THE CROWN ESTATE

Record of HRA

Capacity Increases Programme

March 2025

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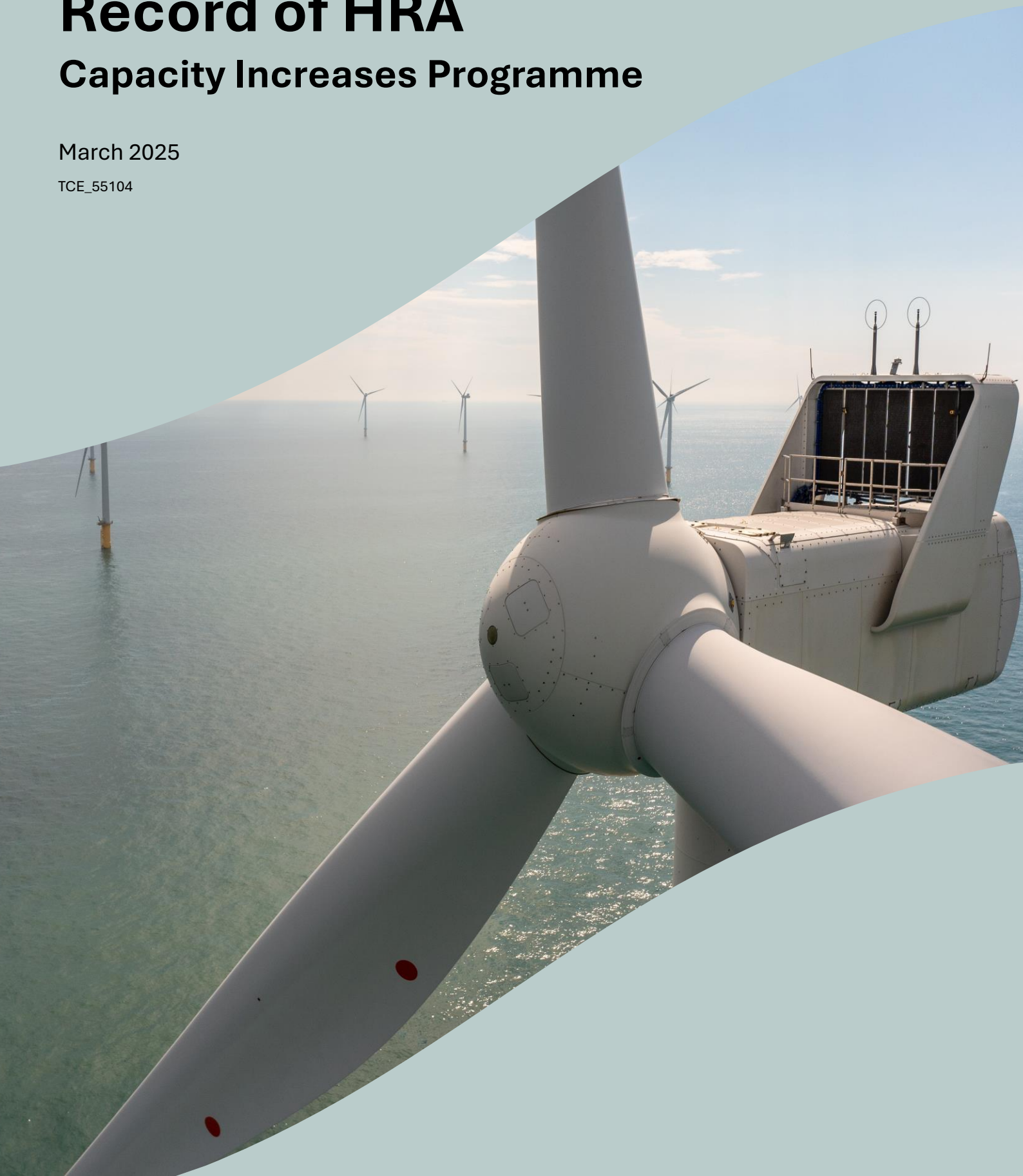

THE CROWN ESTATE

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1. Summary of the Conclusions of the Assessment

1.1.1. The Capacity Increases Programme ("the Capacity Increases Programme", "CIP" or "the Plan") has been considered by The Crown Estate Commissioners ("The Crown Estate") in light of the assessment requirements of Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (SI No. 2017/1012) (as amended) ("the Habitats Regulations") and Regulation 28 of The Conservation of Offshore Marine Habitats and Species Regulations 2017 (SI No. 2017/1013) (as amended) ("the Offshore Habitats Regulations").

1.1.2. Having carried out a screening assessment of the Plan, The Crown Estate concluded that a likely significant effect ("LSE") could not be discounted for a number of Protected sites and European Offshore Marine Sites (together referred to as "Protected sites" within the context of the UK's National Site Network) and their qualifying features (NIRAS, 2024b); that is to say, adopting the approach set out in the 'Waddenzee' ruling of the European Court of Justice Case C – 127/02, it was not possible to exclude, on the basis of objective information, the likelihood of significant effects on those Protected sites without reasonable scientific doubt. Consequently, before taking a decision to proceed with the CIP an Appropriate Assessment ("AA") was required of the implications of the Plan for the qualifying features of those sites in view of their conservation objectives.

1.1.3. Following the production of a Report to Inform an Appropriate Assessment ("RIAA") by The Crown Estates technical advisors, NIRAS, and the completion of an AA in accordance with the Regulations, The Crown Estate has concluded that it cannot rule out adverse effects on site integrity ("AEOI") for some Protected sites as a result of the Plan.

1.1.4. Natural England, Natural Resources Wales, the Joint Nature Conservation Committee, Department for Environment, Food and Rural Affairs ("Defra"), and other selected organisations have been consulted throughout the HRA process, and their submissions considered by The Crown Estate.

2. Introduction

2.1 Background

2.1.1 This is a record of the Habitats Regulations Assessment ("HRA") that The Crown Estate has undertaken under the Habitats Regulations and the Offshore Habitats Regulations, in respect of the seabed agreements for the Capacity Increases Programme.

2.1.2 In 2019, The Crown Estate received several applications from offshore wind developers to increase the capacity of their projects specified in their respective seabed agreements from The Crown Estate. These agreements were awarded as part of The Crown Estates Offshore Wind Leasing Round 3 and 2017 Offshore Wind Extensions opportunities.

2.1.3 The number of simultaneous requests for capacity increases for projects in different locations has similar characteristics to other seabed leasing rounds, in that these are co-ordinated activities which will result in the granting of new/amended seabed rights across multiple sites. The amended seabed rights materially alter parameters that were assumed in the plan-level HRAs associated with the leasing rounds for the original projects and this could mean that the proposals will present likely significant effects which are new or materially different to those assessed by the previous plan-level HRAs. The Crown Estate determined that the changes to projects should be considered together, as a 'plan', and the plan should be subject to a plan-level HRA.

2.2 Plan Description

2.2.1 The Capacity Increases Programme comprises the proposed parameters of seven offshore windfarm projects which have applied for changes to their legal agreements (Agreements for Lease ("AfL") and/or Lease) to increase their generating capacities (Figure 1). The projects were originally awarded rights in either The Crown Estates Offshore Wind Leasing Round 3, or The Crown Estates 2017 Offshore Wind Extensions opportunity. The projects are:

- Awel y Môr
- Dudgeon Extension
- Sheringham Shoal Extension
- North Falls
- Five Estuaries
- Rampion 2
- Dogger Bank D

2.2.2 The total increase in capacity from the Capacity Increases Programme will be up to 4.7GW.

2.2.3 The individual projects are at different stages within the Development Consent Order ("DCO") application process (Table 1) and therefore the amount of project specific data available differed between the projects. As a result, the assessment methods were adapted to accommodate the different data availability.

2.2.4 This Record of the Appropriate Assessment (AA) contains The Crown Estates analysis and assessment of the potential impacts of the Capacity Increases Programme on the Protected sites screened into the assessment.

2.2.5 It should be noted that the outcome of the plan-level HRA does not authorise development: further project-level HRA will be required, in support of development consent and other key project consents which must be obtained for each project individually under the existing regulatory regime.

2.2.6 For reference, The Crown Estate has also undertaken a Marine Conservation Zone ("MCZ") assessment considering the features of sites designated under Part 5 of The Marine and Coastal Access Act 2009 separate to this HRA. This is to inform The Crown Estates duties in relation to MCZs under section 125 of the Marine and Coastal Access Act 2009.

Table 1. DCO Application status of each project included in the plan. As of 18/03/25

Project	Screening Agreed	DCO application submitted	DCO approval granted	Capacity Increase (Total)
Five Estuaries	Agreed	Submitted	Recommendation stage	727MW (1.08GW)
North Falls	Agreed	Submitted	Examination stage	396MW (900MW)
Dudgeon Extension & Sheringham Shoal Extension (combined application)	Agreed	Submitted	Approved	281MW (1GW)
Rampion 2	Agreed	Submitted	Decision stage	800MW (1.2GW)
Dogger Bank D	In progress	-	-	(2GW)
Awel y Môr	Agreed	Submitted	Approved	524MW (1.1GW)

2.3 Plan Objectives

2.3.1 The key objectives of the Plan are as follows:

1. Enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030, thereby:

a. supporting the Government's critical national priority for provision of new nationally significant offshore wind
b. mitigating the risk of pre-2030 offshore wind pipeline attrition
c. helping to achieve the Government targets of 50GW of offshore wind by 2030 and decarbonisation of power generation by 2035, in the context of the UK's Net Zero target for 2050

2. Balance the interests of the environment, other users of the sea, and the commercial needs of the offshore wind industry.

3. Secure value from seabed leasing so far as it does not compromise/enhances the long-term value of sustainable offshore wind development and ensures equity in The Crown Estates processes.

4. Make efficient use of the seabed, recognising its value as a national asset, now and for the long term. Ensuring the unique characteristics of capacity increase projects are used to best advantage and areas already designated for offshore wind are optimised in terms of generation potential.

5. Enable decisions in a manner that supports The Crown Estates marine strategy, ensuring opportunities for additional capacity are balanced with the needs of projects already under agreement with The Crown Estate and requirements for delivery of future offshore wind leasing.

The Crown Estate, 1 St James's
Market, London, SW1Y 4AH

Figure1 – Location of the offshore wind farm projects in the programme

The Crown Estate, 1 St James's
Market, London, SW1Y 4AH

2.4 Habitats Regulations Assessment (HRA)

2.4.1 Council Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora ("the Habitats Directive") and Council Directive 2009/147/EC on the conservation of wild birds ("the Birds Directive") aim to maintain or restore certain species and habitats to a favourable conservation status. Article 6(3) of the Habitats Directive makes specific provisions to protect sites from adverse effects associated with proposed plans and projects.

2.4.2 The Habitats Directive provides for the designation of sites for the protection of habitats and species of European importance, known as Special Areas of Conservation ("SACs"). The Birds Directive provides for the classification of sites for the protection of rare and vulnerable birds and for regularly occurring migratory species, known as Special Protection Areas ("SPAs"). SACs and SPAs, and as a matter of Government Policy Ramsar Sites (wetlands of international importance designated under the Ramsar Convention 1971) are collectively termed European sites (referred to in this record of HRA as "Protected sites") and form part of the UK's National Site Network.

2.4.3 In the UK, the Habitats Regulations transposed the Habitats and Birds Directives into national law as far as the 12nm limit of territorial waters. Beyond territorial waters, the Offshore Habitats Regulations serve the same function for the UK's offshore marine area. Following the UK's withdrawal from the European Union and subsequent transition period, The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ensure that the Habitats Regulations continue to operate effectively in the UK. The Capacity Increases Programme covers areas within and outside the 12nm limit so both sets of Regulations apply. They are collectively referred to as the Habitats Regulations for the purposes of this Record of AA.

2.4.4 In accordance with the Habitat Regulations, Protected sites comprise: designated SACs, Sites of Community Importance ("SCI") included on the list of such sites compiled by the European Commission, candidate SACs ("cSACs") submitted to the European Commission (for possible inclusion as an SCI) or the appropriate authority in the UK, and classified SPAs. As a matter of Government policy, the following should be given the same protection as Protected sites: potential SPAs ("pSPAs"); possible/proposed SACs ("pSACs"); and listed Ramsar sites. This protection is extended to proposed Ramsar sites in England and Wales (NPPF 2023; PPW, 2021). In England only, sites identified or required as compensatory habitat are also afforded the same protection in policy (for example, NPPF 2023 and National Policy Statement EN-1).

2.4.5 Regulation 63 of the Habitats Regulations states that:
A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and (b) is not directly connected with or necessary to the

management of that site, must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

2.4.6 Regulation 28 of the Offshore Habitats Regulations incorporates the equivalent provision.

2.4.7 The CIP is not directly connected with, or necessary to, the management of Protected sites. The Habitats Regulations require that, where it appears to The Crown Estate as a competent authority that the CIP is likely to have a significant effect on any Protected site, either alone or in combination with other plans and projects, an AA is carried out to determine if it is possible to ascertain that it will not adversely affect the integrity of any Protected site in view of that site's conservation objectives.

2.4.8 In undertaking a HRA it is up to a competent authority to consider implementing mitigation measures or amending its plan to avoid or reduce potentially damaging effects on Protected sites. As part of the HRA process, the plan-making authority may agree to a plan only if the authority has ascertained that it will not adversely affect the integrity of a Protected site. The only exception to this is where there are no alternative solutions and the plan must be carried out for imperative reasons of overriding public interest ("IROPI"), in which case the authority must secure all necessary compensatory measures.

2.4.9 The Crown Estate appointed NIRAS as the HRA consultant by direct award under an existing framework agreement. NIRAS has prepared a shadow assessment and provided the technical information required to enable The Crown Estate to undertake an AA for the Capacity Increases Programme.

2.4.10 In outline, the approach to the HRA undertaken by The Crown Estate centres around three reports produced as part of NIRAS's shadow assessment:

- **Scoping Report –** this sets out the criteria that were used to determine whether offshore wind farm projects forming part of the CIP should be scoped into or out of the assessment.
- **Screening and Gap Analysis Report –** this report assesses the potential impact of the plan and screens Protected sites in or out of the AA based on the possibility that the plan will have a Likely Significant Effect (LSE) on Protected sites. This report considered the screening assessments and conclusions for the individual projects, where these were available.
- **Report to Inform Appropriate Assessment (RIAA) –** for Protected sites where an LSE could not be excluded, a further assessment was undertaken. The RIAA assesses the possibility of the plan having an AEOI on such Protected sites using a combination of evidence presented in the project level assessments and original technical assessment work.

2.4.11 To inform the HRA, The Crown Estate has undertaken consultation on the draft RIAA with the relevant UK statutory nature conservation bodies ("SNCBs") and with select

government departments and non-departmental public bodies, as well as environmental non-governmental organisations ("NGOs"), which have relevant expertise in relation to the Capacity Increases Programme (namely the Royal Society for Protection of Birds ("RSPB") and The Wildlife Trusts).

2.4.12 Following review of consultation comments, and a request from the SNCBs. The Crown Estate provided a further opportunity for the SNCBs to be consulted on a draft version of this record of HRA. The final version of this record of HRA has given significant weight to and addresses points raised by the SNCBs.

2.4.13 Natural England, Natural Resources Wales, the Joint Nature Conservation Committee, Defra, and other selected organisations were also consulted throughout the HRA process via the Expert Working Group (EWG) meetings. The Crown Estate has given significant weight to the views of all of the SNCBs.

2.4.14 This Record of AA should be read in conjunction with the following documents:

- NIRAS (2020): Offshore Wind Leasing Round 4 Plan Level HRA. Principles Report ("the Round 4 Principles Report")
- NIRAS (2024a): Capacity Increases Programme HRA. Scoping report. April 2024
- NIRAS (2024b): Capacity Increases Programme HRA. Screening and gap analysis report. May 2024
- NIRAS (2024c): Capacity Increases Programme HRA. Report to Inform Appropriate Assessment. December 2024.

2.4.15 The key information from these documents and the representations of the SNCBs is summarised and referenced in the subsequent sections of this document, together with The Crown Estates consideration of the information and the representations.

3. Scoping

3.1.1. Seven projects are included in the Plan, all of which comprise amendments to projects which were awarded seabed rights under previous plans (Round 3 and Extensions (TCE, 2019)) and were subject to an AA as part of that process. NIRAS undertook a scoping exercise to determine whether proposed changes to leases could result in new or materially different impacts from the projects that would require a new assessment.

3.1.2. Each project was evaluated against a series of tests outlined below. A project was only excluded from a detailed technical assessment (screening and appropriate assessment) if all the criteria applied to the project. All projects, whether scoped in or out of detailed technical assessment, were included in the Plan.

3.1.3. The criteria used to scope the individual projects were as follows:

- Test 1: The predicted scale and nature of impacts at the higher MW capacity are less than or the same as that assessed in the previous plan level HRA – i.e. the scale and nature of impact does not give rise to a risk of new or materially different likely significant effects to those assessed previously.
- Test 2: The project level assessment methodology and conclusions presented in developer's applications for development consent have been advised as being appropriate by SNCBs and/or accepted by another competent authority and conclude no adverse effect on integrity alone or in-combination with other plans or projects.
- Test 3: There has been no deterioration in the status (i.e. feature condition changed from maintain to recover) of any relevant Protected site screened into the previous plan or (where test 2 is passed) project level HRA.
- Test 4: There are no new designations, since the previous plan or (where test 2 is passed) project assessment, that would be relevant to the Plan.

3.1.4. Awel y Môr was the only project to pass all of the above tests. This project was still included in the Plan but was not subject to further detailed assessments, with the exception of its inclusion in the in-combination assessment stage of the RIAA. For the full details of the scoping assessments of the individual projects see the Scoping Report (NIRAS, 2024a).

3.1.5. The Crown Estate, having carefully reviewed the Scoping Report, agrees with the results of the assessment.

4. Screening and gap analysis

4.1. The Likely Significant Effects Test

4.1.1. Under Regulation 63 of the Habitats Regulations and Regulation 28 of the Offshore Habitats Regulations, a competent authority must consider whether a plan or project may result in a LSE on a Protected site, either alone or in combination with other plans or projects. A LSE is, in this context, any effect that may be reasonably predicted as a consequence of a plan or project which may undermine the conservation objectives of the features for which the site was designated but excluding trivial or inconsequential effects. An AA is required if the risk of the plan or project having a LSE on a Protected site, either alone or in combination with other plans or projects, cannot be ruled out on the basis of objective scientific evidence.

