Hornsea Project Four

Volume B2, Annex 7.2: Compensation measures for FFC SPA: Kittiwake Offshore Artificial Nesting Roadmap

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01	-	-	Submitted at Application
02	Amended throughout	Amended throughout	Removal of Gannet from the document for Deadline 1
02	6	1	Position on kittiwake AEoI conclusion
02	Amended throughout	Amended throughout	Updates on implementation studies for Deadline 1

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Glossary

Term	Definition
Compensation / Compensatory Measures	If an Adverse Effect on the Integrity on a designated site is determined during the Secretary of State's Appropriate Assessment, compensatory measures for the impacted site (and relevant features) will be required. The term compensatory measures is not defined in the Habitats Regulations. Compensatory measures are however, considered to comprise those measures which are independent of the project, including any associated mitigation measures, and are intended to offset the negative effects of the plan or project so that the overall ecological coherence of the national site network is maintained.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
European site	A Special Area of Conservation (SAC) or candidate SAC (cSAC), a Special Protection Area (SPA) or a site listed as a Site of Community Importance (SCI). Potential SPAs (pSPAs), possible SACs (pSACs) and Ramsar sites are also afforded the same protection as European sites by the National Planning Policy Framework – para 176 (Ministry of Housing, Communities and Local Government, 2019). European offshore marine sites are also referred to as "European sites" for the purposes of this document.
Hornsea Project Four Offshore Wind Farm	The proposed Hornsea Project Four Offshore Wind Farm project. The term covers all elements of the project (i.e., both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
National Site Network	The network of European Sites in the UK. Prior to the UK's exit from the EU and the coming into force of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 these sites formed part of the EU ecological network knows as "Natura 2000".
Offshore Ornithology Engagement Group (OOEG)	The Hornsea Four Offshore Ornithology Engagement Group means the group that will assist, through consultation the undertaker in relation to the delivery of each compensation measures as identified in the kittiwake compensation plan and the razorbill and guillemot compensation plan. Matters to be consulted upon to be determined by the Applicant and will include site selection, project/study design, methodology for implementing the measure, monitoring, and adaptive management options as set out in the kittiwake compensation plan and the razorbill and guillemot compensation plan.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Ramsar	Wetlands of international importance designated under the Ramsar Convention.
Special Area of Conservation (SAC)	Strictly protected sites designated pursuant to Article 3 of the Habitats Directive (via the Habitats Regulations) for habitats listed on Annex I and species listed on Annex II of the directive.
Special Protection Area (SPA)	Strictly protected sites designated pursuant to Article 4 of the Birds Directive (via the Habitats Regulations) for species listed on Annex I of the Directive and for regularly occurring migratory species.

Term	Definition
Black-legged kittiwake biogeographic population	The east Atlantic breeding population of kittiwake which includes individuals from the Flamborough and Filey Coast SPA (Stroud *et al.*, 2016). Proposed compensation measures will be undertaken within this populations breeding and migratory range.

Acronyms

Acronym	Definition
AEoI	Adverse Effect on Integrity
BRAG	Black, Red, Amber, Green.
CCUS	Carbon Capture, Utilisation and Storage
CfD	Contracts for Difference
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
FID	Final Investment Decision
KIMP	Kittiwake Compensation Implementation and Monitoring Plan
GKIMP	Gannet and Kittiwake Compensation Implementation and Monitoring Plan
MMO	Marine Management Organisation
MoU	Memorandum of Understanding
NNSSR	North Norfolk Sandbanks and Saturn Reef
OOEG	Offshore Ornithology Engagement Group
PINS	Planning Inspectorate
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SoS	Secretary of State
SPA	Special Protection Area
UK	United Kingdom

1 Introduction

1.1.1.1 This Offshore Artificial Nesting Roadmap document provides an overview of the anticipated next steps for implementation of a single offshore artificial nesting structure as a compensation measure for Hornsea Four, if deemed necessary by the Secretary of State (SoS) following their Appropriate Assessment. It should be noted that this document will be updated as necessary and should compensation be required, it will be added to or revised as the Development Consent Order (DCO) application for Hornsea Four progresses. This roadmap sets out a clear pathway to demonstrate that the compensation measure can be secured and that the mechanism for delivery of the compensation measure can be implemented.

1.1.1.2 Following the Applicant's submission, the Applicant has revisited its conclusion of no potential for an adverse effect on integrity (AEoI) in respect of the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (FFC SPA) from Hornsea Four in-combination with other plans and projects and concluded AEoI on the FFC SPA in combination with other plans and projects. The Applicant maintains its position of no AEoI alone or in combination for all other qualifying species (guillemot, razorbill and gannet) of the FFC SPA and for all other European sites.

1.1.1.3 In the DCO Application the Applicant's proposed without prejudice compensatory measures for gannet and kittiwake were presented together in a single **Gannet and Kittiwake Compensation Plan (APP-186)**. However, as set out in the Applicant's position paper **(AS-023)**, the Applicant is updating the Report to Inform Appropriate Assessment (RIAA) **(B2.2 RP Volume B2 Chapter 2 Report to Inform Appropriate Assessment Part 1 (APP-167)** and **Part 4 (APP-170)** and its derogation case (**B2.5 RP Volume B2 Chapter 5 Without Prejudice Derogation Case (APP-182)**) based on an overall conclusion that there is potential for an AEoI on kittiwake at the FFC SPA from Hornsea Four in-combination with other projects (see **Kittiwake Adverse Effects on Integrity (AEoI) Conclusion (AS-023)**).

1.1.1.4 In light of the Applicant's updated position on kittiwake, it is considered appropriate to separate the compensatory measures for gannet (**FFC SPA: Gannet Compensation Plan**; to be submitted at Deadline 5) and kittiwake (**FFC SPA: Kittiwake Compensation Plan (APP-186)**) (into separate compensation plans (and consequently separate Implementation and Monitoring plans), reflecting that compensatory measures for kittiwake are now considered necessary, whereas for gannet the Applicant remains confident there would be no AEoI alone or in combination and the compensatory measures for gannet remain "without prejudice" measures. This roadmap now focusses kittiwake.

2 Description and Scope

2.1.1.1 The provision of a single offshore artificial nest site to increase the annual recruitment of black-legged kittiwake (kittiwake) into the biogeographic population is considered a viable compensation measure for a potential AEoI at the Flamborough and FFC SPA. The Applicant is considering two options by which to achieve this: repurposing an existing oil and gas platform (referred to hereafter as a "repurposed structure") or construction of a new offshore nesting structure, with a preference for a repurposed artificial nesting structure. It is important to note that a single structure will be delivered as effective compensation.

