mitigation Strategy) that an Ecological Clerk of Works (ECoW) may identify during pre-construction surveys and during construction-phase monitoring observations. These documents would be developed as live documents, to reflect the seasonality of the receptors present at the Proposed Development site and the eventual development programme, including pre-construction or enabling works, the construction phase, and the operational phase. The habitat enhancement measures are anticipated to have an overall significant beneficial effect on the protected species and habitats of interest that are present within and near the onshore site boundary.

4.13. Onshore Archaeology

4.13.1. Conclusion of the Environmental Statement

The Project Erebus ES identified potential impacts on onshore archaeological features that had been identified via a combination of desk-based review and review of project-specific geophysical data collected in 2020 and 2021.

Potential impacts during the construction and operational phases were predicted to vary, resulting in negligible, minor adverse, and moderate adverse effects on receptors. However, with embedded mitigation measures proposed, the resulting residual effects were predicted to be minor adverse or negligible for all features.

4.13.2. In Principle Monitoring Proposal

As the Proposed Development passes through archaeologically sensitive areas an Archaeological Watching Brief should be maintained during ground-breaking activities associated with construction. This would entail archaeological monitoring of ground-disturbing works to a point where the presence or absence of potential archaeological remains could be established. This would allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works. It would also provide the opportunity to identify significant archaeological remains, for which further mitigation may be required. Such work would be subject to the approval of a Written Scheme of Investigation, produced by suitably qualified archaeological contractors, and approved by Dyfed Archaeological Trust – Development Management in their capacity as archaeological advisors to the relevant local planning authorities.

4.14. Traffic and Transport

4.14.1. Conclusion of the Environmental Statement

The ES assessment focussed on the highway network provided between Pembroke and the onshore substation site, export cable installation sites and two potential landfall sites, on which all construction trips are expected to pass and on which the Proposed Development is expected to have the greatest impact.

The rural nature of the area results in there being a limited number of sensitive receptors located in the vicinity of the sites or close to the route to be used for construction traffic between Pembroke and the sites. Construction activities will also generate a minimal number of additional trips over the course of an average day and will therefore have a negligible effect on key traffic and transportation criteria identified within the Institute of Environmental Management and Assessment (IEMA) Guidelines.

4.14.2. In Principle Monitoring Proposal

The implementation of measures identified within the outline CTMP (Volume 3, Technical Appendix 25.2 of the ES) will further mitigate the impact of traffic generated by the onshore substation's construction and onshore export cable's installation. The Contractor will also liaise with others

operating in the area to minimise the potential cumulative impacts generated by construction activities. No specific monitoring of project traffic is proposed or considered warranted.

5. Conclusions

Monitoring measures are proposed for key receptor groups as required, through all phases of the Project (Table 5-1). As mentioned previously, it may not be possible to provide precise details on the monitoring program prior to the Marine Licence being granted by NRW. However, the OEMP provides a basis for monitoring, and the scope and methodology for each receptor will be discussed and refined through consultation post-consent.

Table 5-1: Summary of proposed monitoring

EIA Topic	Key Relevant Potential Effect	Proposed Monitoring	Objective of the Monitoring	Phase		
				Pre-Installation	During Installation	Operational Phase
Marine and Coastal Processes	Change in seabed morphology and/or scour around external cable protection.	MBES; SSS	To detect significant changes in seabed morphology. Particular focus around key seabed features, e.g., Turbot Bank. To monitor the recovery of sandwave features subject to levelling and reinstatement as part of cable installation works.	Y (baseline)	N	Y (Yr. 1; Yr. 5; Yr. 10)
Subsea Noise	Generation of undersea noise from floating platforms and associated mooring lines.	Hydrophone	To monitor operational noise to develop knowledge base for future FLOW projects.	Y (baseline)	Y	Y (Yr1; Yr. 2; Yr. 5)

EIA Topic	Key Relevant Potential Effect	Proposed Monitoring	Objective of the Monitoring	Phase		
				Pre-Installation	During Installation	Operational Phase
Marine Seabed and Water Quality	No significant effects.	None	None	N	N	N
Marine and Coastal Ecology (Benthic)	Habitat modification / loss to Annex I sandbank habitat via changes to sediment processes via external cable protection. Recovery of sandwaves features subject to levelling / reinstatement.	Benthic grab; drop-down video (DDV)	Focus on key areas of interest e.g., sandwave features close to Turbot Bank; landfall areas; moorings within the array; areas of sandwave levelling / reinstatement along export cable.	Y	N	Y (Yr. 1; Yr. 5; Yr. 10)
Fish and Shellfish	Loss of habitat, sediment suspension/deposition, fish aggregating device effects, and EMF effects	None	No monitoring proposed as no significant impacts identified.	N	N	N
Marine Ornithology	Mortality through collision with WTG. Displacement from habitats due to presence of WTGs and/or vessels.	Digital aerial survey (DAS); mounted video/camera on floating platforms; radar	To validate and confirm collision risk modelling and displacement predictions presented in the ES. To generate further information on collision statistics for difficult-to-monitor species.	N	Y	Y (Yr. 1; Yr. 2; Yr. 10)

EIA Topic	Key Relevant Potential Effect	Proposed Monitoring	Objective of the Monitoring	Phase		
				Pre-Installation	During Installation	Operational Phase
Marine Mammals	Loss of habitat, entanglement, disruption to prey species	Load cells on mooring lines; ROV survey	To monitor loading on mooring lines.	N	N	Y
Commercial Fisheries (Environmental)	Disruption of fishing activity; loss of fishing grounds; snagging risks; increased steaming times.	None	No monitoring proposed as no significant impacts identified.	N	N	N
Marine Archaeology	Damage to features, burial/smothering through deposition of sediment.	MBES/SSS	To evaluate efficacy of Archaeological Exclusion Zones (AEZs).	Y (baseline)	Y (standard mitigation)	Y (Yr. 1; Yr. 5; Yr. 10)
Shipping and Navigation	Displacement of vessels, contact/collision with vessels/structures.	Radar, Automatic Identification System (AIS)	To reduce any potential risk of disruption of shipping/navigation traffic.	N	Y	Y
Onshore Geology, Hydrology and Hydrogeology	Potential impact on quality and/or quantity of water at Private Water Supply PWS01 South Studdock Farm	Water quality monitoring	To quickly identify any adverse effect on water quality and implement additional mitigation and/or alternative supply	Y	Y	N

EIA Topic	Key Relevant Potential Effect	Proposed Monitoring	Objective of the Monitoring	Phase		
				Pre-Installation	During Installation	Operational Phase
Terrestrial and Coastal Ecology and Onshore Ornithology	Potential impacts on protected species during construction (disturbance, displacement)	Pre-construction surveys, construction-phase monitoring by ECoW	To identify any adverse effects on protected species and inform Protected Species Plan (live document) mitigation measures, micro-siting, and licence requirements	Y	Y	N
Onshore Archaeology and Cultural Heritage	Direct disturbance to archaeological assets	Archaeological watching brief; monitoring of ground-disturbing works where potentially sensitive assets have been identified	To allow, within the resources available, the preservation by record of archaeological deposits. To provide the opportunity to identify significant archaeological remains, for which further mitigation may be required.	N	Y	N
Traffic and Transportation	Construction activities will also a minimal number of additional trips during an average day and will have a negligible effect on key traffic and transportation criteria	None	N/A	N	N	N

6. References

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