4.1.2. The purpose of this test is to identify LSEs on any Protected sites that may result from the implementation of the Plan, and to record The Crown Estates conclusions on the need for an AA. For those features where a LSE cannot be excluded, these must be subject to an AA.

4.1.3. This section addresses this first step of the HRA process, for which The Crown Estate considered the potential impacts of the Plan either alone or in combination with other plans and projects on Protected sites to determine whether there is a risk of LSEs.

4.2. Screening – Identification of Likely Significant Effects

4.2.1. A screening exercise was undertaken to identify Protected sites where a LSE from the Plan could not be excluded. The LSE test identified impact pathways using the criteria presented in the previous fixed wind (Round 4) Principles Report (NIRAS, 2020). A gap analysis was then undertaken whereby the results of this plan-level screening exercise were compared with the screening and assessments undertaken for the individual projects. This comparative analysis also determined whether there was agreement, at project level and based on detailed project information, between project developers and SNCBs on the conclusions of the risk of LSE on Protected sites.

4.2.2. For the screening exercise, both the array areas and cable corridors (or cable regions, depending on the stage of the project) were included in the assessment of LSE. All Protected sites were included in the screening exercise, excluding Protected sites supporting terrestrial and freshwater habitats and species, and migratory birds where there is no pathway of connectivity with the Plan.

4.2.3. The criteria outlined in the Principles Report were applied to the qualifying features of Protected sites, based on the impact pathways (as defined in the Round 4 Principles Report) within the array areas and cable corridors or regions. For the purposes of this plan-level HRA, a LSE was assumed to arise where there is the potential presence of an impact pathway resulting from any of the phases of development that may comprise part of the Plan, including pre-construction, construction, operation, maintenance and decommissioning. Each pathway identified can potentially lead to a variety of impacts,

which can affect receptors in different ways. Further analysis was undertaken to identify the 'pressures' that could arise through these pathways. The use of pressures in this way is consistent with the approach adopted for the Offshore Wind Leasing Round 4 ('Round 4'), Offshore Wind Leasing Round 5 ('Round 5') and marine aggregates HRAs (NIRAS, 2020; NIRAS 2024f, ABPmer, 2023).

4.2.4. To ensure compliance with case law, no mitigation measures to avoid or reduce any potential harmful effects of the plan were assumed or applied at the screening stage (see judgment of 12 April 2018, *People Over Wind and Others*, Case C-323/17, EU:C:2018:244, paragraph 40).

4.2.5. The Screening and Gap Analysis Report identified the qualifying sites and features for which the possibility of LSE (as a result of the plan) could not be excluded. Categories were assigned to each screened in Protected site and feature based on the outcomes of a comparison between plan and project level screening, and in view of project level assessments where applicable (see Table 2). This analysis and the data gathered thereafter informed The Crown Estates conclusions on the sites and features that must be subject to an AA at plan level.

Table 2. Categories assigned to qualifying sites and features screened at plan level following a comparison between plan and project level screening exercises and assessments.

Outcome Category	Definition	Additional Information
Screened out and agreed by SNCBs at project level.	Information was provided or found in project documentation confirming that site had been considered and subsequently agreed with the SNCBs to be screened out.	No further action required (Screened out).
Not considered but screening is agreed with SNCBs at project level, so by proxy these are agreed as screened out.	The site/ feature was screened in at Plan-level, but no details of this site/ feature were provided or could be located in the project-level documentation however developer screening outcomes have been agreed with the SNCBs and so site/feature can be assumed to have been screened out.	No further action required (Screened out).
Assessed and agreed by SNCBs at project level.	Information was provided or found in project	No further action required (Screened in).

Outcome Category	Definition	Additional Information
	documentation confirming that site had been screened in by the developer and an assessment undertaken and the results agreed by the SNCBs.	
Not included in assessment reports but assumed it is screened out (e.g. as the feature does not fly over land, due to large foraging ranges).	The site/ feature was screened in at Plan-level but no details of this site/ feature were provided or could be located in the project-level documentation - however, through examination with expert knowledge relating to each topic, the site was assumed to be screened out based on site/feature specific considerations such as where a species does not fly over land, or has very large foraging range areas. These assumptions are stated in the table within the dashboard, where relevant.	No further action required (Screened out).
Screened out but not yet agreed by SNCBs at project level.	Information was provided or found in project documentation confirming that sites had been screened out but subsequently not agreed with the SNCBs.	Further consideration required to understand the status and any actions being undertaken at the project level, before agreeing next steps.
Assessed but not yet agreed by SNCBs at project level.	Information was provided or found in project documentation confirming that sites had been screened in by the developer and an assessment undertaken however the results had not yet been agreed by the SNCBs.	Further consideration required to understand the status and any actions being undertaken at the project level, before agreeing next steps.
Not considered at project level but included in the HRA screening tool – possibly needs to be	The site/ feature was screened in at Plan-level, but no details of this site/ feature were provided or	Need to understand reason for difference. Further consideration needed to confirm if these sites/features need to be

Outcome Category	Definition	Additional Information
assessed (high level assessment).	could be located in the project-level documentation. Additional information was needed but where a Plan-level assessment was required based on the identified pressures, it would be conducted at a high level. This category also includes cases where the feature had been identified but not yet assessed.	considered/have been considered at project level and the status before determining next steps. Cases where the feature was screened in, but an assessment has not been undertaken would also fall into this category.
Not considered at project level but included in the HRA screening tool – possibly needs to be assessed (detailed assessment).	The site/ feature was screened in at Plan-level, but no details of this site/ feature were provided or could be located in the project level documentation. Additional information was needed but if a Plan-level assessment was required based on the identified pressures, it would be conducted at a high level. This category also includes cases where the feature had been identified but not yet assessed.	Need to understand reason for difference. Further consideration needed to confirm if these sites/features need to be considered/have been considered at project level and the status before determining next steps. Cases where the feature was screened in, but an assessment has not been undertaken would also fall into this category.
Additional sites added by projects following consultation.	Sites/features that had been assessed at project level, which were not screened in at Plan-Level. These would be included in the Plan-level assessment.	No further action required (Screened in).

4.2.6. In addition to the screening comparison an analysis of information (provided by developers) was conducted by NIRAS to address several aspects:

- To understand the reasoning behind the inclusion of certain sites at the project level; where in some case sites that would typically be screened out by the Plan-level HRA screening tool have been included at the request of the SNCBs.
- Whether all project level assessment details were available for inclusion in the Plan-level assessment.

- Whether any recalculations of estimated impacts were necessary for the Plan-level assessment due to different methodologies/ data/ assumptions and advice. This is in relation to the in-combination assessment.

4.2.7. NIRAS highlighted an essential consideration during the project level assessment review which involved recognising variations in advice by SNCBs to determine appropriate methodology for assessments. An approach was adopted by NIRAS to minimise recalculations where variations in methodology occurred, which was specifically applicable to impacts already assessed at the project level and those previously discussed and agreed with consultees. The strategy taken ensured that the assessment process remained efficient and sufficiently precautionary (NIRAS, 2024b). Further information on the specifics of the strategy to determine whether any additional calculations of project impacts were required is available within the Screening and Gap Analysis report within Chapter 2 (NIRAS, 2024b).

4.2.8. A full list of the sites and qualifying features screened into the assessment at plan level and their associated categories is detailed in Section 3 of the Screening and Gap Analysis Report. The number of qualifying sites and features which were deemed to require further consideration is outlined in sections 4-6 of the Screening and Gap Analysis Report (NIRAS, 2024b).

4.2.9. Natural England, Natural Resources Wales, JNCC, Defra and other selected organisations were consulted on the Screening and Gap Analysis Report, and their views taken into account.

4.2.10. The Crown Estate has reviewed the Screening and Gap Analysis Report and carefully considered the feedback provided by the SNCBs and is satisfied that the screening exercise has been conducted in an appropriate manner.

4.2.11. The Crown Estate is satisfied that an appropriate list of Protected sites and their qualifying features (based on the risk of LSE) was taken forward for further assessment in the RIAA.

4.2.12. Given the findings of the screening assessment and RIAA, and the fact that the Capacity Increases Programme is not directly connected with or necessary to the management of a Protected site, The Crown Estate has undertaken an AA of the implications of the Plan for the relevant Protected sites in view of the sites' conservation objectives. The AA has been informed by the information presented in the Scoping Report (NIRAS, 2024a), Screening and Gap Analysis Report (NIRAS, 2024b) and the RIAA produced by NIRAS (NIRAS, 2024c).

5. Appropriate Assessment

5.1. Test for Adverse Effect on Site Integrity

5.1.1. The requirement to undertake an AA is triggered when a competent authority, in this case The Crown Estate Commissioners, determines that a plan or project may have a likely significant effect on a Protected site either alone or in combination with other plans or projects. Guidance issued by the European Commission states that the purpose of an AA is to enable a competent authority to ascertain that the plan or project will not adversely affect the integrity of any Protected site, either alone or in combination with other plans and projects, and in view of the site's conservation objectives (European Commission, 2018).

5.1.2. If the competent authority cannot ascertain the absence of an AEOI beyond reasonable scientific doubt, then under the Habitats Regulations it may not agree to the plan or project unless the competent authority determines that further legal tests are met and that it can rely on a 'derogation.' Such a derogation allows a plan or project to proceed notwithstanding the risk of an AEOI but only if there is no alternative solution, the plan or project must be carried out for IROPI and the compensatory measures necessary to ensure the overall coherence of the National Site Network are secured.

5.1.3. Guidance from the European Commission confirms that disturbance to a species or deterioration of habitats (for which a Protected site has been designated) must be considered in relation to the integrity of that site and its conservation objectives (European Commission, 2018 para 4.6.3):

"The appropriate assessment focuses on assessing the implications for the site of the plan or project, individually or in combination with other plans or projects, in view of the site's conservation objectives. Article 6(3) must therefore be read in close conjunction with Article 6(1) and 6(2) since the conservation objectives to be used in the appropriate assessment are linked also to these two earlier paragraphs."

5.1.4. Section 4.6.4 of the guidance defines site integrity as:

"...the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is or will be classified."

5.1.5. Conservation objectives outline the desired state for a Protected site, in terms of the interest features for which it has been designated.

5.1.6. There are no set thresholds at which impacts on site integrity are considered to be adverse. This is a matter of judgement on a site-by-site basis, depending on the designated feature and nature, scale and significance of the impact.

5.1.7. For each Protected site the conservation objectives have been used by The Crown Estate to determine whether the Plan has the potential to result in an AEOI, either alone or in combination with other plans or projects.

5.2. RIAA Methodology

5.2.1. The assessment undertaken by NIRAS sought to determine whether the potential for LSEs identified during the screening exercise could result (either alone or in-combination with other plans or projects) in an adverse effect on the integrity of any Protected site. An assessment of the impacts of the Plan was undertaken for each Protected site that was screened in.

5.2.2. The RIAA was undertaken using the outputs of the Screening and Gap Analysis report (NIRAS, 2024b), which determined the approach to the assessment. A fundamental principle of the RIAA is the commitment to undertake a reasonable and meaningful assessment where possible. This allows The Crown Estate to determine which of the assessments can be concluded at the plan level, and which can only be meaningfully assessed at the project level (relying on the legal requirement for project level HRA at the consenting stage).

5.2.3. Where possible, data and/or assessments sourced from projects within the Plan were used to inform the Plan alone assessment. This ensured minimal differences between Plan and project level HRA; however, given the difference in stages between the projects and the need for a robust and independent plan level assessment, developer information was evaluated before being adopted and a new assessment was completed where necessary.

5.2.4. Where a new assessment was required (see Table 2), these were either high level or detailed. Where appropriate a high-level assessment 'Common Assessment' was used which qualitatively assessed available evidence to estimate potential effects. Those not captured under this assessment were assessed in detail (Detailed Assessment) either qualitatively or quantitatively. All assessments (high-level and detailed) utilise published research, statutory guidance, grey literature and expert judgement.

5.2.5. The alone assessment considered the outcomes of each individual Project-level assessment for all Protected sites and features screened into the assessment. In order for the Plan assessment to conclude no AEOI it was necessary that this conclusion was reached for each individual project with respect to the Protected site and feature in question. The Plan alone assessment then considered whether the effects of individual projects within the Plan could combine to cause an adverse effect.

5.2.6. In accordance with the precautionary principle, where NIRAS undertook Collision Risk Modelling (CRM) and displacement modelling to fill evidence gaps, the maximum number of adult bird mortalities per year was used to assess the effects of the Project on Protected sites. However, where a DCO had been granted for the Sheringham and Dudgeon Extensions, The Crown Estate reviewed the Project-level HRA and considered

the level of effects predicted by in the HRA and the methodology used by the Secretary of State in reaching their conclusions and adopted the same approach, where appropriate: for example the methodology adopted by the Secretary of State, following examination, to use central values of displacement and mortality for guillemot from the Flamborough and Filey Coast SPA. This was based on advice from Natural England and was considered to be suitably precautionary. The Crown Estate notes that no further information has become available that would undermine this approach, therefore in this case the quantum of effects agreed by the Secretary of State was adopted in this AA.

Interim review

5.2.7. Another unique aspect of the Plan is that project parameters changed throughout the assessment process, as their applications for development consent were prepared. As such there was a period of time between the cut-off date for the RIAA assessment (June 2024) and The Crown Estates consideration of the RIAA and its own recording of the AA, during which some additional information for projects became available, particularly for those projects which were at the pre-application stage of the consenting process at the time of the RIAA. Where such additional information became available, NIRAS were asked to complete an interim review to support The Crown Estates AA. NIRAS confirmed that there was no new information to review with regards to the Dogger Bank D project, but identified additional information relating to North Falls that had become available following the submission of the DCO from the application to the Planning Inspectorate (PINS) which was accepted on 22nd August 2024.

5.2.8. NIRAS reviewed the new information relating to the North Falls project in order to identify any instances where it may be necessary to revise the conclusions of the RIAA for North Falls and the Plan as a whole, especially where this could affect the recommendations included in the RIAA for The Crown Estates AA. During the review, NIRAS noted several slight differences in numbers reported in the updated North Falls assessment, however they confirmed that these differences did not alter the conclusions of the CIP RIAA and the recommendations by NIRAS to The Crown Estate. In all other cases where the North Falls RIAA found that there were no adverse effects, this accorded with the CIP RIAA. Therefore, the conclusions in the CIP RIAA pertaining to instances of no adverse effect remain unchanged.

5.2.9. Further to this, NIRAS considered the implications of the additional information relating to North Falls for the conclusions in the RIAA relating to the in-combination effects of the CIP. NIRAS noted that , given the small contribution of North Falls to the impacts of the CIP for some species at certain sites, the updated information from North Falls did not reduce the uncertainty surrounding these estimates. Therefore, NIRAS concluded that the CIP RIAA conclusions and the recommendations by NIRAS to The Crown Estate also remain unchanged in relation to the in-combination effects of the CIP. Table 3 below summarises the CIP RIAA conclusions and the interim review recommendations for RIAA conclusions.

Table 3. Summary of interim review recommendations by NIRAS

	Feature	Plan Level CIP RIAA Conclusion	In-combination CIP RIAA Conclusion	Interim Review recommendation
Alde-Ore Estuary SPA and Ramsar	Lesser black-backed gull	AEOI cannot be ruled out	AEOI	No change to CIP RIAA conclusion
Farne Islands SPA	Guillemot	NO AEOI	AEOI cannot be ruled out	No change to CIP RIAA conclusion
Flamborough and Filey Coast SPA	Gannet	NO AEOI	AEOI cannot be ruled out	No change to CIP RIAA conclusion
	Guillemot	NO AEOI	AEOI cannot be ruled out	No change to CIP RIAA conclusion
	Razorbill	NO AEOI	AEOI cannot be ruled out	No change to CIP RIAA conclusion
	Kittiwake	AEOI cannot be ruled out	AEOI	No change to CIP RIAA conclusion
	Seabird assemblage	NO AEOI	AEOI cannot be ruled out	No change to CIP RIAA conclusion
Outer Thames Estuary SPA	Red-throated diver	AEOI cannot be ruled out	AEOI cannot be ruled out	No change to CIP RIAA conclusion
Margate and Long Sands SAC	Sandbank	AEOI cannot be ruled out	AEOI cannot be ruled out	No change to CIP RIAA conclusion
Southern North Sea	Harbour porpoise	No AEOI (with mitigation)	No AEOI (with mitigation)	No change to CIP RIAA conclusion

5.2.10. The Crown Estate is satisfied that it has sufficient, up-to-date information about the projects comprised in the CIP and that this review of additional project information is an appropriate approach to take in undertaking this Plan-level assessment.

5.3. In-Combination Assessment

5.3.1. The in-combination assessments built on the assessments undertaken for the Plan alone. The in-combination assessment follows the standard set out in previous plan-level HRAs undertaken by The Crown Estate (Round 4 and Round 5). The subsequent paragraphs describe this process.

5.3.2. An initial search was undertaken to identify plans or projects which may act in-combination with the Plan, and includes the following:

- applications for a new permission;

- applications to change an existing permission;
- granted permissions that have not begun or been completed;
- granted permissions that need renewing; and
- plans that have been published in draft but not yet adopted.

5.3.3. Specific plans and projects were then identified for inclusion in the in-combination assessment (see RIAA Table 2. West coast in-combination projects, and Table 4. East coast in-combination projects for ornithology; Table 3.211 for other receptors, NIRAS 2025c) by means of a quantitative exercise in addition to a manual search, including review of project level RIAAs for the individual projects where available. Tier 1 (operational) projects through to Tier 4 projects (for which applications have been submitted) were included in the assessment.

5.3.4. The Crown Estate is satisfied that a proportionate approach was taken to consideration and assessment of in-combination effects.