2.1.1.2 Kittiwake have been observed readily utilising man-made structures (APEM, 2021 and Niras, 2021) and therefore it is considered that the establishment of an artificial nest site(s) would provide a viable and effective compensation option. Successful establishment of breeding colonies at a site would produce young, which would become part of the wider biogeographic population of kittiwake, thereby maintaining the coherence of the network of SPAs designated for kittiwake. The Evidence Reports (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187), B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**) set out the ecological evidence for the artificial nesting measures and supports likely successful compensation measures. In particular, **B2.7.1.1 Population modelling of black-legged kittiwake on the English east coast to identify the population of first-time breeders available to recruit to new colonies** indicates there is an ample supply of immature birds searching for nest sites and available recruits for appropriately sited artificial nesting platforms.

3 Compensation Levels

3.1 Kittiwake

3.1.1.1 The potential collision mortality effect from Hornsea Four for the project alone is predicted to be 21 individuals. It is calculated that approximately 57 additional breeding pairs will be required to compensate for the potential effect (see **B2.2: Report to Inform Appropriate Assessment (APP-167)** and **B2.7 FFC SPA: Kittiwake Compensation Plan (APP-186)** for further details on the predicted effects and compensation suite).

3.1.1.2 An additional population of kittiwake could be accommodated on either a repurposed or new structure (however preference is for a repurposed structure due to the ecological evidence and stakeholder advice). A colony of over 500 pairs of kittiwake could easily be supported by an artificial nesting structure from an initial design (see **Section 7**) and therefore by providing for the required additional breeding pairs (presented in **Table 2 B2.6 Compensation measures for FFC SPA: Overview**). The Applicant therefore has a high degree of confidence of the feasibility of this compensation measure.

4 Next Steps

4.1.1.1 The Applicant will continue to refine the site selection and design details for an offshore nesting structure following the submission of the Hornsea Four Application. The Kittiwake and Gannet Compensation Plan (**B2.7 FFC SPA: Kittiwake and Gannet Compensation Plan (APP-186)**) and Roadmap included in the Application will continue to be updated based on stakeholder feedback and evidence prior to the close of Examination (noting that a separate version will be produced for gannet alone (FFC SPA: Gannet Compensation Plan) which will be submitted at Deadline 5). Stakeholder engagement following submission of the application and through-out the examination period will include:

- **Statutory Nature Conservation Bodies**: Continuing regular meetings with relevant statutory nature conservation bodies, including Natural England, for feedback and input on the site selection and design of a repurposed or new structure.

- **The Crown Estate**: The Applicant will continue to engage with The Crown Estate through the examination period regarding site selection for a new structure and to ensure that constraints are considered appropriately to mitigate any potential impacts of the new structure. The Applicant will pursue a letter of comfort with The Crown Estate regarding their ability to grant the Applicant the necessary rights once a suitable location has been found. Once a location has been determined for a new structure, the Applicant would seek some form of exclusivity ahead of undertaking additional ground surveys. The Applicant will also engage with The Crown Estate regarding a repurposed structure to discuss the proprietary rights required to access the repurposed structure upon relinquishment by the current oil and gas operator/owner of the production licence relating to the platform.
- **Oil and Gas Operators:** The Applicant will continue to engage with oil and gas operators to explore options and feasibility for repurposing an existing platform, this will build upon the extensive work undertaken to date with two specific oil and gas operators; and
- **Oil and Gas Regulators:** The Applicant is engaging with the Oil and Gas Authority (OGA) at a strategic level on the shaping of a framework for repurposing infrastructure which will include a series of workshops during the Autumn of 2021. The Applicant will keep a close watching brief for the release of further information on repurposing in the context of carbon capture, utilisation and storage (CCUS) and hydrogen and any changes or updates to regulations and/or guidance that can be applied to the repurposing of a platform for offshore nesting. The Applicant has noted the latest developments particularly in the context of carbon capture and the updated Transportation and Storage Regulated Investment (TRI) model last updated in quarter 1 2022. The TRI model sets out a regulated framework which aims to provide visibility to investors. The model addresses the repurposing of existing infrastructure and the Applicant has taken the learnings from the repurposing of existing infrastructure for carbon capture and storage in their engagement with stakeholders.

5 Indicative timescale for delivery and implementation

5.1.1.1 The high-level programme presented below (Table 1) is applicable to the implementation and delivery of offshore artificial nesting compensation measures (repurposed and new). The timing of implementation of an artificial nesting structure is provisional as the timeframe for Examination, consent award, reaching final investment decision (FID) and Contracts for Difference Allocation Round Five, have not yet been set. The programme has been carefully considered to ensure timely delivery of the compensation measure with the Applicant committing to the implementation of a single structure (repurposed or new) at least three kittiwake breeding seasons ahead of operation.

Table 1: Indicative timescale for delivery and implementation.

Activity	Year	2021	2022	2023	2024	2025	2026	2027	2028
Site Selection	2021 – 2022								
Conduct site geophysical surveys	2022								

Activity	Year	2021	2022	2023	2024	2025	2026	2027	2028
and geotechnical investigations									
Design of topside	2022								
Design of foundation	2022								
Offshore nesting consent and licencing	2022								
Fabrication of topside	2022 – 2023								
Fabrication of foundation	2022 – 2023								
Anticipated Hornsea Four DCO Granted	2023								
Transport, Installation & Commissioning	2023								
Compensation Implementation[1]	2023/ 2024 - TBC								
Onshore Construction	2024								
Establishment of Offshore Ornithology Engagement Group (OOEG)	Following consent award								
Kittiwake Compensation Implementation and Monitoring Plan (KIMP)	Following consent award								
KIMP submitted to Secretary of State	Following consent award								
Offshore Construction of Hornsea Four Foundations	2026								
Offshore Construction of Hornsea Four Offshore Turbines	2027								
First Power (partially operational windfarm)	2028								

[1] Due to the uncertainty regarding Allocation Round 5 and Allocation Round 6 of the Contracts for Difference (CfD) scheme the date cannot be confirmed at this time.

5.1.1.2 The Wind Farm is expected to operate for 35 years following construction. The accepted compensation measure(s) would be monitored throughout the operational lifespan of the Wind Farm.