5.4. Uncertainties

5.4.1. The projects in the Plan are all at different stages in the DCO process. As a result, the type of information available for inclusion in the assessment varied from project to project. The RIAA used the most up to date information available at the time of the assessment to determine whether it can be concluded that the Plan will not have an AEOI. Where projects were at an early stage in the consenting process, the information available to inform the RIAA was more limited than for those projects at a later stage, or with a DCO. A cut-off date of June 2024 was set to submit information for consideration in the RIAA, (Dogger Bank D was based on NIRAS calculated data using a proxy approach, North Falls was based on scoping data). For projects without a DCO there was some uncertainty about the project parameters, which could be refined before a DCO is issued. To account for this uncertainty, a precautionary approach was applied, and the worst-case scenario was assessed. As a result of this approach, the predicted effects are likely to be greater than will actually arise.

5.4.2. Because the AEOI test incorporates the application of the precautionary principle as a matter of law - and because plan assessments are (typically), by their nature, less precise than project assessments - it is important for the assessment process to eliminate the prospect of AEOI in so far as is possible at the level of specificity inherent in the nature and purpose of the particular plan. This can be achieved through the incorporation of plan-specific mitigation or specific restriction with regard to plan delivery, or the addition of further mitigation measures at project level.

5.4.3. The Crown Estate also acknowledges that there will be sufficient flexibility and scope for avoidance and appropriate mitigation to be implemented at project level to avoid AEOI in respect of Protected sites in relation to certain elements of the Plan. The Crown Estate notes the Advocate General's opinion in the European Court of Justice case C-6/04 European Commission v United Kingdom, which confirms the progression of assessment that must take place as a plan becomes more specific, whereby 'adverse

effects on areas of conservation must be assessed at every relevant stage of the procedure to the extent possible based on the precision of the plan.'

5.4.4. The Crown Estate has reviewed and given due regard to the responses submitted by members of the HRA Expert Working Group ("EWG"), including SNCBs, throughout the HRA process- and is satisfied that the assessment has been conducted in an appropriate manner.

6. Transboundary Assessment

6.1.1. Given the potential for the Plan to affect mobile features across a wide geographical area the RIAA included non-UK Protected sites within the assessment. These are:

- ABZ 1 / ZPS 1 SAC
- Baie de Morlaix SPA (FR)
- Baie de Saint-Brieuc-Est SPA (FR)
- Baie de Seine Occidentale SPA (FR)
- Baie du Mont Saint Michel SPA (FR)
- Bancs des Flandres SAC (FR)
- Cap d'Erquy-Cap Fréhel SPA (FR)
- Cote de Granit Rose-Sept Iles SPA (FR)
- Doggerbank SAC (DE)
- Doggersbank SAC (NL)
- Duinen en Lage Land Texel SPA (NL)
- Duinen Vlieland SPA (NL)
- Dunes De La Plaine Maritime Falamande SAC (FR)
- Falaise du Bessin Occidental SPA (FR)
- Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC (FR)
- Howth Head SPA (IE)
- Ilot du Trevors SPA (FR)
- Ilots Notre-Dame et Chevret SPA (FR)
- Ireland's Eye SPA (IE)
- Klaverbank SCI (NL)
- Lambay Island SPA (IE)
- Littoral seino-marin SPA (FR)
- lNoordzeekustzone SCI (NL)
- Ouessant-Molene SPA (FR)
- Pagham Harbour SPA (FR)
- Récifs Gris-Nez Blanc-Nez SAC (FR)
- Ridens et dunes hydrauliques du détroit du Pas-de-Calais SAC (FR)
- Saltee Island SPA (IE)
- SBZ 1 SCI (BE)
- SBZ 2 SCI (BE)
- SBZ 3 SCI (BE)
- Seevogelschutzgebiet Helgoland (DE)
- Tregor Goëlo SPA (FR)
- Veerse Meer SPA (NL)
- Vlaamse Banken SAC (BE)
- Vlakte van de Raan SAC (BE / NL)
- Voordelta SAC (NL)
- Waddenzee SCI (NL)

- Westerschelde and Saeftinghe SAC (NL)
- Wicklow Head SPA (IE)
- Zwanenwater SPA (NL)

6.1.2. The Crown Estate has reviewed the assessment of the above SACs and agrees with the conclusions of NIRAS (2024c).

6.1.3. With the exception of Doggersbank SAC (NL), NIRAS did not identify any adverse effects on the above SACs from the Plan either alone or in-combination with other plans or projects before the implementation of mitigation. For Doggersbank SAC the RIAA recommended, following the implementation of mitigation (see Table 5, NIRAS 2024c), a conclusion of no AEOI.

6.1.4. The following mitigation measures have been recommended to minimise impacts on harbour porpoise at Doggersbank SAC from wind turbine monopile foundation installation at locations where effective deterrent ranges overlap with >20% of the SAC area by:

- Reduction of piling noise levels, e.g. low-noise piling; and/or,
- Attenuation of piling noise, e.g. bubble curtain.

6.1.5. With such measures in place NIRAS concluded that no AEOI will occur either for the Plan alone, noting that other projects in the Plan are relatively distant from the Protected site (>26km), or in combination.

6.1.6. The Ministry of Infrastructure and Water Management in the Netherlands did not raise any specific concerns in relation to transboundary effects of the Plan on Doggersbank SAC. The Crown Estate considered the assessment of Doggersbank SAC carefully and agrees with the conclusions of NIRAS (2024c).

6.1.7. The Crown Estate has reviewed the assessment of the above SPAs and agrees with the conclusions of NIRAS (2024c).

6.1.8. With the exception of Lambay Island SPA, NIRAS (2024c) did not identify any potential for AEOI of SPAs from the Plan alone. In relation to the in-combination assessment NIRAS identified an increase in baseline mortality of less than 5 birds or 0.5% from the Plan, but the additional mortality would not result in a detectable impact on population size or distribution of the above SPAs. Additionally, as the project arrays fall outside the Protected site boundaries, there is no pathway for collision, disturbance and displacement to result in adverse effects. The Plan's contribution to any in-combination impacts on the qualifying features is considered insufficient to prevent or delay the achievement of the conservation objectives for these Protected sites. NIRAS (2024c) concluded that any additional impacts from the Plan alone would not make an appreciable difference to any in-combination impact for the above SPAs.

6.1.9. In regard to Lambay Island SPA, NIRAS identified an increase in baseline mortality of 0.6% from the Plan. The impact of the Plan alone is considerably lower than that predicted in the in-combination assessment. Results from the in-combination assessment indicated that the effects of displacement from the Plan, along with other plans and projects, on the guillemot population at Lambay Island SPA, across all scenarios, were not considered significant enough to adversely affect the integrity of the site. Therefore, NIRAS (2024c) concluded that the Plan alone presents no potential for an adverse effect on the integrity of the guillemot feature at Lambay Island SPA.

6.1.10. The Department of Housing, Local Government and Heritage in Ireland did not raise any specific concerns in relation to transboundary effects from the Plan for Lambay Island SPA. The Crown Estate considered the assessment of Lambay Island SPA carefully and agrees with the conclusions of NIRAS (2024c).

6.1.11. The Crown Estate considered the above assessment of transboundary impacts on Protected sites carefully and agrees with NIRAS's conclusions. To inform The Crown Estates assessment of these sites, the Department of Housing, Local Government and Heritage in Ireland, the Federal Public Service of Health, Food Chain Safety and Environment in Belgium, Ministry of the Environment and Food in Denmark, Ministry of Infrastructure and the Environment in the Netherlands and the General Secretariat of the Sea in France were contacted. These government departments of Ireland, Belgium, Denmark, the Netherlands and France did not raise any concerns in relation to transboundary effects from the Plan and implications for the Protected sites highlighted above (6.1.1 to 6.1.11). As a result, this AA does not consider these sites further. Mitigation measures for Doggersbank SAC are included within section 8.

7. Assessment Findings

7.1.1. The following sections provide a summary of the key findings of the assessment in relation to the Protected sites and features screened into the assessment, and a summary of any relevant feedback provided by the SNCBs and other consultees.

7.1.2. As highlighted previously, the RIAA included non-UK Protected sites within the assessment. Having reviewed the assessment of these non-UK sites (see 6.1.1– 6.1.11), The Crown Estate agrees with NIRAS's conclusions and this AA does not assess these sites further. Mitigation measures for Doggersbank SAC are included within section 8.

7.1.3. The RIAA provides detailed assessment of the LSEs on all features and pathways screened into the HRA. Where no comments have been raised by stakeholders during consultation on the RIAA, The Crown Estate has carefully considered the assessment presented in the RIAA and agrees with its conclusions (NIRAS, 2024c). The justification presented in the RIAA should be referred to. Where comments have been raised by stakeholders during consultation and additional consideration is required this is presented below in Section 7.2 onwards.

7.1.4. The draft RIAA, as presented for consultation (version 1), utilised the Natural England approach of using Biologically Defined Minimum Population Scales (BDMPS) to apportion non-breeding guillemot and razorbill to Protected sites. This resulted in an AEOI not being excluded for several Scottish SPAs. Following a discussion with NatureScot on 7th November 2024 and advice received on 15th November 2024, the assessment of these sites was revised to use NatureScot's guidance on apportioning and the final version of the RIAA was updated to reflect the changes to the assessment conclusions.

7.1.5. For guillemot, NatureScot guidance (NatureScot, 2023) highlights that guillemot is a dispersive rather than fully migratory species and typically does not travel far from its breeding colony during the non-breeding season (Buckingham et al., 2022). Foraging ranges established during the breeding season are therefore relevant year-round for assessing connectivity with offshore wind farms. It is therefore highly unlikely that birds from Fowlsheugh SPA would interact with the majority of North Sea projects included in the in-combination assessment, including CIP projects. This is because the CIP projects are located beyond the mean-maximum foraging range plus one standard deviation for this population.

7.1.6. For razorbill at Forth Islands and St Abb's Head, apportioning was recalculated by NIRAS for Dogger Bank D based on comments received from the developer during consultation on the draft RIAA. This adjustment reduced the contribution of the plan to razorbill mortality to a maximum of 4.66 birds per annum at Forth Islands and 4.16 adult birds per annum at St Abb's Head. These values fall below the threshold of 5 birds annually (or, if greater than 5 birds, no more than a 0.5% increase in baseline mortality). Consequently, it was concluded that the plan will not materially contribute to an in-combination impact and an in-combination assessment was not progressed for these sites/features.

7.1.7. It is therefore concluded that the Plan would not cause an adverse effect on these features and does not materially contribute to any in-combination impact. This does not imply there is no in-combination adverse effect on site integrity (AEOI), but rather that the Plan's contribution is not significant enough to necessitate further assessment for these features in this AA.

7.1.8. As a result, all Scottish SPAs which were classified as AEOI in version 1 of the RIAA have been ruled out and effectively screened out due to distance from the plan. The Scottish SPAs removed from the assessment are:

- St Abbs to Fast Castle Head SPA
- East Caithness Cliffs SPA
- Forth Islands SPA
- Foula SPA
- Fowlsheugh SPA
- North Caithness Cliffs SPA
- Troup, Pennan and Lion's Head SPA

7.1.9. The RIAA assumed a range of measures (best practice and other proven mitigation measures) will be implemented by all projects under the Plan, in order to avoid or minimise potential impacts on certain features. The RIAA concluded that an AEOI from the Plan alone and in combination could be excluded for several Protected sites/ features if best practice design and mitigation measures (Table 4) are secured in the legal agreements.

7.1.10. Following review of the RIAA and consultation responses, the features for which The Crown Estate agrees with NIRAS' (2024c) conclusions that an AEOI can be excluded from the Plan alone and in combination, and do not require further consideration in this AA are outlined in Table 4. The routine mitigation measures will be secured in the legal agreements with developers.

Table 4. Best Practice Mitigation Measures

ID	Pressure	Receptors	Mitigation or Best Practice
1	Collision	Marine mammals	To minimise the risk of accidental collisions, a Vessel Traffic Management Plan should be developed to ensure that construction and operational vessels are not routed through areas known to support aggregations of marine mammals.
2	Physical presence	Marine mammals, birds	A Vessel Traffic Management Plan should be developed to ensure that construction and operational vessels take all possible steps to minimise disturbance to Annex II marine mammal species and rafting seabird species, including,

ID	Pressure	Receptors	Mitigation or Best Practice
			where relevant, reference to Natural England's best practice protocol for vessel movements in red-throated diver SPAs.
3	Underwater noise	Fish, marine mammals	To reduce the risk of injury, a marine mammal mitigation plan (MMMP) should be prepared and best practice mitigation for pile driving (JNCC, 2010) and Unexploded Ordnance (UXO) disposal (JNCC, 2025) applied.
4	Toxic contaminants	All features	To reduce the risk of the accidental release of toxic contaminants during construction a Construction Environmental Management Plan should be developed. To reduce the risk of the accidental release of toxic contaminants during operation an Operation and Maintenance (O&M) Environmental Management Plan should be developed. To reduce the risk of the accidental release of toxic contaminants during vessel movements, all vessels involved in construction/decommissioning and operational activities should adhere to routine, best practice measures in accordance with the MARPOL Convention.
5	EMF	Marine mammals, Fish	To ensure that any EMF effects are negligible, ensure that cable burial is undertaken in accordance with requirements of National Policy Statement (EN-3), unless consideration of shallow burial is recommended to minimise impacts to protected habitat features in restricted areas (Dogger Bank D, Holderness Inshore MCZ).
6	Light	Birds	It is assumed lights on turbines will meet the minimum regulatory requirements as set out in the International Association of Marine Aids to Navigation and Lighthouse (IALA) Recommendation O117 on 'The Marking of Offshore Wind Farms' for navigation lighting and by the Civil Aviation Authority in the Air Navigation Orders (CAP 393 and guidance in CAP 764). In keeping with the minimum legal requirements, this will minimise the risks of migrating birds becoming attracted to or disorientated by turbines at night or in poor weather. Meeting these requirements would mean the Plan would therefore be consistent with OSPAR guidance and NPS EN-3 with the design aiming to minimise the emission of light whilst still complying with safety protocols and regulations in relation to aviation and shipping navigation.

ID	Pressure	Receptors	Mitigation or Best Practice
7	Invasive species	Habitats, sessile species	To reduce the risk of the spread of INNS, it is assumed that best practice, including compliance with MARPOL, will be implemented by projects and it is further recommended that all projects prepare biosecurity plans, which may be included within a project environmental management plan (PEMP).

Table 5. Summary of Sites/ features where The Crown Estate has agreed with NIRAS' RIAA conclusions and adopts the findings of the RIAA, these sites are not considered further.

Site	Receptors	Mitigation	Conclusion
Berriedale and Langwell Waters SAC	Atlantic Salmon	Routine only (3,4,5): see Table 4.	No AEOI
Berwickshire and North Northumberland SAC	Grey seal	Routine only (2,3,4,5): see Table 4	No AEOI
Dartmoor SAC	Atlantic Salmon	Routine only (3,4,5): see Table 4.	No AEOI
Essex Estuaries SAC	Estuaries	Routine only (4,7): see Table 4.	No AEOI
	Intertidal mudflats and sandflats		
	Glasswort and other annuals colonising mud and sand		
	Cord-grass swards		
	Atlantic salt meadows		
	Mediterranean saltmarsh scrub		
	Sandbanks which are slightly covered by seawater all the time		
Flamborough Head SAC	Vegetated sea cliffs	None	No AEOI
Humber Estuary SAC	Sea lamprey	Routine only (2, 3,4,5): see Table 4.	No AEOI
	Grey Seal		
Inner Dowsing, Race Bank and North Ridge SAC	Sandbanks which are slightly covered by seawater all the time	None	No AEOI

Site	Receptors	Mitigation	Conclusion
Moray Firth SAC	Bottlenose dolphin	Routine only (2,3,4,5): see Table 4.	No AEOI
Orfordness-Shingle Street SAC	Lagoons	Routine only (4,7): see Table 4.	No AEOI
	Annual vegetation drift lines	None	No AEOI
	Coastal shingle vegetation outside the reach of waves	None	No AEOI
Rannoch Moor SAC	Freshwater pearl mussel	Routine only (3,4,5): see Table 4.	No AEOI
River Avon SAC	Sea lamprey	Routine only (3,4,5): see Table 4.	No AEOI
	Atlantic salmon		
River Dee SAC	Freshwater pearl mussel	Routine only (3,4,5): see Table 4.	No AEOI
	Atlantic salmon		
River Derwent SAC	Sea lamprey	Routine only (3,4,5): see Table 4.	No AEOI
	River lamprey		
River Evelix SAC	Freshwater pearl mussel	Routine only (3,4,5): see Table 4.	No AEOI
River Itchen SAC	Atlantic salmon	Routine only (3,4,5): see Table 4.	No AEOI
River Oykel SAC	Freshwater pearl mussel	Routine only (3,4,5): see Table 4.	No AEOI
	Atlantic salmon		
River South Esk SAC	Freshwater pearl mussel	Routine only (3,4,5): see Table 4.	No AEOI
	Atlantic salmon		
River Spey SAC	Freshwater pearl mussel	Routine only (3,4,5): see Table 4.	No AEOI
	Atlantic salmon		

Site	Receptors	Mitigation	Conclusion
River Tay SAC	Atlantic salmon	Routine only (3,4,5): see Table 4.	No AEOI
River Teith SAC	Atlantic salmon	Routine only (3,4,5): see Table 4.	No AEOI
River Tweed SAC	Atlantic salmon	Routine only (3,4,5): see Table 4.	No AEOI
Solent and Isle of Wight Lagoons SAC	Coastal lagoons	None	No AEOI
Solent Maritime SAC	Sandbanks which are slightly covered by seawater all the time	None	No AEOI
	Estuaries		
	Mudflats and sandflats not covered by seawater		
	Coastal lagoons		
	Salicornia and other annuals colonizing mud/sand		
	Spartina swards		
	Atlantic salt meadows		
South Wight Maritime SAC	Reefs	None	No AEOI
	Submerged or partially submerged sea caves		
The Wash and North Norfolk Coast SAC	Intertidal mudflats and sandflats	Routine only (2,3,4,5,7): see Table 4.	No AEOI
	Lagoons		
	Shallow inlets and bays		
	Reefs		
	Sandbanks which are slightly covered by seawater all the time		

Site	Receptors	Mitigation	Conclusion
	Harbour seal		
Ailsa Craig SPA	Gannet	None	No AEOI
Buchan Ness to Collieston Coast SPA	Guillemot	None	No AEOI
Copinsay SPA	Guillemot	None	No AEOI
Fair Isle SPA	Guillemot	None	No AEOI
Flamborough and Filey Coast SPA	Puffin	None	No AEOI
Hoy SPA	Guillemot	None	No AEOI
Liverpool Bay	Red-throated diver	None	No AEOI
Marwick Head SPA	Guillemot	None	No AEOI
Noss SPA	Guillemot	None	No AEOI
Skomer, Skokholm and the Seas off Pembrokeshire	Manx shearwater	None	No AEOI
West Westray SPA	Guillemot	None	No AEOI

7.2. Annex I Habitats

7.2.1. Dogger Bank SAC

7.2.1.1. Dogger Bank SAC is designated for the conservation of the protection of sandbanks which are slightly covered by sea water all the time. The feature is currently in unfavourable condition with a restore conservation objective.

7.2.1.2. Section 3.231(1-23) of the RIAA provides detailed assessment of the LSE on the qualifying feature of the SAC screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the Plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical damage and indirect physical damage both alone, and in combination with other reasonably foreseeable plans and projects.

7.2.1.3. NIRAS (2024c) concluded that, with the unfavourable condition of the sandbank feature and its high sensitivity to habitat loss and damage, the part of the Plan which includes capacity increases at Dogger Bank D (alone and in combination) would result in AEOI.

7.2.1.4. The RIAA calculated for habitat loss that the impact from the Dogger Bank D alone is 2,233,000m^2, which equates to 0.018% of the feature's distribution within this European

Site. Such impacts would delay restoration, which is contrary to the conservation objectives of this SAC. The Round 4 Plan HRA (NIRAS, 2022a) and subsequent Appropriate Assessment by The Crown Estate (TCE, 2022) concluded that the Round 4 projects on Dogger Bank would result in AEOI and that these projects could only be progressed via a derogation under the Habitats Regulations (subject to satisfactory consideration of alternatives and IROPI test). This sets precedent that the threshold for AEOI has been exceeded in relation to infrastructure development within Dogger Bank SAC. Further consideration of mitigation for Dogger Bank SAC is within the Mitigation Measures Section.

7.2.1.5. The unfavourable condition of the site is believed to relate (at least in part) to the current impacts on the site from the presence of large-scale and widespread infrastructure associated with offshore oil and gas and cabling activities (JNCC, 2022) as well as offshore wind farm infrastructure. As such, there is also the potential for existing plans and projects to act in combination with the CIP, and specifically Dogger Bank D to prevent or impede the achievement of the conservation objectives to restore the extent and distribution and the structure and function of the qualifying sandbank habitat and return the site to a favourable condition.

7.2.1.6. Natural England and JNCC agreed with the findings of the RIAA in relation to AEOI on Dogger Bank SAC. The Crown Estate has considered and agrees with the conclusions of the RIAA relating to the potential impact on the sandbank feature of the Dogger Bank SAC.

7.2.1.7. The Crown Estate has considered the ability to mitigate the impact on the Dogger Bank SAC and has concluded that, based on the evidence currently available, it is possible to mitigate impacts but not to an acceptable level (see Mitigation Measures Section). The Crown Estate has therefore decided that it is unable to conclude that the Plan will not adversely affect the integrity of the Dogger Bank SAC.

7.2.2. Flamborough Head SAC

7.2.2.1. Flamborough Head SAC is designated for the conservation of the protection of reefs and submerged or partially submerged sea caves. The condition of the features has not yet been assessed with a maintain or restore conservation objective.

7.2.2.2. Section H5 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SAC screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from an impact pathway that was identified relating to indirect physical damage both alone, and in combination with other reasonably foreseeable plans and projects.

7.2.2.3. NIRAS (2024c) concluded that there will be no significant or adverse effect on the ability of the site to achieve its conservation objectives and favourable conservation status from the CIP either alone, or in combination with other plans and projects.

7.2.2.4. The RIAA identified the potential for indirect effects resulting from scour and hydrodynamic changes from the presence of fixed structures. NIRAS determined that the reef features and associated communities will have low sensitivity to indirect effects due to the distance of Dogger Bank D export cable (over 6 km) from the SAC. Other plans or projects have the potential to exert the same pressures. However, in view of the above assessment, any additional impact from the CIP alone would not make an appreciable difference to any in-combination impact. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.2.2.5. Natural England raised concern that marine processes at Flamborough Head SAC required further detailed impact assessment to provide certainty to the conclusions drawn by the RIAA. Subsequently NIRAS provided additional information within H5 paragraph 2 of the RIAA demonstrating the distance of the export cable to the SAC and the low sensitivity of this feature to indirect physical damage. This is considered an appropriate approach to inform a plan-level assessment and supports the conclusions in respect of this Protected site and its features. The Crown Estate considers that the assessment has been undertaken appropriately. As discussed above, detailed assessment will, as a matter of course, be progressed on the basis of additional information availability, to inform project-level conclusions.

7.2.2.6. The Crown Estate agrees with conclusions of the RIAA (NIRAS, 2024c) with respect to Flamborough Head SAC. The Crown Estate therefore ascertained that the CIP would not adversely affect the integrity to Flamborough Head SAC, alone or in-combination with other plans and projects.

7.2.3. Margate and Long Sands SAC

7.2.3.1. Margate and Long Sands SAC is designated for the conservation of the protection of sandbanks which are slightly covered by sea water all the time. The feature is currently in unfavourable condition with a restore conservation objective.

7.2.3.2. Section H6 and H9 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SAC screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical damage and indirect physical damage both alone, and in combination with other reasonably foreseeable plans and projects.

7.2.3.3. NIRAS (2024c) concluded that, with the unfavourable condition of the sandbank feature and its high sensitivity to habitat loss and damage, the part of the Plan which includes capacity increases at Five Estuaries (alone and in combination) would result in AEOI.

7.2.3.4. The RIAA calculated for direct/indirect physical damage that the impact from the Five Estuaries export cable is up to 0.63km^2. For habitat loss from cable protection (up to 5,400m^2) the RIAA identified 0.0008% of the total area of the SAC would be affected.

Considering the restore objective NIRAS concluded AEOI cannot be ruled out due to the uncertainty around predicted habitat loss and damage set against existing pressures on the Protected site. Other plans or projects have the potential to exert the same pressures described here.

7.2.3.5. The unfavourable condition of the site is believed to relate to the current impacts from the presence of fisheries activity and vulnerability to habitat loss from activities such as offshore wind. As such, there is also the potential for existing plans and projects to act in combination with the CIP, and specifically North Falls, to prevent or impede the achievement of the conservation objectives to restore the extent and distribution and the structure and function of the qualifying sandbank habitat and return the site to a favourable condition.

7.2.3.6. Initially the RIAA concluded no AEOI for Margate and Long Sands. Following consultation with the HRA EWG, Natural England and JNCC highlighted their disagreement with the findings and provided further information to support this. They specifically highlighted the updated conservation objectives, which are set to restore for this Protected site, and any additional impact would be contrary to the restore objective. On submission of this information NIRAS updated the findings of the RIAA to align with the consultation response from Natural England and JNCC. As such Natural England and JNCC now agree with the updated findings of the RIAA in relation to AEOI on Margate and Long Sands SAC. The Crown Estate has considered and agrees with the conclusions of the RIAA relating to the likely magnitude of potential impact on the sandbank feature of the Margate and Long Sands SAC from both Five Estuaries and North Falls projects.

7.2.3.7. The Crown Estate has considered the ability to mitigate the impact on the Margate and Long Sands SAC and has concluded that, based on the evidence currently available, it is not possible to mitigate impacts and avoid AEOI (see Mitigation Measures Section). The Crown Estate has therefore decided that it is unable to conclude that the Plan will not adversely affect the integrity of the Margate and Long Sands SAC.

7.2.4. Orfordness – Shingle Street SAC

7.2.4.1. Orfordness-Shingle Street SAC is classified for lagoons, annual vegetation of drift lines and coastal shingle vegetation outside the reach of waves. The condition of lagoons is favourable (although there is no condition assessment for the latter two features) with a maintain or restore conservation objective.

7.2.4.2. Section H5 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SAC screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from an impact pathway that was identified relating to indirect physical damage both alone, and in combination with other reasonably foreseeable plans and projects.

7.2.4.3. NIRAS (2024c) concluded that there will be no significant or adverse effect on the ability of the site to achieve its conservation objectives and favourable conservation status from the CIP either alone, or in combination with other plans and projects.

7.2.4.4. The RIAA identified the potential for indirect effects resulting from scour and hydrodynamic changes from the presence of fixed structures. NIRAS determined that there will be negligible effects on intertidal features from the North Falls export cable. Other plans or projects have the potential to exert the same pressures. However, in view of the above assessment, any additional impact from the CIP alone would not make an appreciable difference to any in-combination impact. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.2.4.5. Natural England raised concern that the SAC had not been considered within the assessment specifically for impacts to vegetated shingle habitats by Five Estuaries and North Falls due to the deployment of compensatory measures (predator exclusion fencing). No further information was added to the RIAA and no in combination assessment was undertaken by NIRAS due to a lack of design information for these compensatory measures (which Natural England and JNCC also acknowledge). Although the impacts from the deployment of compensation measures cannot be assessed meaningfully at the plan level, it is anticipated that they would be subject to HRA at project level at the appropriate time. Consequently, this does not affect the conclusions in respect of this Protected site and its features. The Crown Estate considers that the assessment has been undertaken appropriately.

7.2.4.6. The Crown Estate agrees with conclusions of the RIAA (NIRAS, 2024c) with respect to Orfordness-Shingle Street SAC. The Crown Estate therefore ascertained that the Plan would not adversely affect the integrity to Orfordness-Shingle Street SAC, alone or in-combination with other plans and projects.

7.3. Annex II Species

7.3.1. Southern North Sea SAC

7.3.1.1. The Southern North Sea SAC is a SAC designated for the conservation of the Annex II species harbour porpoise. The feature has a maintain conservation objective and is currently in favourable condition.

7.3.1.2. Section 3.43 of the RIAA provides detailed assessment of the LSE on the relevant qualifying feature of the SAC screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, physical presence, underwater noise, toxic contaminants, electromagnetic fields and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.3.1.3. The common assessment confirms that, with the exception of underwater noise, all screened in pressures would lead to a negligible impact on this species at any population scale. NIRAS noted there is a risk of injury within an estimated 500m and 1km for pile driving and UXO disposal respectively. However, such risk can be reduced to negligible levels through implementation of routine mitigation (JNCC, 2010 & 2025) and implementation of a MMMP. The RIAA found that impacts associated with disturbance could be detrimental under certain scenarios. Site Integrity Plans (SIP) are proposed by a number of projects within the Plan to avoid AEOI for this Protected site. NIRAS therefore recommended that these Projects be included within an strategic (Plan level) SIP (SSIP) in order to ensure that no such in combination AEOI occurs. The SSIP must contain suitable measures such as to prevent exceedance of the noise disturbance thresholds which are defined within JNCC (2020) guidance as 20% of the relevant area of the site in any given day or an average of 10% of the relevant area of the site over a season and must consider both cable and array areas.

7.3.1.4. NIRAS (2024c) concluded that with this mitigation in place there will be no significant effect on the ability of the site to achieve its conservation objectives and favourable conservation status from the CIP either alone, or in combination with other plans and projects.

7.3.1.5. Natural England welcomed the principle and the proposed use of an SSIP but highlighted a lack of detail as to the content of the SSIP, how it will be secured or the mitigation measures to be used within it. They also noted the difference in consents already achieved by some projects within the plan and queried how mitigation at the project level, which is unknown, would be taken into account at the plan level. Defra also flagged the requirement for further information on noise abatement technologies and alternative installation methods to reduce noise levels. Subsequently NIRAS provided additional information outlining additional routine mitigation to be captured within the SSIP. Natural England have indicated that they remain unclear about how the SSIP will be secured or which mitigation methods will be included. The SSIP will be developed in consultation with the EWG (taking into account the outcome of project level assessments) and secured under the AfL and The Crown Estate considers that the assessment has been undertaken appropriately.

7.3.1.6. The Crown Estate has considered and agrees with conclusions of the RIAA (NIRAS, 2024c) with respect to Southern North Sea SAC. The Crown Estate therefore ascertained that the CIP would not adversely affect the integrity of the Southern North Sea SAC, alone or in-combination with other plans and projects.

7.4. Birds

7.4.1. Alde-Ore Estuary SPA& Ramsar

7.4.1.1. Alde-Ore Estuary SPA & Ramsar is classified for lesser black-backed gull among other species. The condition of the feature is not available however they have a maintain or restore conservation objective.

7.4.1.2. Section 3.32 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SPA screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, underwater noise, above water noise, toxic contaminants, light and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.4.1.3. NIRAS (2024c) concluded that there was the potential for an AEOI of the feature due to plan-level impacts both alone and in-combination with other projects. This is due to the impact of collisions from the CIP associated with the lesser black-backed gull feature, which is considered to make a material contribution causing an AEOI. NIRAS concluded there will be a negative effect on the population dynamics and therefore hinder the ability of the site to achieve its restore conservation objective status from the CIP alone, and in combination with other plans and projects.

7.4.1.4. The alone assessment identified the combined impact of the CIP would lead to between 11.02% and 31.10% increase in baseline mortality. The in-combination assessment identified that using the maximum collision risk scenario the median population size was projected to be 77.81% smaller than the unimpacted population at Alde-Ore Estuary SPA and Ramsar after a 50-year period. The PVA model predicted a median reduction of 2.91% in population growth rate. Other plans or projects have the potential to exert the same pressures described above. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.4.1.5. Natural England welcomed the conclusions drawn by the RIAA for this SPA and agreed with the findings of AEOI alone. The Crown Estate considers that the assessment has been undertaken appropriately.

7.4.1.6. The Crown Estate agrees with conclusions of the RIAA (NIRAS, 2024c) and has considered the ability to mitigate the impact on the Alde-Ore Estuary SPA and Ramsar site. The Crown Estate has concluded that, based on evidence currently available it is possible to mitigate the impact but not to an acceptable level with respect to Alde-Ore Estuary SPA & Ramsar (see Mitigation Measures Section). The Crown Estate has therefore ascertained that it cannot exclude the possibility that the CIP will adversely affect the integrity of the Alde-Ore Estuary SPA & Ramsar.

7.4.2. Farne Islands SPA

7.4.2.1. Farne Islands SPA is classified for guillemot among other species. The condition of the feature is not available but has a maintain or restore conservation objective.

7.4.2.2. Section 3.32 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SPA screened into the assessment as a result of the Plan. This includes an assessment of the potential risk of the plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, underwater noise, above water noise, toxic contaminants, light and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.4.2.3. NIRAS (2024c) concluded that there was the potential for an AEOI of the feature due to plan-level impacts in-combination with other projects. This is due to the impact of displacement from the CIP associated with the guillemot feature.

7.4.2.4. The RIAA outlined that the effects of displacement from the Plan alone on guillemot at the SPA were not significant and resulted in no AEOI. The in-combination assessment concluded that the level of impact will not affect the viability of the guillemot population resulting in no AEOI. Other plans or projects have the potential to exert the same pressures described above. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.4.2.5. Natural England advised that an AEOI could not be ruled out from the Berwick Bank proposal and as such subsequent projects have the potential to contribute to in-combination impacts. Subsequently NIRAS updated the conclusions of the RIAA to reflect this, and this affects the conclusions in respect of this Protected site and its features. As a result of this change NIRAS concluded AEOI on the guillemot feature of the Farne Islands SPA. The Crown Estate considers that the assessment has been undertaken appropriately.

7.4.2.6. The Crown Estate agrees with the conclusions of the RIAA (NIRAS, 2024c) and has considered the ability to mitigate the impact on Farne Islands SPA. The Crown Estate has concluded that, based on evidence currently available it is possible to mitigate the impact but not to an acceptable level with respect to Farne Islands SPA (see Mitigation Measures Section). The Crown Estate has therefore ascertained that it cannot rule out the possibility that the CIP will adversely affect the integrity of the Farne Islands SPA.

7.4.3. Flamborough and Filey Coast SPA

7.4.3.1. Flamborough and Filey Coast SPA is classified for kittiwake, guillemot, razorbill, gannet and a breeding seabird assemblage. The condition of the features except for kittiwake (unfavourable and restore objective) has not been assessed and have maintain or restore conservation objectives.

7.4.3.2. Section 3.32 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SPA screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, underwater noise, above water noise, toxic contaminants, light and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.4.3.3. NIRAS (2024c) concluded that there was the potential for an AEOI of the feature due to plan-level impacts both alone and in-combination with other projects. This is due to the impact of collisions and displacement from the CIP associated with the kittiwake (alone and in combination) gannet, guillemot and razorbill (in combination) features, which is considered to make a material contribution, causing an AEOI.

7.4.3.4. The RIAA identified for kittiwake a potential impact of 7.43% to 11.45% and a reduction in population growth. The kittiwake population in Flamborough and Filey SPA is in unfavourable condition and has a restore objective and as such any impact could hinder the conservation objective to recover the population. NIRAS concluded an AEOI of the kittiwake feature due to plan-level impacts alone. Where assessed for in-combination impact the RIAA determined that the kittiwake population at the SPA would be 34.91% to 44.77% smaller than the unimpacted population reflecting a reduction of 0.84% to 1.16% in population growth rate. Therefore, NIRAS concluded that there is a potential for AEOI due to plan level impacts in combination with other plans and projects.

7.4.3.5. For gannet the RIAA identified no AEOI alone, but AEOI in-combination due to plan level impacts in combination with other plans and projects. Where assessed for in-combination impact the RIAA determined that the gannet population at the SPA would be 25.14% to 27.32% smaller than the unimpacted population reflecting a reduction of 0.57% to 0.62% in population growth rate. NIRAS also considered the implications from avian influenza and the significant gannet population declines and the potential for the impact to recover. Therefore, NIRAS concluded that there is a potential for AEOI due to plan level impacts in combination with other plans and projects.