6 Consultation

6.1.1.1 Post-consent, a steering group named the Offshore Ornithology Engagement Group (OOEG) would be convened by the Applicant to consult on the implementation, reporting and any necessary adaptive management of the structure as determined by the Applicant. The OOEG will aim to incorporate relevant stakeholders and ultimately inform the Kittiwake Compensation Implementation and Monitoring Plan (KIMP).

6.1.1.2 The KIMP will be produced (following the content in the outline Gannet and Kittiwake Compensation Implementation and Monitoring Plan (GKIMP) (**B2.7.6 Outline Gannet and Kittiwake Compensation Implementation and Monitoring Plan (APP-192)**)) noting that separate versions will be produced for gannet alone (Outline Gannet Compensation Implementation and Monitoring Plan: Bycatch and Outline Gannet Compensation Implementation and Monitoring Plan: Artificial Nesting Structure) which will be submitted at Deadline 5, as a result of the removal of gannet from certain kittiwake documents. The KIMP will document all of the proposed compensation measures for kittiwake (including mechanisms and programme for delivery, monitoring, adaptive management and reporting). The OOEG will be consulted during development of the KIMP. The KIMP will be submitted to the Secretary of State for approval following consent award.

6.1.1.3 The Applicant will identify and design a practical, high-quality nesting structure to support the required number of nesting birds. This would be discussed with the OOEG.

6.1.1.4 Following design and location decisions, the project will move into the implementation phase. This will involve extensive consultation with stakeholders via the OOEG process to ensure cooperation across the monitoring aspects of the compensation measure. The proposed implementation process of the measure will be documented in the KIMP and will be submitted to the Secretary of State (and other appropriate stakeholders) for approval.

6.1.1.5 The success of the compensation measures (see Section 3.2 of **B2.7 FFC SPA: Kittiwake and Gannet Compensation Plan (APP-186)**) will be monitored to report on how the measure is delivering as agreed via the KIMP. The details of the monitoring phase of the compensation measure will be discussed with the OOEG and will be set out within the KIMP for approval by the Secretary of State (and other relevant stakeholders, as necessary).

6.1.1.6 Monitoring will inform any adaptive management of the compensation measure, if required. The Applicant will focus on maximising effectiveness through good initial design and appropriate maintenance. This will be continued until Hornsea Four has ceased operating and therefore no further collision mortality or a determination is made by the Secretary of State following consultation with the relevant statutory nature conservation body, that compensation is no longer required.

6.1.1.7 Reporting of the results of implementation of the compensation measure will be carried out

according to timescales discussed with the OOEG and set out in the KIMP. It is expected that annual reporting will be undertaken to monitor breeding success.

7 Design Considerations

7.1.1.1 Further design and engineering assessment works are being undertaken by the Applicant following identification of an area of search to determine the exact location and technical design criteria for any repurposed structure, but for the purpose of the Application, the following is assumed based on relevant experience.

7.1.2 Repurposing Existing Offshore Platforms

7.1.2.1 The Applicant's preferred option is to utilise an existing offshore platform (potentially an existing oil and gas structure or similar), and use the foundation to:

A. Design, construct and install a new topside once the existing topside structure has been removed and decommissioned; and
B. Repurpose the existing topside structure by adding additional nesting.

7.1.2.2 For example, a platform currently under design consideration consists of a topside platform of 16 x 12.75 m area sitting atop a 47 m high jacket foundation in 25 m water depth. Indicative design parameters are provided in **A4.6.1 Volume A4 Annex 6.1 Compensation Project Description (APP-057).**

7.1.3 New Offshore Platforms

7.1.3.1 The Applicant is refining the design a new foundation and topside for the specific purpose of supporting kittiwake nesting. The maximum design parameters for a new offshore nesting foundation and platform are presented in **A4.6.1 Volume A4 Annex 6.1 Compensation Project Description (APP-057)**.

7.1.4 Topside designs

7.1.4.1 Initial design work for topsides has been undertaken and an early-stage topside design for either a repurposed or new structure is shown in **Figure 1** below. The design features of the topside and the rationale for these is detailed in **B2.7.5 Compensation measures for FFC SPA: Artificial Nesting: Site Selection and Design (APP-191).** In summary, this initial design provides space on nesting ledges for approximately 500 nests with a vertical back wall and 30 cm length of shelf allowed for each nest. A vertical dividing wall would be installed between each 30 cm length to provide shelter from the wind and to prevent predators from walking along the ledges. Ledges are designed to be 20 cm wide with 50 cm vertical gap between ledges. An overhanging roof would be provided at the top of the nesting structure to provide shelter and to deter predators.

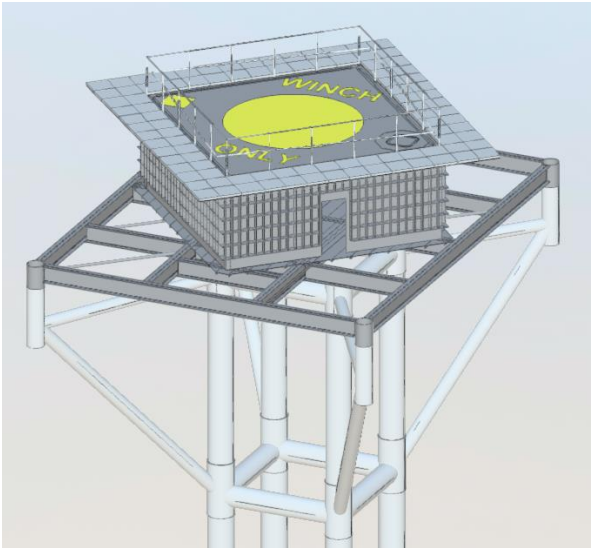

Figure 1: Potential topside design.

1.1.1.1 Following this initial design work, the Applicant has commissioned the detailed engineering design for the artificial nesting structure, details of which the Applicant will aim to provide into the Examination by Deadline 5.

8 Site Selection

8.1.1.1 The Applicant is currently progressing through a detailed site selection process to identify an offshore location in UK waters where an artificial structure which provides additional breeding opportunities to kittiwake can be established. This may be a new location or a re-purposed structure. This will be determined by the on-going site identification process outlined within the Evidence Report (**B2.7.3 Compensation measures for FFC SPA: Offshore Artificial Nesting: Site Selection and Design (APP-187)**) where an initial search area within which the structure will be located is presented.

8.1.1.2 The site selection process for the offshore artificial nesting structure was undertaken via a heatmapping exercise. Ecological criteria are a primary consideration, with technical and commercial parameters also considered in the site selection analysis. The heatmap has been applied using 5 km search grids, across the entire search area (detailed in **A4.6.1 Volume A4 Annex 6.1 Compensation Project Description (APP-057)**), each with unique identifying codes. 5 km search grids are used as it is considered that they are large enough to provide the flexibility required for ground conditions to ensure the structure can be suitably micro-sited.

8.1.1.3 In relation to a repurposed structure (which is the Applicant's preferred method of providing artificial nesting as compensation), highly feasible options have been identified with existing kittiwake colonies following initial surveys undertaken in 2021, where there is scope to provide additional nesting, and in suitable locations. Consideration has also been given to suitable timeframes for decommissioning and penchant by platform owners or operators to collaborate in repurposing. Hornsea Four is currently progressing discussions with owners and operators of suitable platforms within the Area of Highest Ecological Potential (see **B2.7.3 Compensation measures for FFC SPA: Offshore Artificial Nesting: Site Selection and**

Design (APP-191) for further details on the identification of this area). An independent engineering consultancy is reviewing the relevant platform documentation to confirm the viability of the options for repurposing from a technical and structural perspective. The Applicant is in the process of securing memorandums of understanding (MOUs) with operators to allow specific platforms and locations to be discussed and shared with stakeholders and will provide an update to the ExA on this at Deadline 2. The Applicant will undertake further survey work on nesting seabirds for the preferred repurposing options in the summer of 2022 following the same methods which Natural England have praised

8.1.1.4 The topside design for a repurposed structure will be developed specifically to the platform in question to ensure as many elements as possible of the existing platform can remain in situ and be repurposed where appropriate. Hornsea Four is also progressing discussions with regulatory bodies regarding the regulatory mechanism by which to transfer an oil and gas platform for another use.

8.1.1.5 In relation to a new structure, statutory stakeholders have advised that site selection should avoid the core foraging range distance from FFC SPA, and it would be beneficial for the location to be close enough to FFC SPA for colony interchange to be a possibility. The search area for a breeding colony would therefore be located approximately beyond 55 km and broadly around 100 km from the FFC SPA. Other information has also been considered such as information on prey, presence of designated sites and planned, under construction and operational wind farm locations.

8.1.1.6 In respect of commercial site selection criteria, existing assets have been identified using open data sources from The Crown Estate, including offshore wind farms, minerals and aggregates, offshore mines, oil and gas and dredging disposal sites. Additionally, known future assets, such as Round Four offshore wind farm lease areas and carbon capture, utilisation and storage (CCUS), have been identified. A 500 m buffer has been applied to all assets (aside from Offshore windfarms for which a 5 km buffer has been applied as advised by the Crown Estate)) and will be excluded from site selection. The Applicant is undertaking continued consultation with The Crown Estate and operators to ensure commercial criteria used for site selection is appropriate and robust.

8.1.1.7 Following the heatmapping process described above, a potential area of highest ecological opportunity measuring 140 km by 70 km has been identified.

8.1.1.8 Following the DCO Application, this area has been further refined and informed by technical, environmental and commercial considerations as well as consultation with relevant stakeholders. The process included:

- Focusing on areas that are most suitable, "green" in the heatmap results (see **B2.7.5 Compensation measures for FFC SPA: Artificial Nesting: Site Selection and Design (APP-191)** for the criteria used in creating the heatmap);
- Reviewing platform nesting survey results to identify where birds are already nesting in the Southern North Sea to maximise our colonisation potential;
- Seeking further advice from ornithological specialists on ecological suitability of proposed locations;
- Taking into account existing and future windfarms in terms of distance and orientation;

- Review of shipping data to avoid shipping routes;
- Review of other infrastructure and other industry areas such as aggregates and dredging, disposal sites and licenced areas;
- Review of commercial fisheries data; and
- Consultation with key stakeholders including the Maritime and Coastguard Agency (MCA), Trinity House, Natural England, the Marine Management Organisation and the National Federation of Fishermen's Organisations (NFFO).

1.1.1.2 As a result of the above process a refined area of search for a new offshore nesting structure consisting of a 10x10km section of the heatmap has been identified and is shown in **Figure 2**. The refined area of search is approximately 70km from FFC SPA at its nearest point. The refined area is in proximity to a number of platforms, upon one platform over 300 kittiwake apparently occupied nests have been observed during the Hornsea Four Summer 2021 boat based surveys. The Applicant is undertaking further analysis on evidencing nesting availability limitations and further engagement with operators to explore how deterrents and human activities could be influencing presence and absences on the structures. This information will be provided as updates to this Roadmap at a future deadline.