7.4.3.6. The RIAA identified for guillemot no AEOI alone, but AEOI in-combination due to plan level impacts in combination with other plans and projects. Where assessed for in-combination impact the RIAA determined that the guillemot population at the SPA would be 15.44% smaller than the unimpacted population reflecting a reduction of 0.33% in population growth rate. NIRAS also considered the precedent set by the Sheringham Shoal Extension (SEP) and Dudgeon Extension (DEP) project examination where concerns were raised regarding growth rates for this species at the SPA by Natural England. The Secretary of State concluded that AEOI could not be ruled out for guillemot. Therefore, NIRAS concluded that there is a potential for AEOI due to plan level impacts in combination with other plans and projects.

7.4.3.7. For razorbill the RIAA identified no AEOI alone, but AEOI in-combination due to plan level impacts in combination with other plans and projects. Where assessed for in-combination impact the RIAA determined that the guillemot population at the SPA would be 7.35% smaller than the unimpacted population reflecting a reduction of 0.15% in population growth rate. NIRAS also considered the precedent set by the SEP and DEP examination where concerns were raised regarding growth rates for this species at the SPA by Natural England. The Secretary of State concluded that AEOI could be ruled out for razorbill; however, due to a difference in in-combination assessments (with the RIAA for SEP and DEP considering fewer projects) the combined level of impact under the CIP is greater resulting in a difference in conclusions for this species. As a result, NIRAS concluded that there is a potential for AEOI due to plan level impacts in combination with other plans and projects on the razorbill feature.

7.4.3.8. In regards to the breeding seabird assemblage, following consultation further consideration of to the effect on this assemblage was undertaken due to impacts on the qualifying features at the Flamborough and Filey Coast SPA. As highlighted above the conclusions of AEOI for kittiwake, gannet, guillemot and razorbill features indicates that an adverse effect on the seabird assemblage is likely and an AEOI cannot be ruled out due to the magnitude of impacts from in-combination projects. As such NIRAS concluded that an AEOI of the seabird assemblage at Flamborough and Filey Coast SPA cannot be ruled out.

7.4.3.9. Other plans or projects have the potential to exert the same pressures described above. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.4.3.10. Natural England agreed with the conclusions of the RIAA for the kittiwake and gannet features. However, they raised concerns over the draft conclusions for guillemot and razorbill and flagged that an assessment on the seabird assemblage should be undertaken. Subsequently NIRAS provided additional information within section 3.3242 (F) paragraphs (1-10 for guillemot, 11-22 for razorbill and 49-51 for the seabird assemblage) of the RIAA for the seabird assemblage and updated the conclusions for guillemot and razorbill determining AEOI for plans and projects in combination with the CIP. The Crown Estate considers that the assessment has been undertaken appropriately.

7.4.3.11. The Crown Estate agrees with the conclusions of the RIAA (NIRAS, 2024c) and has considered the ability to mitigate the impact on Flamborough and Filey Coast SPA and has concluded that, based on evidence currently available it is possible to mitigate the impact but not to an acceptable level with respect to the five features of Flamborough and Filey Coast SPA (see Mitigation Measures Section). The Crown Estate has therefore ascertained that it cannot exclude the possibility that the CIP will adversely affect the integrity of the Flamborough and Filey Coast SPA.

7.4.4. Greater Wash SPA

7.4.4.1. Greater Wash SPA is classified for sandwich terns and red throated diver among other species. The condition of the features is not available, however they have maintain or restore conservation objectives.

7.4.4.2. Section 3.32 of the RIAA provides detailed assessment of the LSEs on the relevant qualifying features of the SPA screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the Plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, underwater noise, above water noise, toxic contaminants, light and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.4.4.3. NIRAS (2024c) concluded that there was the potential for an AEOI of the feature due to plan-level impacts in-combination with other projects. This is due to the impact of collision, displacement and disturbance from the Plan associated with the sandwich tern and red-throated diver features.

7.4.4.4. The RIAA identified for sandwich tern no AEOI alone, but AEOI in-combination due to plan level impacts in combination with other plans and projects. Where assessed for in-combination impact the RIAA determined that the sandwich tern population at the SPA would be affected by an increase in baseline mortality of 8.52% to 10.17%. NIRAS also considered the precedent set by the SEP and DEP examination where the project concluded predicted mortality due to collisions from in-combination projects could adversely affect the Greater Wash SPA. This conclusion was accepted by the Secretary of State in determining the development consent application and as such the conclusions were reviewed and validated for inclusion in the plan-level HRA. Therefore, NIRAS concluded that there is a potential for AEOI due to plan level impacts in combination with other plans and projects.

7.4.4.5. For red-throated diver the RIAA identified AEOI alone and AEOI in-combination due to plan-level impacts in combination with other plans and projects. Where assessed for in-combination impact the RIAA determined that the baseline mortality would increase 0.0% to 0.1% (SEP and DEP) by 0.05% to 0.54% (Dogger Bank D) of the red-throated diver population at the SPA. The RIAA concluded that the lack of seasonal restrictions for Dogger Bank D introduces uncertainty regarding adverse effects on the distribution of red-throated divers within the SPA and the availability of suitable habitat. As such an AEOI on the Greater Wash SPA could not be ruled out.

7.4.4.6. Other plans or projects have the potential to exert the same pressures described above. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.4.4.7. Natural England highlighted that they had advised to the SEP and DEP examination that an in-combination AEOI could not be ruled out for sandwich tern but that they did not agree with the conclusion of alone AEOI for this species. Subsequently NIRAS updated the conclusions of the RIAA to reflect this within section 3.3242 (s) paragraphs 1-4 of the RIAA. Natural England disagreed with the conclusions for red-throated diver and identified the lack of commitment to seasonal restrictions and vessel movements best practice from Dogger Bank D as issues affecting the conclusion of no AEOI. Subsequently NIRAS updated the conclusions of the RIAA to AEOI in combination and the requirement for seasonal restrictions as mitigation to reflect Natural England's concerns. The Crown Estate considers that the assessment has been undertaken appropriately.

7.4.4.8. The Crown Estate has reviewed the conclusions of the RIAA (NIRAS, 2024c) and has considered the ability to mitigate the impact on Greater Wash SPA; The Crown Estate has concluded that, based on evidence currently available it is possible to mitigate the impact to red throated diver to an acceptable level through the implementation of a seasonal restriction and vessel movement best practice. For sandwich tern it is possible to mitigate the impact but not to an acceptable level with respect to Greater Wash SPA (see Mitigation Measures Section). Natural England have agreed with these conclusions. The Crown Estate therefore ascertained that it cannot exclude the possibility that the CIP will adversely affect the integrity of the Greater Wash SPA.

7.4.5. North Norfolk Coast SPA & Ramsar

7.4.5.1. North Norfolk Coast SPA & Ramsar is classified for sandwich tern among other species. The condition of the feature is not available; however, it has a maintain or restore conservation objective.

7.4.5.2. Section 3.32 of the RIAA provides detailed assessment of the LSE on the relevant qualifying feature of the SPA screened into the assessment as a result of the CIP. This includes an assessment of the potential risk of the plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, underwater noise, above water noise, toxic contaminants, light and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.4.5.3. NIRAS (2024c) concluded that there was the potential for an AEOI of the feature due to plan-level impacts in-combination with other projects. This is due to the impact of collision and displacement from the CIP associated with the sandwich tern feature.

7.4.5.4. The RIAA identified for sandwich tern no AEOI alone and AEOI in-combination due to plan level impacts in combination with other plans and projects. Where assessed for in-combination impact the RIAA determined that the sandwich tern population at the SPA would be affected by an increase in baseline mortality of 10.73% to 12.88%. NIRAS also considered the precedent set by the SEP and DEP examination where the project level RIAA concluded predicted mortality due to collisions from in-combination projects could adversely affect the Greater Wash SPA. This conclusion was accepted by the Secretary

of State in determining the development consent application and as such the conclusions were reviewed and validated for inclusion in the plan-level HRA. Therefore, NIRAS concluded that there is a potential for AEOI due to plan level impacts in combination with other plans and projects.

7.4.5.5. Other plans or projects have the potential to exert the same pressures described above. However, in view of the above assessment, any additional impact from the CIP alone would not make an appreciable difference to any in-combination impact. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.4.5.6. Natural England highlighted that they had advised to the SEP and DEP examination that an in-combination AEOI could not be ruled out for sandwich tern and that they did not agree with the conclusion of alone AEOI. Subsequently NIRAS updated the conclusions of the RIAA to reflect this (AEOI in combination only) within section 3.3242 (v) paragraphs 1-4 of the RIAA. The Crown Estate considers that the assessment has been undertaken appropriately.

7.4.5.7. The Crown Estate agrees with the conclusions of the RIAA (NIRAS, 2024c) and has considered the ability to mitigate the impact on North Norfolk Coast SPA & Ramsar and has concluded that, based on evidence currently available it is possible to mitigate the impact but not to an acceptable level with respect to North Norfolk Coast SPA & Ramsar (see Mitigation Measures Section). The Crown Estate has therefore ascertained that it cannot exclude the possibility that the Plan will adversely affect the integrity of the North Norfolk Coast SPA & Ramsar.

7.4.6. Outer Thames Estuary SPA

7.4.6.1. Outer Thames Estuary SPA is classified for red-throated diver. The condition of the feature is unknown however it has a maintain or restore conservation objective.

7.4.6.2. Section 3.32 of the RIAA provides detailed assessment of the LSE on the relevant qualifying feature of the SPA screened into the assessment as a result of the Plan. This includes an assessment of the potential risk of the Plan arising from impact pathways that were identified relating to habitat loss/gain, direct physical, indirect physical, collision, underwater noise, above water noise, toxic contaminants, light and suspended sediments both alone, and in combination with other reasonably foreseeable plans and projects.

7.4.6.3. NIRAS (2024c) concluded that there was the potential for an AEOI of the feature due to plan-level impacts in-combination with other projects. This is due to the impact of disturbance from the Plan associated with the red-throated diver feature.

7.4.6.4. The RIAA identified for red-throated diver no AEOI alone or in-combination. Other plans or projects have the potential to exert the same pressures described in paragraph 7.4.6.2

above. The assessment does not replace the information requirements of project level HRA and does not attempt to pre-empt their conclusions.

7.4.6.5. Natural England advised that an AEOI could not be ruled out alone for this feature due to the operational displacement effects of North Falls. Subsequently NIRAS updated the conclusions of the RIAA to reflect this, and this affects the conclusions in respect of this Protected site and its features.

7.4.6.6. As a result of this change NIRAS concluded that there was a risk of AEOI on the red-throated diver feature of the Outer Thames Estuary SPA. The RIAA outlined that the effective displacement area was calculated as 27.06% of the SPA area. NIRAS noted that the additional displacement caused by North Falls (in addition to existing offshore wind farms within this SPA) would further reduce the unimpacted area available and increase the overall displacement pressure within the SPA. NIRAS concluded that the loss of unimpacted habitat and increased displacement effects mean that an AEOI cannot be ruled out due to plan level impacts in-combination with other plans and projects and noted the requirement for seasonal restrictions as mitigation to reflect Natural England's concerns. The Crown Estate considers that the assessment has been undertaken appropriately.

7.4.6.7. The Crown Estate agrees with the conclusions of the RIAA (NIRAS, 2024c) and has considered the ability to mitigate the impact on Outer Thames Estuary SPA; The Crown Estate has concluded that, based on evidence currently available it is not possible to mitigate the impact to red throated diver to an acceptable level at this stage. The Crown Estate has therefore ascertained that it cannot exclude the possibility that the Plan will adversely affect the integrity of the Outer Thames Estuary SPA.

8. Mitigation Measures

8.1.1. Unless otherwise stated, the below mitigation measures will be secured through wording included in the legal agreements between The Crown Estate and the project developers, which places binding obligations on project developers to adhere to the specified mitigation. Where there is uncertainty regarding the feasibility of mitigation measures, the worst case (i.e. that the mitigation is not feasible) has been used as the basis for the conclusion of this HRA for the relevant feature. Project developers will be required to demonstrate the use of measures that result in the lowest feasible impact to proceed to next stages within their legal agreements.

8.1.2. The Crown Estate has identified routine measures which mitigate the potential adverse effects of the Plan on Protected sites (see Table 4). In addition to these routine mitigation measures, further mitigation measures have been identified that individual projects will be required to implement, to further reduce their impacts on Protected sites.

8.1.3. Table 1. DCO Application status of each project included in the plan. As of 18/03/2 in section 2 highlights the current DCO Application status of each project included within the Plan; this demonstrates the unique situation of the Capacity Increases Programme which is that a plan level assessment is being undertaken whilst projects are at varying stages of the consenting process and continue to develop their proposals at the same time as this assessment takes place.

8.1.4. Project level HRAs will be required for individual projects arising from the Capacity Increases Programme as a matter of law. In some cases, the Plan-level HRA is being carried out after the projects' individual HRA assessments. In those instances, the Plan-level HRA has sought to include the assessment information and outcomes from the project level HRAs into the Plan assessment. However, where no DCO is in place, projects will be able to utilise the information contained in this AA to inform project level HRAs. In all cases, as indicated above, mitigation measures identified in this record of HRA will be secured through obligations in the legal agreements between The Crown Estate and the project developers, unless otherwise stated.

8.1.5. In accordance with the mitigation hierarchy, avoidance and mitigation measures should always be applied to reduce impacts where it is feasible to do so, and compensation measures should be used as a last resort for the residual effects.

8.2. Embedded mitigation

8.2.1. The mitigation note supplied by NIRAS (2024c) contains tables which identify a list of impacts which require mitigation. Project level mitigation measures, if required, may have already been agreed or will be agreed with SNCBs and licensing authorities prior to consent. In addition to the best practice measures discussed in Table 4 Section 7, measures and design parameters were identified from the project information and were

included in the assessment of impacts. These are considered as 'embedded mitigation measures' and are listed below in Table 6.

8.2.2. Any AfL from The Crown Estate will stipulate that any future Lease is conditional upon gaining all relevant statutory consents; The Crown Estate will only issue a Lease once all necessary consents have been granted.

8.2.3. The Crown Estate expects developers without a DCO to undertake project level HRA, and in doing so, utilise the information and outcomes referred to in the Plan RIAA and identify any additional mitigation measures that may be required for the DCO application.

Table 6. Embedded project level mitigation measures identified by projects within the Plan.

Project	Protected site	Measure
Awel y Môr	Liverpool Bay / Bae Lerpwl SPA (Red-throated Diver)	The Array Area has been reduced from a maximum area of 88km^2 to 78km^2 reducing displacement impacts.
Rampion 2	Flamborough and Filey Coast SPA (gannet and kittiwake)	There will be a minimum blade tip clearance of at least 22m above MHWS, reducing collision impacts.
North Falls	Farne Islands SPA (guillemot); Flamborough and Filey Coast SPA (guillemot, gannet, razorbill and kittiwake); Outer Thames Estuary SPA (red-throated diver)	The Array Area has been reduced from a maximum area of 149.5km^2 to 95km^2 reducing displacement impacts.
	Alde Ore Estuary SPA and Ramsar (Lesser black-backed gull); Flamborough and Filey Coast SPA (gannet and kittiwake)	There will be a minimum blade tip clearance of at least 27m above MHWS, reducing collision impacts.
		Maximum number of turbines has been reduced from 72 to 57.
SEP & DEP	Flamborough and Filey Coast SPA (gannet and kittiwake)	There will be a minimum blade tip clearance of at least 30m above MHWS, reducing collision impacts.

8.3. Plan Level mitigation

8.3.1. To further reduce the impacts of the Plan on Protected sites, project developers will be required to adopt the following measures in relation to their individual projects under the terms of their AfL and/or Lease. This is subject to any additional or alternative measures that may be required by the DCO as a result of more detailed project-level assessment but in any event, The Crown Estate will need to be satisfied that developers will adopt all feasible measures to mitigate the impacts of their project on Protected sites.

Doggersbank SAC

8.3.2. The HRA concludes that for piling locations where Effective Deterrent Ranges (EDR) for Dogger Bank D overlap with >20% of the Protected site area mitigation is required to reduce impacts from disturbance effects from piling events on marine mammals by means of:

a. Reduction of piling noise levels, e.g. low-noise piling; and/or
b. Attenuation of piling noise, e.g. bubble curtain

8.3.3. The requirement for additional mitigation would be negated if information is provided at Project level to evidence a sufficiently reduced effective deterrent range for monopile installation (i.e. avoiding 20% threshold exceedance), or if pin piles are used.

Southern North Sea SAC

8.3.4. The Crown Estate, in consultation with the EWG, will develop an SSIP, with which project developers will be required to comply. The SSIP will include strategic consideration of suitable measures and best endeavours to achieve piling noise reduction from (e.g.) noise abatement as well as scheduling to ensure any development as a result of the Plan stays within the thresholds outlined by Statutory Nature Conservation Body guidance (JNCC, 2020).

8.3.5. The SSIP will provide a framework for developers to work within and identify possible mitigations if required. It will:

- set out thresholds for significant disturbance that should not be breached according to relevant guidance,
- have a requirement to report noisy activities to a central location,
- define requirements on developers should thresholds be breached, or a risk is identified that thresholds may be breached, and
- be secured within the relevant legal agreements between The Crown Estate and the project developers.

Dogger Bank SAC

8.3.6. The HRA concludes habitat loss and damage from infrastructure on the sandbank habitat at Dogger Bank SAC. To mitigate the impact on Dogger Bank SAC and to reduce the amount of habitat loss and damage, project design restrictions will be implemented on Dogger Bank D to remove gravity base structures and suction caisson monopole foundations, minimise rock protection as secondary cable protection within the SAC. This will reduce the footprint of infrastructure for Dogger Bank D within the SAC. Despite this reduction there will remain the possibility of AEOI but the impact on this feature of the site will be reduced.

8.3.7. Where avoidance of the use of cable protection is not possible, any requirement for cable protection within the SAC must be robustly justified through a cable burial risk assessment, taking into account the moratorium on bottom towed fishing gear and other risks/hazards. The requirement for justification of the use of cable protection within the

SAC will reduce the use of cable protection and its footprint within the SAC. Natural England have advised that exploration of the use of cable protection which has the greatest likelihood of removal should be included. The Crown Estate will, where usage of cable protection cannot be avoided, therefore require utilisation of cable protection which has the greatest likelihood of removal at decommissioning wherever feasible within the legal agreements.