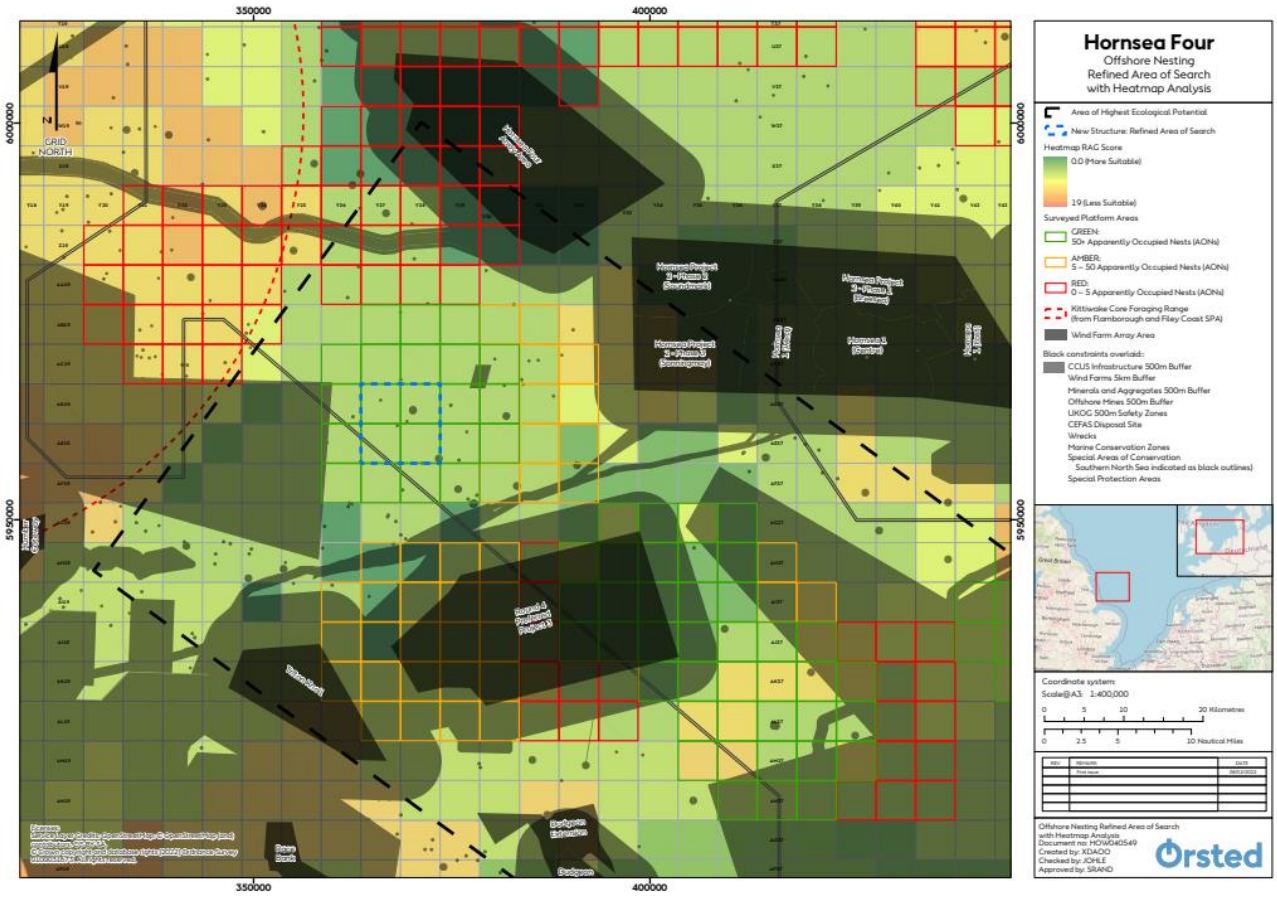

Figure 2 Proposed new structure locations with heatmap analysis

8.1.1.9 In support of the above refinement process, the Applicant has undertaken geophysical surveys and will be undertaking geotechnical investigations in Q2 2022 to inform the

selection of a precise location, to ensure suitable ground conditions for construction and to inform the technical design of the artificial nesting structure. A full account of the criteria for the site selection process undertaken to date is provided in **B2.7.5 Compensation measures for FFC SPA: Artificial Nesting: Site Selection and Design (APP-191)**.

The Applicant is working closely with other developers to consider strategic artificial nesting compensation measures, collaborative evidence gathering and implementation.

9 Monitoring and Adaptive Management

9.1.1.1 Monitoring forms an integral component of the compensatory measure and will be discussed with relevant stakeholders through the OOEG.

9.1.1.2 The success in deployment of the kittiwake artificial nest structure will be monitored through observations of the number of breeding birds and their breeding success. Monitoring of these rates will follow the standard methods provided by Walsh *et al.*, (1995) and specified by the Joint Nature Conservation Committee's (JNCC) Seabird Monitoring Programme which acts as the hub of seabird population information. All relevant monitoring data collected during the project will be contributed to the JNCC's Seabird Monitoring Programme. Collection of seabird data in this format will permit comparisons to be made with on-going monitoring at existing colonies along the east coast of England, including that undertaken by the RSPB at the FFC SPA (Babcock *et al.*, 2018). In order to monitor the number of breeding birds and their breeding success whole colony counts and productivity monitoring will be conducted at the artificial nest sites.

9.1.1.3 Post construction, monitoring of the artificial nesting structure will be conducted to record nesting birds of the first breeding season and will continue for the lifetime of the offshore wind farm project (while also informing adaptive management and maintenance). The precise nature of monitoring at the structure will be influenced by the final form and location the compensation measure takes, but the intention is to predominantly carry out remote monitoring using cameras on the structure. It is noted within the relevant Evidence Reports, that the exact methods required may differ between an onshore and offshore structure, but the design of the structure will seek to incorporate monitoring whilst minimising disturbance. The frequency, duration and nature of the monitoring will be discussed with OOEG members following the Applicant's decision on the refined areas of search for the structure. (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187), B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**). The details of the monitoring will be set out within the KIMP for approval by the Secretary of State.

9.1.1.4 Monitoring of the artificial nesting structure will inform the adaptive management programme (see **Section 9.1.2**) and influence any potential maintenance work required on the structure (either repurposed or new). With reference to adaptive management, monitoring of breeding pairs and breeding success each breeding season will likely determine the employment of adaptive management the following season.

9.1.1.5 In addition to the monitoring of compensation effectiveness outlined above, the deployment of an artificial nesting structure (either repurposed or new) for kittiwake presents an opportunity for research. Furthermore, providing access to birds and their nests through

structure design can facilitate further research opportunities, and projects to increase understanding of adult survival. Such research could help deliver some of the research opportunities identified by stakeholders through the Offshore Wind Strategic Monitoring and Research Forum (OWSMRF) (Ruffino *et al.*, 2020). Such opportunities could include the following:

- RO3.1c - Undertake targeted empirical data collection as informed by the sensitivity analyses (RO3.1b);
- RO3.3c - Deploying strategic adult kittiwake mark-recapture at multiple colonies, and analyses of re-sighting data (Re-trapping Adults for Survival (RAS) studies);
- RO3.3d - Deploying strategic chick mark-recapture at multiple colonies, and analyses of re-sighting data; and
- RO3.9b - Regional comparison of kittiwake diets during the breeding season: field studies.

9.1.1.6 Hornsea Project Three has already committed to delivering some of the OWSMRF research in relation to kittiwake diet and Hornsea Four could build on and complement this work. It is also important to note the Hornsea Four Outline Ornithological Monitoring Plan report (**F2.19: Outline Ornithological Monitoring Plan (APP-254)**) which outlines the proposed approach and objectives of any ornithological monitoring required by the Deemed Marine Licences (DMLs) prior to the granting of development consent. The report considers kittiwake along with other seabird species (including guillemot and razorbill).

9.1.1.7 As stated above, the monitoring taken forward will be consulted on with the OOEG and detailed in the KIMP that will be submitted for approval prior to the commencement of the authorised project.

9.1.2 Adaptive Management

9.1.2.1 Adaptive management is an iterative, post-consent process which combines management measures and subsequent monitoring with the aim of improving effectiveness whilst also updating knowledge and improving decision making over time. Adaptive management will be an important component of the compensation measure and used as a method to address unforeseen issues or deviations from expected time scales (i.e. colonisation rate of structure). Adaptive management measures are therefore designed to support the compensation measure once functioning as a way of furthering the success and supporting resilience of the measure. All known issues and risks will be mitigated through good design of the structure and routine maintenance.

9.1.2.2 Any adaptive measures will be explored with relevant stakeholders as part of the OOEG to identify an initial list of potential approaches within identified parameters. At this early stage, some potential adaptive management options have been identified in the following examples:

- Extension of structure to facilitate further nesting spaces;
- Additional protection from elements;
- Provision of nesting material;
- Enhanced recruitment support – kittiwake calls, decoys etc; and

- Provision of supplementary food.

9.1.2.3 A full list of adaptive management measures will be detailed within the implementation and monitoring plan (following discussion with the OOEG).

9.1.2.4

9.1.2.5 Multiple adaptive management measures will be explored prior to the construction of the artificial nesting structure as it is important to consider the differences between intelligent structure design (which is covered in a separate section) and maintenance activity[2], and adaptive management. The site selection process gives weight to locations where productivity for kittiwake in relation to prey availability is favourable and the population is expanding to give confidence that this would not be an issue, especially in the short to medium term.

9.1.2.6 For kittiwake, acknowledging that there is natural large inter-annual variability in prey resource (forage fish recruitment), there may be short term (1-2 years) opportunities to enhance the availability of prey at or adjacent to the structure (either new or repurposed) in the breeding season (if required). This is discussed in more detail in the Evidence Reports (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-186), B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**) and within the Supporting Evidence for Seabird Prey Resource report (**B2.6.2 Compensation Measures for FFC SPA: Prey Resource Evidence (APP-185)**) exact methods will be discussed with the OOEG. In the mid to long term, the results of the initial diet studies together with fisheries data (Inshore Fisheries and Conservation Authorities (IFCA), International Council for the Exploration of the Sea. (ICES) etc.) could be used to inform temporary measures to increase productivity at the structure.

9.1.2.7 The data collected will be shared with relevant advisors and authorities in order to inform consideration of fisheries management by UK government, if required. Any long-term challenges to the effectiveness of the artificial nest structure relating to prey resource should be viewed in a North Sea context and in the context of natural variability, climate change and other pressures. In the event that the Applicant, in consultation with the OOEG, concludes that the artificial nesting structure is ineffective in delivering compensation and after all adaptive management options relating to the performance of the structure have been exhausted, the Applicant will consult with the OOEG with the aim of identifying alternative long-term compensation measures that are securable, deliverable and proportionate to the impact on the kittiwake at FFC SPA. In such circumstances, the Applicant will update the KIMP and will carry out the updated Plan as approved. Adaptive management measures are designed to support the compensation measure once functioning (post construction) as a way of furthering the success and supporting resilience of the measure (Evidence Reports (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-186), B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**). As mentioned above, adaptive management will be linked closely to the monitoring plan, the full detail of which will be agreed through the OOEG and set out within the KIMP.

[2] It is worth noting at this stage that ad-hoc maintenance, not linked to adaptive management, to the structure will also be highlighted by the monitoring plan. This will allow any remedial works or repairs to be conducted during the non-breeding season when breeding birds are not present at the structure (further information is provided in the relevant Evidence Report).

10 Decommissioning

10.1.1.1 The requirement for, and the exact nature of decommissioning the offshore nesting structure, will be determined in consultation with the relevant authorities towards the end of the 35-year operational life of Hornsea Four.

10.1.1.2 For a new structure, the Applicant will design the structure for a design life equal to that of the windfarm (i.e. 35 years plus three years to establish the compensation measures, pre-wind farm operation. Therefore, the lifetime of the structure is approximately 38 years). In the final few years of wind farm operation, the Applicant will commence inspections and surveys of the bird nesting structure to determine if an extension of the lifetime is possible.

10.1.1.3 Similarly, a repurposed platform would remain in place for the operational lifetime of the windfarm. The decommissioning of the platform will therefore be considered as part of the planning and consents process in consultation with the relevant regulatory bodies.

10.1.1.4 Owners of platforms are currently required to remove infrastructure relatively soon following cessation of production from a field and in accordance with a decommissioning programme approved by the Offshore Petroleum Regulator for Environment and Decommissioning ("OPRED"). However, currently available platform decommissioning plans propose that certain infrastructure will remain in-situ on the seabed and will not be removed, such as rock protection at pipeline crossings. The platforms of interest to the Applicant are those with an existing colony of kittiwake that are due for decommissioning. In these circumstances the owners will already have a decommissioning programme in place, which if approved will require the approval of OPRED and the Secretary of State for Business Energy and Industrial Strategy to amend.

10.1.1.5 Any proposal to allow a particular piece of infrastructure to remain in situ for a particular period of time may also require a derogation from the Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR") requirements. The Oil and Gas Authority (OGA) are tasked with considering the re-use of infrastructure in line with the waste hierarchy of reduce, re-use, recycle, energy recovery and dispose. It is therefore a requirement to consider the re-use of a platform before committing to decommission. The OSPAR requirements must therefore be read in parallel with the waste hierarchy requirements. An important point of distinction between onshore nesting and offshore nesting is the application of OSPAR to offshore nesting. It is not possible to include a requirement in the DCO for the structure to remain in situ in perpetuity without further recognition of the UK's obligations under OSPAR.

10.1.1.6 The owner of the platform will also need to consent to an amendment to the decommissioning programme as they will have planned their decommissioning operations in accordance with an agreed work programme and budget. The owners would need to consent to changing the scope of the decommissioning programme particularly in circumstances where the structure is adapted, for example the removal of the topside to leave the jacket in place. In those circumstances the existing owner would decommission the topside and the Applicant would likely be responsible for decommissioning the jacket together with any new topside/additions. These issues can be addressed pursuant to a

commercial arrangement governing the transfer of the platform to the Applicant.

10.1.1.7 Once the current decommissioning programme has been amended the current thinking is that OPRED will continue with their role in approving the decommissioning programmes pertaining to the associated infrastructure (all infrastructure save for the platform) following transfer of the platform from an owner to the Applicant. The Marine Management Organisation shall be responsible for approving the plan to decommission the platform.