8.3.8. Despite this reduction there will remain the possibility of AEOI but the impact on this feature of the site will be reduced.

Margate and Long Sands SAC

8.3.9. The HRA concludes habitat loss and damage from infrastructure on the sandbank habitat at Margate and Long Sands SAC. To mitigate the impact on Margate and Long Sands SAC and to reduce the amount of habitat loss and damage the use of cable protection and sandwave clearance will be minimised.

8.3.10. Where avoidance of the use of cable protection is not possible, any requirement for cable protection within the SAC must be robustly justified through a cable burial risk assessment. The requirement for justification of the use of cable protection will reduce the footprint of infrastructure for Five Estuaries and North Falls within the SAC. Natural England have advised that exploration of the use of cable protection which has the greatest likelihood of removal should be included. The Crown Estate will, where usage of cable protection cannot be avoided, therefore require utilisation of cable protection which has the greatest likelihood of removal at decommissioning wherever feasible.

8.3.11. Despite this reduction there will remain the possibility of AEOI but the impact on this feature of the site will be reduced.

Alde-Ore Estuary SPA, Farne Islands SPA, Flamborough and Filey Coast SPA, North Norfolk Coast SPA

8.3.12. To reduce bird collisions, NIRAS recommended that all projects seek to maximise the blade tip clearance above sea level. The Crown Estate agrees in part with NIRAS recommendations. However, following consultation, Natural England have advised that this mitigation is not included for Rampion 2. The mitigation will therefore require all developers, other than Rampion 2, to increase the blade tip clearance to the greatest extent that is feasible, with a minimum target clearance of 34m.

Greater Wash SPA and Outer Thames Estuary SPA

8.3.13. To reduce the risk from disturbance from cable laying activities to red-throated diver, The Crown Estate will require projects to minimise, so far as is feasible and unless otherwise agreed with the SNCBs, cable laying activities during the sensitive periods within the Greater Wash SPA and Outer Thames SPA and a 2km buffer from 1st November to 31st March. The Crown Estate will also include requirements committing developers to follow Natural England's best practice protocol for vessel movements within the SPA. This mitigation is appropriate to reduce the effects of disturbance on red-throated divers.

8.3.14. NIRAS noted that if such restrictions were implemented, it may be possible to rule out an AEOI for the Greater Wash SPA for red throated diver, but that further work at the Project level was required to understand the effect of the restrictions. The Crown Estate has reviewed the mitigation secured through the project-level DCO and Deemed Marine Licence for Sheringham and Dudgeon Extensions projects to reduce effects on red-throated diver in the Greater Wash SPA and The Crown Estate is satisfied that satisfactory restrictions are in place and therefore concludes that there is no adverse effect on this feature from cable laying activities. No other activities within the plan have impacts on this feature and therefore the plan-level conclusion is also No AEOI.

8.3.15. However, NIRAS considered that the same conclusion could not be reached in relation to the red throated diver population at Outer Thames Estuary SPA and AEOI due to array impacts could not be excluded even with the implementation of seasonal restrictions. The Crown Estate has reviewed and agrees with NIRAS' conclusion of AEOI on the red-throated diver feature of the Outer Thames Estuary SPA.

Securing mitigation

8.3.16. The mitigation measures identified in this AA will be secured through AfL and/or Lease for relevant offshore wind projects awarded rights for increased capacities as an outcome of this leasing process.

Stakeholder Mitigation Proposals

8.3.17. During the RIAA consultation with the HRA EWG in November Natural England highlighted an additional control measure which could be placed on Dogger Bank D in relation to an additional assessment requirement for hotspot analysis. This utilises a modelling technique such as MRSea to identify any high-density seabird areas from baseline data considering both individual species and overall aggregations in order to inform array design changes which would result in reductions of potential collision and displacement impacts of Dogger Bank D.

8.3.18. The Crown Estate further considered this proposal following consultation with SNCBs on the draft AA and determined that this exercise and the requirement for it to take place should be addressed during project level consenting activity when more detailed information, including survey results, will be available. This will better inform the requirement for the analysis and will make the outputs from the exercise more meaningful.

Residual effects

8.3.19. It has not been possible to rule out an AEOI for sandbank features of Dogger Bank SAC and Margate and Long Sands SAC alone or in-combination. It has also not been possible to rule out AEOI for multiple SPAs including:

- Alde-Ore Estuary SPA
  - lesser black-backed gull (alone and in combination)

- Farne Islands SPA
  - guillemot (in combination)
- Flamborough and Filey Coast SPA
  - kittiwake (alone and in combination)
  - guillemot (alone and in combination)
  - gannet (in combination)
  - razorbill (in combination)
  - seabird assemblage (in combination)
- Greater Wash SPA
  - Sandwich tern (in combination)
- North Norfolk Coast SPA
  - Sandwich tern (in combination)
- Outer Thames Estuary SPA
  - red-throated diver (alone and in combination)

8.3.20. Only two options remain for the Protected sites listed above:

- the consideration of alternatives (including amendment to the Plan); or
- explore the derogation provisions of the Habitats Regulations, i.e. if there are no feasible alternative solutions, whether there are IROPI for the plan to proceed, with the necessary compensatory measures secured in agreement with the relevant SNCB.

8.3.21. Therefore, further consideration on whether the tests set out in the Habitat Regulations can be met to allow the Plan to proceed are presented in the Derogation Case Section (below).

9. Conclusions of the Appropriate Assessment

9.1.1. The Crown Estate has undertaken an AA of the effects of the Plan in respect of several Protected sites and their qualifying features (as detailed in the RIAA), and with consideration for their conservation objectives and feature conditions. To inform this Record of AA, The Crown Estate has considered the information and analysis provided by NIRAS in the Scoping Report, Screening and Gap Analysis Report and RIAA, and has given careful consideration to the advice from Natural England, JNCC, NatureScot and Defra that was provided over the course of the development of this HRA.

9.1.2. The Crown Estate has assessed the potential for AEOI in respect of Protected sites that may be affected by the plan, and other than the Protected sites listed below, has concluded that there is sufficient scope and flexibility for project specific mitigation measures to be applied at the project level by developers to ensure no AEOI. The exceptions are:

- Dogger Bank SAC
- Margate and Long Sands SAC
- Alde-Ore Estuary SPA
- Farne Islands SPA
- Flamborough and Filey Coast SPA
- Greater Wash SPA
- North Norfolk Coast SPA
- Outer Thames Estuary SPA

9.1.3. It has not been possible to rule out AEOI with regards to the Protected sites above and some of their features. Despite this, mitigation measures have been applied as highlighted in Section 8 in order to reduce the impact on the Protected sites as far as reasonably possible. In view of this, consideration is given to the further tests set out in the Habitat Regulations in the Derogation Case Section to determine whether the Plan can proceed.

9.1.4. The views of stakeholders on the uncertainties of the CIP, and its effects, as well as specific matters to be addressed by developers at project level will be provided to applicants that are awarded rights following the conclusion of the HRA process. It is expected that developers will have regard to these in the development of the CIP projects.

9.1.5. As such, The Crown Estate concludes that with the exception of the Protected sites listed above there will be no AEOI in respect of any Protected site, or the ability of each Protected site to achieve its conservation objectives as a result of the CIP, both alone and in combination with other reasonably foreseeable plans and projects. With regards to those Protected sites affected by the CIP, given that The Crown Estate cannot exclude the possibility of AEOI for these sites, consideration is given to the further tests set out in

the Habitats Regulations in the Derogation Case Section to determine whether the CIP can proceed.

9.1.6. Where it has not been possible to exclude an AEOI it is recognised that this may, in some cases, result from the precautionary approach to assessment adopted here. Further evaluation at project level may allow some conclusions to be revised outside of the Plan, where additional evidence is presented. Similarly, further mitigation measures secured at project level, may reduce the scale of any adverse effects. However, the prospect of this further evaluation at project level has not been taken into account by The Crown Estate in identifying the adverse effects of the CIP for the purposes of this AA.

10. Derogation Case

10.1.1. The Crown Estate has been unable to exclude AEOI with regards to the following Protected sites and features listed in Table 7 below.

Table 7. Protected sites and features for which the AA could not rule out Adverse Effect on Site Integrity.

Protected site	Features	AEOI Plan Alone and/or in combination	Quantification of Plan impact*
Dogger Bank SAC	sandbanks slightly covered by seawater at all times	alone and in-combination	24.53 km^2 (2.23 km^2 and 22.3 km^2 loss and damage)
Margate and Long Sands SAC	sandbanks slightly covered by seawater at all times	alone and in-combination	0.64 km^2 (5,400m^2 and 0.63 km^2 loss and damage)
Alde-Ore Estuary SPA	Lesser black-backed gull	Alone and in combination	23.79
Farne Islands	Guillemot	alone and in-combination	122.57
Flamborough and Filey Coast SPA	Kittiwake Guillemot	alone and in-combination	115.08 158.45
	Gannet Razorbill	in-combination	28.46 83.47
	Seabird Assemblage	alone and in-combination	See footnote [1]
Greater Wash SPA	Sandwich tern	in-combination	5.5
North Norfolk Coast SPA	Sandwich tern	in-combination	5.54
Outer Thames Estuary SPA	Red-throated diver	In-combination	Disturbance effect not quantified in mortality terms

* For ornithological features the quantification of Plan impact is based on the adult annual mortality predicted in the RIAA

10.1.2. Notwithstanding this, The Crown Estate has considered whether there is a case for the Plan to proceed by means of a derogation - in other words, whether there are alternative solutions to the Plan, whether there are Imperative Reasons of Overriding Public Interest (IROPI) for the Plan to proceed and if so, whether compensatory measures necessary to ensure the overall coherence of the National Site Network can be secured. This is detailed in sections 10.2 to 10.4.

[1] Following advice from Natural England, the assemblage has been included for completeness. However, no quantum is included here, as compensating for the impacts to the other qualifying features will, as a matter of course, address the AEOI risk on the assemblage.

10.2. Alternative Solutions

10.2.1. The Habitats Regulations provide that in circumstances where an adverse effect on the integrity of a Protected site cannot be excluded, the plan-making authority may, nevertheless, agree to the plan if it is satisfied that (there being no alternative solutions that would be less damaging to the Protected site), the plan must be given effect for IROPI. This is known as a "derogation".

10.2.2. Defra's guide "Habitats regulations assessments: protecting a Protected site" (Defra, 2021) includes advice on the use of a derogation. In relation to the alternative solutions test, the guidance indicates that alternatives need to meet the original objectives of the proposal (in this case the CIP); it goes on to state that an alternative solution is acceptable if it:

- achieves the same overall objective as the original proposal;
- is financially, legally and technically feasible; and
- is less damaging to the Protected site and does not have an adverse effect on the integrity of this or any other Protected site.

10.2.3. Therefore, the absence of feasible alternative solutions should be demonstrated before moving on to the next test for a derogation (IROPI).

10.2.4. The Crown Estate has considered the alternative solutions test following the established principles set out in the April 2021 version of the Habitats Regulations Assessment Handbook (Tyldesley and Chapman, 2013) to establish the presence or absence of alternative solutions:

Step 1 – define the objectives or purpose of the plan and the problem it is causing that needs to be solved, i.e. the harm that it would cause to the integrity of a Protected site;
Step 2 – understand the need for the plan;
Step 3 – are there financially, legally and technically feasible alternative solutions;
Step 4 – are there alternative solutions with a lesser effect on the integrity of the Protected site?

Step 1: Define the objectives or purpose of the plan and the problem it is causing

10.2.5. The key objectives of the Plan are as follows:

1. Enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030, thereby:
    a. supporting the Government's critical national priority for provision of new nationally significant offshore wind
    b. mitigating the risk of pre-2030 offshore wind pipeline attrition
    c. helping to achieve the Government targets of 50GW of offshore wind by 2030 and decarbonisation of power generation by 2035, in the context of the UK's Net Zero target for 2050

2. Balance the interests of the environment, other users of the sea, and the commercial needs of the offshore wind industry.
3. Secure value from seabed leasing so far as it does not compromise/enhances the long-term value of sustainable offshore wind development and ensures equity in The Crown Estates processes.
4. Make efficient use of the seabed, recognising its value as a national asset, now and for the long term. Ensuring the unique characteristics of capacity increase projects are used to best advantage and areas already designated for offshore wind are optimised in terms of generation potential.
5. Enable decisions in a manner that supports The Crown Estates marine strategy, ensuring opportunities for additional capacity are balanced with the needs of projects already under agreement with The Crown Estate and requirements for delivery of future offshore wind leasing.

10.2.6. As noted in the AA, it has not been possible to rule out an AEOI in relation to a number of Protected sites and their features as a result of the Plan (when assessed alone and in-combination). The relevant Protected sites and their features are listed within Table 7.

Step 2: Understand the need for the plan

10.2.7. With reference to the plan objectives above, the Plan is needed to contribute to the UK's drive to meet its carbon reduction commitments. The Plan supports decarbonisation and security of the UK's energy supply and government targets. Further detail relating to underpinning legislative drivers referred to within the objectives is provided below:

- Significant new offshore wind generation capacity is essential to help the UK meet its legally binding net zero by 2050 commitment (made through the Climate Change Act 2008 (2050 Target Amendment) Order 2019 - brought into force in June 2019 in response to recommendations by the Climate Change Committee (CCC) (CCC, 2019)) and interim carbon budgets. Additional new offshore wind generation capacity is required given the urgent need for greater volumes of low carbon electricity, and accelerating the transition from fossil fuels depends critically on how quickly new renewables including offshore wind can be rolled out.
- It is clear, that the Plan is consistent with existing national policy in offering the potential for up to 4.7GW of additional low carbon generation; it is also consistent with national policy as evident from National Policy Statements EN-1 and EN-3 (January 2024)[2] and the UK government's latest proposals to accelerate the decarbonisation of the UK's electricity grid to 2030 including the establishment of Great British Energy and the Clean Power 2030 Advisory Commission and publication of the Clean Power Action Plan[3].

[2] https://www.gov.uk/government/collections/national-policy-statements-for-energy-infrastructure
[3] Clean Power 2030 Action Plan: A new era of clean electricity https://www.gov.uk/government/publications/clean-power-2030-action-plan

10.2.8. It is in this context that the UK Government has designated offshore wind as Critical National Priority infrastructure, within the Energy National Policy Statements EN-1, and identified that:

For both derogations [under the Habitats Regulations and under Section 126(7) of the Marine and Coastal Access Act 2009]*, the Secretary of State will consider the particular circumstances of any plan or project, but starting from the position that energy security and decarbonising the power sector to combat climate change:*

- *requires a significant number of deliverable locations for CNP Infrastructure and for each location to maximise its capacity. This NPS imposes no limit on the number of CNP infrastructure projects that may be consented. Therefore, the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution. Further, the existence of another way of developing the proposed plan or project which results in a significantly lower generation capacity is unlikely to meet the objectives and therefore be treated as an alternative solution; and*
- *are capable of amounting to imperative reasons of overriding public interest (IROPI) for HRAs, and, for MCZ assessments, the benefit to the public is capable of outweighing the risk of environmental damage, for CNP Infrastructure*.

10.2.9. It should be noted that the consequence of the CIP would be that each location included in the Plan will be able to maximise its capacity.

Steps 3 and 4: Are there financially, legally and technically feasible alternative solutions, and are there alternative solutions with a lesser effect on the integrity of the Protected site?

The table below sets out the alternative solutions considered by The Crown Estate and summarises The Crown Estates assessment of each solution.