10.1.1.8 The Applicant acknowledges that there will be ongoing liabilities, inclusive of decommissioning liabilities that will need to be considered as part of any commercial arrangement to transfer the platform from the current owners to the Applicant. Providing the Applicant can work with OPRED, BEIS and the OGA to gain consent to repurpose the platform noting the current petroleum regulatory regime, then the Applicant will be caught by the provisions of Section 29 of the Petroleum Act 1998 and may be required to post security to share in the costs of the decommissioning of the proposed infrastructure. The posting of security will be dependent upon how the platform is transferred to the Applicant and the ongoing discussions with the regulators. A high-level review has concluded that there should not be an impediment to the Applicant being caught by the existing decommissioning provisions pursuant to the Petroleum Act 1998 however the Applicant has explored other options under the existing regulatory framework for offshore renewables. The Applicant has revisited whether the platform can be reclassified so that its refurbishment, operation, maintenance and decommissioning can fall under the Marine and Coastal Access Act 2009 and for the Marine Management Organisation to regulate the use of the platform and has concluded there is no legal impediment in this regard. These discussions continue with regulators, but the current objective is to seek agreement in principle that the platform can be reclassified and regulated under the existing regulatory framework for offshore renewables.

11 Securing key consents and seabed agreements

11.1.1.1 The Applicant may need to adapt the structure as outlined in **Section 5** Design Considerations. Part 4 of the Marine and Coastal Access Act 2009 states that a person may only carry on a licensable activity (or cause or permit any other person to carry on a similar activity) in accordance with the grant of a marine licence. It is unlikely that an exemption will apply to the requirement for a licence and therefore if adaptations to the identified platforms are required or indeed a new structure is preferred, the Applicant will apply for a Marine Licence. It is understood that the Marine Management Organisation (MMO) will aim to decide applications within thirteen weeks of validation of the application post submission. Stakeholder engagement will continue with the MMO in advance of submission of the Marine Licence application and the Applicant is confident that the necessary Marine Licence will be granted.

11.1.1.2 For a new structure, the necessary seabed rights will need to be secured with the owner of the seabed, this is likely to be the Crown Estate although if the structure is located within the foreshore (the intertidal between mean high-water springs and mean low water springs) a land referencing exercise will need to be undertaken to identify the owner of the foreshore. The Crown Estate is responsible for around half of the foreshore around England, Wales and Northern Ireland. The Crown Estate has the right to lease and licence these areas for a wide

range of uses. The other portion of foreshore is likely to be the Crown Estate owned, but not registered or alternatively in private ownership. The refined area of search is outside of the foreshore and the Crown Estate are the owners the Applicant is therefore pursuing a letter of comfort to confirm the Crown Estate has the powers to grant the Applicant the necessary seabed rights. Once the location of the new structure has been identified exclusivity will be sought by the Applicant with a view to entering into a lease prior to construction. If an alternative area is pursued located in the foreshore and it is not owned by the Crown Estate, the Applicant will follow the process set out in the onshore nesting document (**B2.7.5: Compensation measures for FFC SPA: Onshore Artificial Nesting Roadmap (APP-190)**) to secure a voluntary agreement.

12 Draft DCO wording

Schedule [ ]

Ornithology Compensation Measures

PART 1

COMPENSATION TO PROTECT THE COHERENCE OF THE NATIONAL SITE NETWORK[3]

PART 1

KITTIWAKE COMPENSATION

1. In this Schedule—

"The FFC" means the site designated as the Flamborough and Filey Coast Special protection Area;

"KCIMP" means the kittiwake compensation implementation and monitoring plan for the delivery of measures to compensate for the predicted loss of adult kittiwakes from the FFC as a result of the authorised development;

"the kittiwake compensation plan" means the document certified as the kittiwake compensation plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents, etc.);

"the Hornsea Four Offshore Ornithology Engagement Group" or "H4 OOEG" means the group that will assist, through consultation, the undertaker in the delivery of the compensation measures identified in the kittiwake compensation plan;

"the offshore compensation measure" means the offshore nesting structure; and

"the onshore compensation measure" means the onshore nesting structure.

2. Work Nos. 1, 2, 3, 4 and 5 together with any associated development offshore may not be commenced until a plan for the work of the H4 OOEG has been submitted to and approved by the Secretary of State, such plan to include—

(a) terms of reference of the H4 OOEG;

(b) details of the membership of the H4 OOEG which must include—

(i) the MMO and the relevant statutory nature conservation body as core members for the offshore compensation measure;

(ii) the relevant local planning authority and statutory nature conservation body as core members for the onshore compensation measure;

(iii) the RSPB and The Wildlife Trust as advisory members, for both the onshore compensation measures and/or the offshore compensation measures subject to their area of expertise;

(c) details of the proposed schedule of meetings, timetable for preparation of the KCIMP and reporting and review periods;

(d) the dispute resolution mechanism and confidentiality provisions; and

(e) the scope of work to be limited to the topics for discussion as identified by the appointed chair to include in relation to the compensation measure, monitoring and adaptive management.

3. Following consultation with the H4 OOEG, the KCIMP must be submitted to the Secretary of State for approval in consultation with the MMO and relevant statutory nature

[3] This wording reflects the current wording in the draft DCO submitted at DL1.

conservation body for the offshore compensation measure (if required), and with the relevant local planning authority and relevant statutory nature conservation body for the onshore compensation measures (if required). The KCIMP must be based on the strategy for kittiwake compensation set out in the kittiwake compensation plan and include—

(a) details of locations where compensation measures will be delivered, and in the event an onshore structure is required, details of landowner agreement(s) and in the event an offshore structure is required, details of any relevant seabed agreement(s);

(b) details of the design of the artificial nesting structure; including the projected number of nests that will be accommodated on the structure, and how risks from avian or mammalian predation and for an onshore nesting structure how unauthorised human access will be mitigated;

(c) an implementation timetable for delivery of the artificial nesting structure, such timetable to ensure that the structure is in place to allow for three full kittiwake breeding seasons prior to operation of any turbine forming part of the authorised development. For the purposes of this paragraph each breeding season is assumed to have commenced on 1st April in each year and ended on 31st August;

(d) details of the maintenance schedule for the artificial nesting structure;

(e) details for the proposed ongoing monitoring of the measures including—

(i)survey methods;

(ii)survey programmes; and

(iii)colony and productivity counts;

(f) recording of H4 OOEG consultations;

(g) details of any adaptive management measures, with details of the factors used to trigger any such measures; and

(h) provision for reporting to the Secretary of State, to include details of the use of the structure by breeding kittiwake to identify barriers to success and target any adaptive management measures.

4. The undertaker must construct the artificial nest structure as set out in the KCIMP approved by the Secretary of State.

5. The undertaker must notify the Secretary of State of completion of construction of the artificial nest structure as set out in the KCIMP.

6. The artificial nest structure must not be decommissioned without prior written approval of the Secretary of State in consultation with relevant statutory nature conservation body.

7. The KCIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved KCIMP must be in accordance with the principles set out n the kittiwake compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the kittiwake compensation plan.

[PART 3[4])

Guillemot and Razorbill Compensation Measures

[4] The proposed DCO wording shall be updated for DL2 together with the relevant definitions and terms applicable to Gannet, Razorbill and Guillemot Compensation Measures under Part 1.

1. The GRIMP must be submitted to the Secretary of State for approval in consultation with the MMO and the relevant statutory nature conservation body for offshore compensation measures, and with the relevant statutory nature conservation body and the relevant local planning authority and relevant conservation trusts for onshore compensation measures. The GRIMP must be based on the strategy for guillemot and razorbill compensation set out in the guillemot and razorbill compensation plan and include:

    a) in the event that the undertaker must implement predator eradication and/or predator control measures
        i. details of locations where compensation measures will be deployed;
        ii. details of how any necessary access rights, licences and approvals have or will be obtained and any biosecurity measures will or have been secured;
        iii. an implementation timetable for delivery of the predator eradication and/or predator control measure that ensures that the measure has been implemented two years prior to operation of any turbine forming part of the authorised development;
        iv. proposals for monitoring and reporting on the effectiveness of the measures, including productivity rates; breeding population and distribution of breeding birds;
        v. recording of H4 OOEG consultations;
        vi. details of any adaptive management measures, with details of the factors used to trigger any such measures; and
        vii. provision for reporting to the Secretary of State, to include details of the use of each site by breeding guillemot and razorbill to identify barriers to success and target the adaptive management measures.
    b) in the event that the undertaker must implement bycatch reduction measures
        i. details of relevant technology supply agreements and arrangements with fishers to uptake the bycatch reduction technology that will or has been secured;
        ii. an implementation timetable for provision of the bycatch reduction measures that ensures that the measures are in place prior to the operation of any turbine forming part of the authorised development;
        iii. proposals for monitoring and reporting on the effectiveness of the measures, including the collection of data from participating fishers;
        iv. recording of H4 OOEG consultations;
        v. details of any adaptive management measures and details of the factors used to trigger adaptive management measures for each species; and
        vi. provision for annual reporting to the Secretary of State, to identify barriers to success and target the adaptive management measures.

2. The undertaker must implement the compensation measures as set out in the GRIMP approved by the Secretary of State.

3. The undertaker must notify the Secretary of State of completion of implementation of the measures set out in the GRIMP.

4. The GRIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved GRIMP must be in accordance with the principles set out in the guillemot and razorbill compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the kittiwake compensation plan.

PART 4

Fish Habitat Enhancement

5. No turbine forming part of the authorised development may begin operation until arrangements for the implementation and monitoring of fish habitat enhancement measures have been put in place in accordance with the principles as set out in the KIMP and the GRIMP (as relevant).]

13 Funding

13.1.1.1 The Applicant has identified the costs associated with the development, implementation and ongoing monitoring of the proposed compensation measure. These costs have been included within a detailed Derogation Funding Statement (**B2.10 RP Volume B2 Chapter 10 Without Prejudice Derogation Funding Statement (APP-202)**). This statement is supplemental to the Funding Statement (**E1.1 CA Volume E1.1 Funding Statement (APP-224)**) submitted as part of the suite of Application documents. The Funding Statement(s) outlines the overall project cost based on the capital expenditure and operational expenditure assumptions in the "Review of Renewable Electricity Generation Cost and Technical Assumptions" (Arup 2016). The Funding Statement(s) also detail the corporate structure and a robust explanation to allow the Secretary of State to conclude that the necessary funding to deliver the compensation measure can be secured.

13.1.1.2 Part of the Funding Statement addresses the costs associated with decommissioning of a repurposed platform. As referred above it is likely that the costs of decommissioning the jacket could, in principle, be transferred to the Applicant. On the premise that the Applicant would accept liability for decommissioning of the platform which would be delayed to a future date and in view of the benefits associated with the repurposing of the platform for both the Applicant and the current owner of the platform, it is considered likely that the Applicant would either pay salvage value for the platform or perhaps pay a nominal value. The decommissioning costs including tax considerations, the potential for the Applicant to provide some form of security and the need to address the risk of both parties being subject to the provisions of section 29 of the Petroleum Act 1998, can in principle be addressed as part of the commercial arrangement on transfer of the platform.

14 Legislative and political issues

14.1.1.1 The regulations which are currently in force in the UK Continental Shelf would not permit the retention of infrastructure indefinitely for nesting kittiwake as the OSPAR Regulations

require infrastructure to be removed unless a specific derogation has been obtained. As referred above it may be possible to seek permission to delay the decommissioning of a particular platform with the consent of the SoS and OPRED by amending the relevant decommissioning programme to effectively carve out part of the platform to be decommissioned at a later date, to enable the existing population to be maintained and compensation measures to be secured.

14.1.1.2 There has recently been a significant focus on the energy transition and, in particular, the potential re-use of offshore oil and gas infrastructure to accommodate the more towards "net zero" such as the re-use of infrastructure for the production of hydrogen and/or for carbon capture and storage purposes. The Applicant is in discussions with the OGA, OPRED, OREI and the MMO to determine who is best placed to regulate the use of the asset once it has been transferred. There is the potential for the platform to be moved out of the oil and gas regulatory framework and into the framework to which the Applicant operates. This will require a reclassification into which the Applicant operates and this is currently under discussion with the regulators.

14.1.1.3 The Applicant is confident that a clear description of how liabilities will be transferred/managed and funding arrangements for existing parties, as well as consideration of long-term liabilities will be addressed prior to the end of Examination.

15 Conclusion

15.1.1.1 The Applicant is confident that the compensation measure is viable, will be effective and can be delivered. The Applicant will continue stakeholder engagement to demonstrate the suitability of the refined site selection and design and ensure the compensation measures can be readily achieved and secured.

16 References

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