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
1. Enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030, thereby: • supporting the Government's critical national priority for provision of new nationally significant offshore wind • mitigating the risk of pre-2030 offshore wind pipeline attrition • helping to achieve the Government targets of 50GW of offshore wind by 2030 and decarbonisation of power generation by 2035, in the context of the UK's Net Zero target for 2050	Not proceeding with the Plan would not meet the objectives, in particular: • to enable at least 4.7GW of new offshore wind rights in England and Wales • supporting the deployment of offshore wind generation at scale (50GW) before 2030[4] • supporting the achievement of other aims and objectives of the British Energy Security Strategy (2022), including the ambition that by 2030 over half of the UK's renewable generation capacity will be from wind • supporting the achievement of the	Amending the generating capacity of individual projects would result in loss of capacity which would not meet the objectives of the Plan: • to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection and development pathway to 2030 • supporting the wider need to deploy offshore wind generation at scale (50GW) before 2030[4] above • helping the achievement of the Government's Net Zero Strategy[5 above].	Removing projects where the proposed additional capacity causes or contributes to AEOI from the Plan would result in the award of one project (Awel y Môr) and an increase in capacity of 524MW. The removal of a single project, such as Dogger Bank D, which is causing AEOI from the Plan would result in the award of up to 6 projects and a smaller increase in capacity than that of the whole Plan, in this case by 2GW. This may reduce impacts to ornithological or benthic features such as removing impacts from the plan on benthic features of Dogger Bank SAC. Removing any project(s) including Dogger Bank D does not meet the	Not proceeding with the Plan would remove the risk of impacts to the ornithological and benthic features identified to be at risk but would cause significant delay to deployment of offshore wind capacity. In 2024, the Crown Estate set out its early thinking for the development of Future Offshore Wind (The Crown Estate, 2024). This identified potential for offshore wind leasing up to 2030, with anticipated development timelines from 2035 to 2040. This does not: • enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection and development pathway to 2030	Through the AA stage The Crown Estate has considered introducing feasible design restrictions that can reduce the impact on the SACs and SPAs. Even with the inclusion of such restrictions and other forms of mitigation, The Crown Estate has concluded that in each case, an adverse effect on site integrity cannot be excluded. The Crown Estate has not been able to identify any other alternative project design restrictions, other than those listed within this AA, which would result in no AEOI. This alternative solution fails to avoid AEOI and would not meet this objective of the Plan.	Offshore wind farm projects that are located outside UK territorial waters are not an alternative to the CIP. This does not meet the objectives of the Plan: • to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection and development pathway to 2030 • mitigate the risk of pre-2030 pipeline attrition • support the wider need to deploy offshore wind generation at scale in the UK marine area (50GW) before 2030[4 above] • support the achievement of the Government's Net Zero Strategy including the	There is no evidence of other developers seeking to undertake capacity increases at other locations that would deliver commensurate capacity to CIP. Commencing a new process to identify alternative capacity increases may remove the immediate risk of impacts to the ornithological and benthic features identified to be at risk but would cause significant delay to the deployment of offshore wind capacity. Any alternative capacity increases may also introduce significant risks to ornithological and benthic features due to the location and known impact pathways associated with other projects within The Crown Estates existing offshore wind pipeline. This does not:

[4] to help the UK meet its commitments under the Climate Change Act 2008 (as amended) and the UK's Nationally Determined Contribution (NDC) under the Paris Agreement to reduce greenhouse gas emissions by at least 68% from 1990 levels by 2030

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
	Government's Net Zero Strategy[5]. There is an urgent need for renewable energy projects within the UK and accelerating the transition from fossil fuels depends critically on how quickly new renewables including offshore wind can be rolled out. The do nothing alternative solution would fail to meet the objectives of the CIP and would erode the ability of the UK government to meet its 50GW by 2030 target, achieve its ambition that over half our renewable generation capacity will be from wind by 2030, decarbonise power generation by 2035 (or earlier by 2030 under the Government's latest	Given the imperative to decarbonise energy as rapidly as practicable, it is also important to mitigate against delays to existing project developments (and pipeline attrition) by allowing for a greater than 4.7GW total capacity through the CIP; this will help to maximise the contribution of the offshore wind industry towards realising Government targets. This is supported by the National Policy Statement EN-1 which recognises that that energy security and decarbonising the power sector to combat climate change requires a significant number of deliverable locations for Critical National Priority Infrastructure and for each location	objectives of the Plan: • to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection and development pathway to 2030 • mitigate the risk of pre-2030 pipeline attrition (see section 10.2.13) • supporting the wider need to deploy offshore wind generation at scale (50GW) before 2030[4 above] • supporting the achievement of the Government's Net Zero Strategy[5 above]. Removal of any project from the plan would fail against this	• help the need to deploy offshore wind generation at scale (50GW) before 2030[4 above] • help the achievement of the Government's Net Zero Strategy including the decarbonisation of power generation by 2035 (or earlier by 2030 under the Government's latest proposals)[5 above]. Therefore, this alternative solution has a similar outcome to do nothing alternative solution and would fail to meet this objective of the Plan. Relying on Future Offshore Wind leasing would not meet the objective to: • deploy offshore wind generation		decarbonisation of power generation by 2035 (or earlier by 2030 under the Government's latest proposals)[5 above]. Although the UK is party to international treaties and conventions in relation to climate change and renewable energy, according to the principle of subsidiarity and its legally binding commitments under those treaties and conventions, the UK has its own specific legal obligations and targets in relation to carbon emission reductions and renewable energy generation. Other international and EU countries similarly have their own (different) binding targets. Sites outside the UK are required for	• enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection and development pathway to 2030 • mitigate the risk of pre-2030 pipeline attrition • help the need to deploy offshore wind generation at scale (50GW) before 2030[4 above] • help the achievement of the Government's Net Zero Strategy including the decarbonisation of power generation by 2035 (or earlier by 2030 under the Government's latest proposals)[5 above]. The requirement for the projects within the plan to optimise their

[5] which commits to the decarbonisation of power generation by 2035

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
	proposals) and reduce greenhouse gas emissions by 78% against 1990 levels by 2035 in accordance with the Sixth Carbon Budget. This alternative solution fails to meet this objective of the Plan.	to maximise its capacity. This alternative solution fails to meet this objective of the Plan.	objective. This alternative solution would erode the ability of the UK government to meet its 50GW by 2030 target, achieve its ambition that over half the UK's renewable generation capacity will be from wind by 2030, and decarbonise power generation by 2035 (or earlier by 2030 under the Government's latest proposals) and reduce greenhouse gas emissions by 78% against 1990 levels by 2035 in accordance with the Sixth Carbon Budget. This is supported by the National Policy Statement EN-1 which recognises that that energy security and decarbonising the power sector to combat climate change requires a significant number of deliverable locations for Critical National Priority Infrastructure and for each location	at scale (50GW) before 2030[4 above] • support the decarbonisation of power generation by 2035 (or earlier by 2030 under the Government's latest proposals) as part of the Government's Net Zero Strategy[5 above]. This is supported by the National Policy Statement EN-1 which recognises that that energy security and decarbonising the power sector to combat climate change requires a significant number of deliverable locations for Critical National Priority Infrastructure and for each location to maximise its capacity. It further recognises that as a result of the need for a significant number of deliverable locations, the fact that there are other potential plans or projects deliverable		other countries to achieve their own respective targets in respect of climate change and renewable energy. This alternative solution fails to meet this objective of the Plan.	capacity is supported by the National Policy Statement EN-1 which recognises that that energy security and decarbonising the power sector to combat climate change requires a significant number of deliverable locations for Critical National Priority Infrastructure and for each location to maximise its capacity. Each project within the CIP is directly seeking to maximise capacity of existing agreements in line with this policy. Therefore, this alternative solution has a similar outcome to abandoning the Plan and relying on Future Offshore Wind leasing solution and would fail to meet this objective of the Plan. This alternative solution fails to meet this objective of the Plan

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
			to maximise its capacity. It further recognises that the existence of another way of developing the proposed plan or project which results in a significantly lower generation capacity is unlikely to meet the objectives and therefore be treated as an alternative solution. This alternative solution fails to meet this objective of the Plan.	in different locations to meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution. This alternative solution fails to meet this objective of the Plan.			
2. Balance the interests of the environment, other users of the sea, and the commercial needs of the offshore wind industry.	The do-nothing alternative solution does not: • balance the commercial needs of the offshore wind industry or other users of the sea or the environment. However, it would remove the risk of impacts to ornithological and benthic features identified to be at risk in the AA prioritising the	Amending a project's capacity would still allow for some capacity which would: • potentially balance the needs of the environment and other users of the sea. However, it would not balance the needs of the offshore wind industry or completely remove the risk of impacts to ornithology and benthic features	Removing projects causing AEOI from the Plan would not: • balance the commercial needs of the offshore wind industry. However, it would remove the risk of impacts to ornithological and benthic features identified to be at risk in the AA prioritising the interests of the environment. This alternative solution fails to meet	Not proceeding with the Plan and relying on Future Offshore Wind would not: • balance the commercial needs of the offshore wind industry. • remove the risk to ornithological and benthic features; it is likely there will be effects on the environment with any development current or future. This alternative solution fails to meet	There are no feasible design restrictions that can reduce the impact on the SACs and SPAs beyond those already identified by The Crown Estate: • unfeasible restrictions would not balance the commercial needs of the offshore wind industry • other design restrictions would not remove the risk to ornithological	Offshore wind farm projects that are located outside UK territorial waters are not an alternative to the Plan as they will not: • balance the commercial needs of the offshore wind industry. However, it would remove the risk of impacts to ornithological and benthic features identified to be at risk in the AA prioritising	There is no evidence of other developers seeking to undertake capacity increases at other locations. Not proceeding with the current Plan and re-starting the process with different sites would not: • balance the commercial needs of the offshore wind industry. • remove the risk to ornithological and benthic features; it is likely there will be effects on

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
	interests of the environment. This alternative solution fails to meet this objective of the Plan.	identified to be at risk in the AA. This alternative solution fails to meet this objective of the Plan.	this objective of the Plan.	this objective of the Plan.	and benthic features. Where measures have been proposed by the EWG through consultation these have either been integrated into this Appropriate Assessment or, following careful consideration have not been identified as feasible by The Crown Estate (see section 8). As such, The Crown Estate has not been able to identify any other alternative project design restrictions that are feasible and would result in no AEOI. This alternative solution fails to meet this objective of the Plan.	the interests of the environment. This alternative solution fails to meet this objective of the Plan.	the environment with any development current or future. This alternative solution fails to meet this objective of the Plan.
3. Secure value from seabed leasing so far as it does not compromise/enhances the long-term value of sustainable offshore wind development and ensures equity in The	The do-nothing alternative solution does not: • secure additional value from seabed leasing.	Amending a projects capacity would still allow for some capacity which would: • secure additional value from seabed leasing.	Removing projects causing AEOI from the Plan may still secure additional value from seabed leasing for those projects which are not removed albeit less value than	Not proceeding with the Plan and relying on Future Offshore Wind may: • compromise the long-term value of sustainable offshore wind development by	There are no feasible design restrictions (beyond those already identified by The Crown Estate) which could reduce impacts to ornithological or benthic features. In	Relying on offshore wind farm projects that are located outside UK territorial waters may reduce impacts to ornithological or benthic features identified to be at risk	There is no evidence of other developers seeking to undertake capacity increases at other locations. Not proceeding with the current Plan and re-starting the process with different sites

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
Crown Estates processes.	Do nothing would not offer the opportunity to existing customers to increase their capacities and make best use of the seabed in areas that are suitable for offshore wind and sustainable wind development. This may compromise the long-term value of sustainable offshore wind development. This alternative solution fails to meet this objective of the Plan.	Amending or limiting capacity at some projects versus others may reduce impacts to ornithological or benthic features through the reduction of turbines however it is not certain whether this is the case or to what degree a reduction would occur. In the instance of benthic features conclusions for Dogger Bank and Margate and Long Sands SACs would not be altered due to any loss/damage at these protected sites resulting in AEOI. In relation to ornithological features in the instance of Flamborough and Filey Coast SPA the site is currently at capacity/derogation level across multiple features and as such amending capacity will not alter the conclusions for this site.	proceeding with the Plan. Removal of projects may reduce impacts to ornithological or benthic features however in the instance of benthic features conclusions for Dogger Bank and Margate and Long Sands SACs would not be altered due to any loss/damage at these protected sites resulting in AEOI. In relation to ornithological features in the instance of Flamborough and Filey Coast SPA the Protected site is currently at capacity/derogation level across multiple features and as such removing projects will not alter the conclusions for this site for which multiple projects (in combination) in this plan impact upon. In addition, should projects be removed from the plan there are implications for	preventing projects under agreement from maximising the capacity of their sites and the requisite value that this will create from the seabed under agreement, • not ensure equity in The Crown Estates processes (valuing future offshore wind over existing customers). Not proceeding with the Plan may reduce impacts to ornithological or benthic features however it is likely there will be effects on the environment with any development current or future. For example, ornithological features in the instance of Flamborough and Filey Coast SPA the Protected site is currently at capacity/derogation level across multiple	the instance of benthic features conclusions for Dogger Bank and Margate and Long Sands SACs they would not be altered by alternative design restrictions due to the approach that any loss/damage at these protected sites results in AEOI. In relation to ornithological features in the instance of Flamborough and Filey Coast SPA the Protected site is currently at capacity/derogation level across multiple features and as such there are no alternative design restrictions that will alter the conclusions for this site that can reduce the impact on the SACs and SPAs that: • would not compromise the long-term value of sustainable offshore wind development	in the AA however this is not an alternative to the Plan as they will not: • secure additional value from seabed leasing. In addition, it would compromise the value of sustainable offshore wind development. This alternative solution fails to meet this objective of the Plan.	may remove the risk to ornithological and benthic features identified to be at risk in the AA however it is likely there will be effects on the environment with any development current or future. This is not an alternative to the Plan as they may: • compromise the long-term value of sustainable offshore wind development • not ensure equity in The Crown Estates processes (valuing other customers over Plan customers). This alternative solution fails to meet this objective of the Plan.

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
		Further to this, altering capacities may not make best use of the seabed in areas that are suitable for offshore wind and sustainable wind development. This may therefore compromise the long-term value of sustainable offshore wind development. This alternative solution fails to meet this objective of the Plan. Therefore, altering capacities is not a suitable alternative solution.	the long-term value of sustainable offshore wind development. This alternative solution fails to meet this objective of the Plan. Therefore, removing some projects from the plan is not a suitable alternative solution.	features and as such not proceeding with this plan and focusing on future offshore wind projects will likely result in effects at this later stage. This alternative solution fails to meet this objective of the Plan. Therefore, not proceeding with the plan and relying on Future Offshore Wind instead is not a suitable alternative solution.	• would ensure equity in The Crown Estates processes. This alternative solution fails to meet this objective of the Plan.		
4. Make efficient use of the seabed, recognising its value as a national asset, now and for the long term. Ensuring the unique characteristics of capacity increase projects are used to best advantage and areas already designated for offshore wind are optimised in terms of generation potential.	The do-nothing alternative solution does not: • make efficient use of the seabed as a national asset in the short or longer term • take advantage of the opportunity to use areas already designated for offshore wind and	Amending a project's capacity would still allow for some capacity which does meet some aspects of this objective namely: • takes advantage of the opportunity to use areas already designated for offshore wind and • optimise the generation potential in so far as possible. However, it does not:	Removing projects causing AEOI from the Plan meets some aspects of this objective namely: • it may take advantage of the opportunity to use some areas already designated for offshore wind and • optimise the generation potential at some projects.	Not proceeding with the Plan and relying on Future Offshore Wind would not: • take advantage of the opportunity to use areas already designated for offshore wind • optimise the generation potential • make efficient use of the seabed as a national asset in the short or longer term.	There are no feasible design restrictions beyond those identified by The Crown Estate that: • take advantage of the opportunity to use areas already designated for offshore wind and • optimise the generation potential. In the instance of benthic features for	Offshore wind farm projects that are located outside UK territorial waters are not an alternative to the Plan as they will not: • make efficient use of the seabed as a national asset in the short or longer term • take advantage of the opportunity to use areas already designated for offshore wind and	There is no evidence of other developers seeking to undertake capacity increases at other locations. Not proceeding with the current Plan and re-starting the process with different sites does not specifically meet the objective to 'ensure the unique characteristics of capacity increase projects are used to the best advantage' and it would not:

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
	• optimise the generation potential. Do nothing does not specifically meet the objective to 'ensure the unique characteristics of capacity increase projects are used to the best advantage'. This alternative solution fails to meet this objective of the Plan.	However, it does not: • make efficient use of the seabed as a national asset in the short or longer term. Amending or limiting capacity at some projects versus others may reduce impacts to ornithological or benthic features through the reduction of turbines however it is not certain whether this is the case or to what degree a reduction would occur. Where this occurs, it is unlikely to change the conclusions of the AA. This alternative solution fails to meet this objective of the Plan.	• make efficient use of the seabed as a national asset in the short or longer term due to the removal of projects which does not allow for optimisation of generation potential or use of areas designated for offshore wind at these sites. This alternative solution fails to meet this objective of the Plan.	Relying on Future Offshore Wind does not specifically meet the objective to 'ensure the unique characteristics of capacity increase projects are used to the best advantage'. This alternative solution fails to meet this objective of the Plan.	Dogger Bank and Margate and Long Sands SACs it is unlikely that the conclusions would change by alternative design restrictions due to the approach that any loss/damage at these protected sites results in AEOI. In relation to ornithological features in the instance of Flamborough and Filey Coast SPA the Protected site is currently at capacity/derogation level across multiple features and as such there are no alternative design restrictions that will alter the conclusions for this site that can reduce the impact on SPAs due to the in-combination aspect of the Plan. This alternative solution fails to meet this objective of the Plan.	• optimise the generation potential Relying on offshore wind farm projects outside of UK waters does not specifically meet the objective to 'ensure the unique characteristics of capacity increase projects are used to the best advantage'. This alternative solution fails to meet this objective of the Plan.	• make efficient use of the seabed as a national asset in the short or longer term • take full advantage of the opportunity to use areas already designated for offshore wind • optimise the generation potential Re-starting the process may meet some aspects of this objective however current CIP projects areas would not be used to the best advantage and would not be optimised for offshore wind generation. This alternative solution fails to meet this objective of the Plan.

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
5. Enable decisions in a manner that supports The Crown Estates marine strategy, ensuring opportunities for additional capacity are balanced with the needs of projects already under agreement with The Crown Estate and requirements for delivery of future offshore wind leasing.	The do-nothing alternative solution does not enable decisions that: • Support The Crown Estates marine strategy to deliver an additional 25-35GW of offshore wind rights by 2030 • Balance opportunities for additional capacity with projects already under agreement and the delivery of future offshore wind leasing. This alternative solution fails to meet this objective of the Plan.	Amending a projects capacity would still allow for some capacity which does meets this objective in part namely: • Balance opportunities for additional capacity with projects already under agreement. However, it does not: • Support The Crown Estates marine strategy to deliver an additional 25-35GW of offshore wind rights by 2030 or meet requirements for delivery of future offshore wind leasing. This alternative solution fails to meet this objective of the Plan.	Removing projects causing AEOI from the Plan meets this objective in part namely: • It supports The Crown Estates marine strategy- to secure the best outcomes for the economy, the environment and society, whilst supporting delivery of a thriving marine environment, However, it does not: • Balance opportunities for additional capacity with projects already under agreement and requirements for delivery of future offshore wind – as this alternative solution requires removal of AEOI causing projects. • Support The Crown Estates marine strategy	Not proceeding with the Plan and relying on Future Offshore Wind does not enable decisions that: • Support The Crown Estates marine strategy to deliver an additional 25-35GW of offshore wind rights by 2030 • Balance opportunities for additional capacity with projects already under agreement and the requirement for delivering future offshore wind. Relying on Future Offshore wind does not mitigate the risk of pre-2030 pipeline attrition and as such further does not support The Crown Estates marine strategy for a healthy offshore wind pipeline. This alternative solution fails to meet this objective of the Plan.	There are no feasible design restrictions beyond those already identified by The Crown Estate that: • Support The Crown Estates marine strategy to secure the best outcomes for the economy, the environment and society, whilst supporting delivery of a thriving marine environment, • Balance opportunities for additional capacity with projects already under agreement and the requirement for delivering future offshore wind. In the instance of benthic features for Dogger Bank and Margate and Long Sands SACs it is unlikely that the conclusions would change by alternative design restrictions	Offshore wind farm projects that are located outside UK territorial waters are not an alternative to the Plan as they will not: • Support The Crown Estates marine strategy to deliver an additional 25-35GW of offshore wind rights by 2030 • Balance opportunities for additional capacity with projects already under agreement and delivery of future offshore wind leasing. Relying on offshore wind farm projects outside of UK waters does not specifically meet UK targets for energy requirements around net zero and energy independence. This alternative solution fails to meet this objective of the Plan.	There is no evidence of other developers seeking to undertake capacity increases at other locations. Not proceeding with the current Plan and re-starting the process with different sites would not: • Support The Crown Estates marine strategy to deliver an additional 25-35GW of offshore wind rights by 2030 due to delays associated with re starting the process • Balance opportunities for additional capacity with projects already under agreement and the delivery of future offshore wind. Re-starting the process may meet some aspects of this objective to balance opportunities for additional capacity with projects under agreement however

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
			to deliver an additional 25-35GW of offshore wind rights by 2030 This alternative solution fails to meet this objective of the Plan.		due to the approach that any loss/damage at these protected sites results in AEOI. In relation to ornithological features in the instance of Flamborough and Filey Coast SPA the Protected site is currently at capacity/derogation level across multiple features and as such there are no alternative design restrictions that will alter the conclusions for this site that can reduce the impact on SPAs due to the in-combination aspect of the plan. This alternative solution fails to meet this objective of the Plan.		there is no evidence that other developers are seeking capacity increases. This alternative solution fails to meet this objective of the Plan.
Summary of Conclusions	Not proceeding with the CIP would remove the risk of impacts to ornithological and benthic features identified to be at risk in the AA but would not meet the key objectives of the	Amending the generating capacity of individual projects would result in loss of capacity. It could reduce the risk of impacts to the ornithological and benthic features identified to be at risk	Removing projects causing AEOI from the Plan would result in the award of one project with a capacity of 524MW. The removal of some projects, e.g. those not yet in Examination or the	Not proceeding with the Plan and relying on Future Offshore Wind would remove the risk of impacts to the ornithological and benthic features identified to be at risk in the AA but would not meet the key	The Crown Estate has not been able to identify any other alternative project design restrictions, other than those listed within this AA, that would result in no AEOI. In the instance of benthic	Offshore wind farm projects that are located outside UK territorial waters are not a feasible alternative to the CIP as this would not meet the objective to support the decarbonisation of the	There is no evidence of other developers seeking to undertake capacity increases at other locations. Not proceeding with CIP as it is currently or re-starting the process may change the risk of impacts to the

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
	CIP referred to above and in particular to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030. In summary, there is an urgent need for renewable energy projects within the UK and accelerating the transition from fossil fuels depends critically on how quickly new renewables including offshore wind can be rolled out. The do nothing alternative solution would fail to meet the objectives of the CIP and would erode the ability of the UK government to meet its 50GW by 2030 target, achieve its ambition that over half our renewable generation capacity will be from wind by	in the AA but would not meet the key objectives of the CIP referred to above and in particular to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030. There is an urgent need for renewable energy projects within the UK and accelerating the transition from fossil fuels depends critically on how quickly new renewables including offshore wind can be rolled out. Amending the capacity of a project as an alternative solution would fail to meet the objectives of the CIP and would erode the ability of the UK government to meet its greenhouse gas emissions reduction targets (including net zero), achieve its ambition that over	earlier stages of the DCO process, which are causing AEOI from the Plan would result in the award of less projects (up to and including six projects) and a smaller increase in capacity than that of the whole plan. This alternative would either remove or reduce the risk of impacts to the ornithological and benthic features identified to be at risk in the AA but would not meet the key objectives of the CIP referred to above and in particular to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030. There is an urgent need for renewable energy projects within the UK and accelerating the transition from fossil fuels depends	objectives of the CIP referred to above and in particular to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030. There is an urgent need for renewable energy projects within the UK and accelerating the transition from fossil fuels depends critically on how quickly new renewables including offshore wind can be rolled out. Not proceeding with the Plan and relying on Future Offshore Wind hinders the wider need to deploy offshore wind generation at scale (50GW) before 2030 to help the UK meet its commitments under the Climate Change Act 2008 (as amended) and the UK's NDC under the Paris Agreement to reduce greenhouse gas emissions by at	features for Dogger Bank and Margate and Long Sands SACs it is unlikely that the conclusions would change by alternative design restrictions due to the approach that any loss/damage at these protected sites results in AEOI. In relation to ornithological features in the instance of Flamborough and Filey Coast SPA the Protected site is currently at capacity/derogation level across multiple features and as such there are no alternative design restrictions that will alter the conclusions for this site that can reduce the impact on SPAs due to the in-combination aspect of the Plan. This alternative solution is not a suitable alternative for the Plan.	UK electricity supply and UK commitments on offshore wind generation. Although the UK is party to international treaties and conventions in relation to climate change and renewable energy, according to the principle of subsidiarity and its legally binding commitments under those treaties and conventions, the UK has its own specific legal obligations and targets in relation to carbon emission reductions and renewable energy generation. Other international and EU countries similarly have their own (different) binding targets. Sites outside the UK are required for other countries to achieve their own respective targets in respect of climate change and renewable energy. This alternative solution is not a suitable alternative for the Plan.	ornithological and benthic features identified to be at risk in the AA (noting that a number of other projects currently within the pipeline are likely to similarly impact on the same ornithological and/or benthic features) but would cause significant delay and not meet the objectives of the CIP referred to above (due to lack of developers requesting capacity increases and the timeframes associated with the delivery of the CIP projects). In particular it would not meet the objective to enable increases in offshore wind capacity at sites with existing agreements for lease, grid connection capacity available and a development pathway to 2030. Future offshore wind and alternative locations would not deliver capacity for a period of time well beyond 2030 and

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
	2030 and decarbonise power generation and reduce greenhouse gas emissions by 78% by 2035. This alternative would also not contribute towards the latest Government targets in the Clean Power Action Plan namely, that by 2030 in a typical weather year clean sources of energy produce at least as much power as Great Britain consumes in total, and clean sources produce at least 95% of Great Britain's generation. This alternative solution is not a suitable alternative for the Plan.	half our renewable generation capacity will be from wind by 2030 and achieve its objective to decarbonise power generation by 2035. This alternative would also reduce the contribution of the Plan towards the latest Government targets in the Clean Power Action Plan namely, that by 2030 in a typical weather year clean sources of energy produce at least as much power as Great Britain consumes in total, and clean sources produce at least 95% of Great Britain's generation. This alternative solution is not a suitable alternative for the Plan.	critically on how quickly new renewables including offshore wind can be rolled out. Removing projects causing AEOI from the Plan would erode the ability of the UK government to meet its greenhouse gas emissions reduction targets (including net zero), achieve its ambition that over half our renewable generation capacity will be from wind by 2030 and achieve its objective to decarbonise power generation by 2035. This alternative would also materially reduce the contribution of the Plan towards the latest Government targets in the Clean Power Action Plan namely, that by 2030 in a typical weather year clean sources of energy produce at least as much power as Great Britain consumes in total, and clean sources produce at least 95%	least 68% from 1990 levels by 2030. Future offshore wind has identified objectives to bring between 20-30GW to market of new offshore wind seabed rights in the waters of England and Wales by 2030, for delivery out to 2040. This alternative solution fails to meet the key objective of the CIP to enable increases in offshore wind capacity at sites with a development pathway to 2030. It would also not contribute towards the latest Government targets in the Clean Power Action Plan namely, that by 2030 in a typical weather year clean sources of energy produce at least as much power as Great Britain consumes in total, and clean sources produce at least 95% of Great Britain's generation. This alternative solution is not a			would not have a delivery pathway to 2030. It is unlikely with the progression of legal agreements, plan level HRA and project level consenting that projects would be able to deliver progress to achieve meaningful contribution to 2030 target. The re-starting of a process for capacity increase as an alternative to the CIP would erode the ability of the UK government to meet its greenhouse gas emissions reduction targets (including net zero), achieve its ambition that over half our renewable generation capacity will be from wind by 2030 and achieve its objective to decarbonise power generation by 2035. This alternative would also not contribute towards the latest Government targets in the Clean Power Action Plan namely, that by 2030 in a typical weather year clean sources of

Objectives	Do Nothing	Amend a Projects capacity	Remove one or more projects causing AEOI	Abandon the Plan and rely on Future Offshore Wind	Alternative Design Restrictions	Offshore Wind Farms not in the UK EEZ	Consider capacity increases at other locations.
			of Great Britain's generation. This alternative solution is not a suitable alternative for the Plan.	suitable alternative for the Plan.			energy produce at least as much power as Great Britain consumes in total, and clean sources produce at least 95% of Great Britain's generation. Therefore, this alternative solution has a similar outcome to do nothing alternative solution. This alternative solution is not a suitable alternative for the Plan.

10.2.10. During consultation with SNCBs on the draft AA, JNCC indicated concerns about the assessment of alternative solutions to the CIP. In response to this, further clarifications and additional information have been incorporated into that assessment and the Derogation Case.

10.2.11. The total capacity of projects included in the CIP (including the original projects) is 7.28GW. This capacity is referenced here, as it is noted that although the capacity of the increases is up to 4.7GW, the removal of the increases has the potential to prevent projects from coming forwards in their totality on the basis of commercial viability.

10.2.12. The Crown Estate has reviewed again the pipeline of offshore wind, with a delivery pathway to 2030, including all projects within the CIP. There is currently 38GW consented with the potential to secure government support to deliver by 2030. There is a further 22GW within the consenting process, and a significant volume in pre-planning, some of which may be able to secure government support to delivery by 2030. All of the projects within CIP, including Dogger Bank D (Dogger Bank D, 2024b), have a development pathway to 2030. The loss of CIP capacity would significantly undermine the potential for the UK Offshore Wind sector to achieve 2030 targets.

10.2.13. The removal of any one project, such as Dogger Bank D, may not theoretically prevent the delivery of 2030 targets, on the assumption that all projects come forward. However, this does not consider the potential for attrition of projects within the offshore wind pipeline, many of which have similar or higher potential impacts than those within CIP. Should any one project be removed from CIP, there is a significant risk that the attrition of any additional projects would lead to failure to achieve 2030 ambitions due to a lack of resilience within the existing pipeline.

10.2.14. Of particular concern is the 22GW of the offshore wind pipeline which is within the consenting process. The projects which navigate the most quickly through the consenting stage may be anticipated to progress in sufficient time to deliver against 2030. However, it must be acknowledged that a number of offshore wind projects have been subject to significant delays, such as Norfolk Vanguard which was approved in 2022, following submission in 2018 (Planning Inspectorate, 2022) and East Anglia One North and East Anglia Two offshore wind projects which were the subject of applications in 2019, approved in 2022 and the subject of a legal challenge which was not finally disposed of until 2024. Having sufficient capacity progressing to absorb either projects failing to progress or becoming significantly delayed in the consenting process is essential to delivering 2030 ambitions.

10.2.15. Furthermore, analysis of 2035 Clean Power ambitions for decarbonisation of the grid indicates that, even with all of the CIP projects, and the other projects in the pipeline coming forward, there is a potential shortfall in energy generation compared to demand at 2035. The removal of any capacity from CIP would therefore further prevent the programme from supporting UK Government policy to decarbonise the energy grid by 2035.

Conclusion on Alternatives

10.2.16. The Crown Estate has considered a range of alternative solutions, including giving weight to those put forwards in consultation on the draft AA by the SNCBs, and has concluded that there are no feasible alternative solutions to the Plan which meet the plan's objectives and which would lead to less harm to the affected Protected sites.

10.2.17. Having identified the objectives of the Plan and considered all alternative means of fulfilling these objectives, The Crown Estate is satisfied that no feasible alternative solutions with lesser effects are available.

10.3. Imperative Reasons of Overriding Public Interest (IROPI)

10.3.1. Having demonstrated the absence of alternative solutions, the Habitats Regulations and Offshore Habitats Regulations only allow a plan (or project) that has an adverse effect on the integrity of a Protected site to proceed if there are IROPI for why the plan (or project) must, nevertheless, go ahead.

10.3.2. A number of in-principle grounds for IROPI are established through the derogation provisions in the Habitats Regulations and set out in guidance provided by Defra (Defra, 2021) and the European Commission (European Commission, 2019). It should be noted that where the site concerned hosts a priority natural habitat or a priority species, and those features are at risk of adverse effects, the grounds for IROPI should normally include human health, public safety or beneficial consequences of primary importance to the environment but may also be of a social or economic nature (subject to the opinion of the relevant national government in England or Wales). None of the features are classed as priority habitats or species.

10.3.3. The guidance identifies the following principles for considerations of IROPI:

- Imperative: There would usually be urgency to the objective(s), and it must be considered "indispensable" or "essential" (i.e. imperative). In practical terms, this can be evidenced where the objectives of the plan (or project) falls within a framework for one or more of the following:
  i. actions or policies aiming to protect fundamental values for citizens' life (health, safety, environment);
  ii. fundamental policies for the State and the Society; or
  iii. activities of an economic or social nature, fulfilling specific obligations of public service.
- Public interest: The interest must be a public rather than a solely private interest (although a private interest can coincide with delivery of a public objective).
- Long-term: The interest would generally be long-term; short-term interests are unlikely to be regarded as overriding because the conservation objectives of Protected sites are long term interests.
- Overriding: The public interest (which can be national, regional or local) of proceeding with the plan (or project) must be greater than the interest of conservation interest potentially put at risk should the plan or project go ahead.

Reasons of Public Interest

10.3.4. The Plan will provide a significant contribution to limiting the extent of climate change in accordance with the objectives of the Paris Agreement and is essential for meeting the UK's Nationally Determined Contribution (NDC) for the period 1 January 2021 - 31 December 2030 (to reduce greenhouse gas emissions by at least 68% of 1990 levels by 2030). It is also relevant to note that at the 29th UNFCCC conference of the parties (COP29) in Baku on 12 November 2024, the Prime Minister announced the UK's 2035 NDC which will commit the UK to reducing greenhouse gas emissions by at least 81% by 2035, compared to 1990 levels (excluding emissions from international aviation and shipping). The Plan will form an important part of the trajectory towards achieving this target.

10.3.5. Renewables such as offshore wind will play a critical role in the transition away from fossil fuels, as outlined by the British Energy Security Strategy released in April 2022. Beyond the 2030 time horizon, the Government's Sixth Carbon Budget sets a target to reduce greenhouse gas emissions by 78% from 1990 to 2035 (including international aviation and shipping emissions)[6]; as part of this target, the Government's Net Zero Strategy committed to the decarbonisation of power generation by 2035[7]. The current Government have since announced proposals to accelerate the decarbonisation of power generation to 2030 and among other things, has established Great British Energy and the Clean Power 2030 Advisory Commission and published the Clean Energy Action Plan[8] to support progress towards this target.

10.3.6. In addition, in its recommendations to Government for the Sixth Carbon Budget, the Committee on Climate Change concluded that offshore wind is expected to become the "backbone" of the whole UK energy system, providing 65-70% of total generation by 2050; generating capacity for offshore wind is expected to be 100GW or more by 2050, with the CCC's five different scenarios ranging from 65GW to 140GW.

10.3.7. The consequences of not achieving the objectives of the Paris Agreement would be severely detrimental to societies across the globe and to human health, to social and economic interests and to the environment - namely, the increases in mean temperature in most land and ocean regions, hot extremes in most inhabited regions, heavy precipitation in several regions and the probability of drought and precipitation deficits in some regions. Sea level rise will continue and marine ice sheet instability in Antarctica or irreversible loss of the Greenland ice sheet could result in multi-metre rise in sea levels leading to extreme flooding (IPCC, 2018), increasing the risks associated with sea level rise to small islands, low-lying coastal areas and deltas for many human and ecological systems (IPCC, 2018). Climate-related risks to health, livelihoods, food security, water

[6] https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035
[7] https://www.gov.uk/government/publications/net-zero-strategy
[8] Clean Power 2030 Action Plan: A new era of clean electricity https://www.gov.uk/government/publications/clean-power-2030-action-plan

supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C (IPCC, 2018).The impacts of climate change are global in scope and unprecedented in human existence; the science linking the concentration of greenhouse gas emissions to average global temperature on Earth is without question.

10.3.8. The need to address climate change is established through the Climate Change Act 2008; the UK has a legal commitment to decarbonise with legally binding targets in place to cut emissions (versus 1990 baselines) by 34% by 2020 and 100% by 2050 (Net Zero). This commitment is further enshrined in the UK's NDC (to reduce greenhouse gas emissions by at least 68% from 1990 levels by 2030 and as recently announced by the Prime Minister to reduce greenhouse gas emissions by at least 81% by 2035, compared to 1990 levels) and through the UK Low Carbon Transition Plan and the UK Clean Growth Energy Strategy. In April 2022 the UK Government further reinforced its commitment to addressing climate change through the British Energy Security Strategy. The Government's most recent Sixth Carbon Budget sets a target to reduce greenhouse gas emissions by 78% from 1990 to 2035 (including international aviation and shipping emissions). As indicated above the current Government has recently announced an acceleration of the decarbonisation of power generation to 2030 and has established Great British Energy and the Clean Power 2030 Advisory Commission. The Plan will aid the government in the delivery of its strategy for decarbonisation and to achieve the legally binding commitments set out in the Climate Change Act 2008.

10.3.9. In March 2019, the UK government announced its ambition to deliver at least 30GW of offshore wind by 2030, as part of the Offshore Wind Sector Deal. The Sector Deal reinforces the aims of the UK's Industrial Strategy and Clean Growth Strategy, which seeks to maximise the advantages for UK industry from the global shift to clean growth, and in particular: 'The deal will drive the transformation of offshore wind generation, making it an integral part of a low-cost, low-carbon, flexible grid system.' In April 2022, the British Energy Security Statement was released and the UK Government further committed offshore wind to 50GW by 2030. In July 2024 the Great British Energy (GBE) founding statement, in partnership with The Crown Estate, outlined aims to introduce new offshore wind developments, potentially delivering an additional 20-30GW of offshore wind seabed leases by 2030. As noted in the Alternatives table above, there is a need to have a plentiful pipeline due to the potential attrition of projects. The inclusion of a project on a 'future project pipeline' does not indicate that the project will go ahead, or if it does, at a particular generation capacity; attrition occurs for various reasons, including the time taken in the consenting process, financial reasons (too costly), construction reasons (too challenging) or supply chain issues. It is therefore not possible to conclude with any certainty that the ambitions set out in government policy, will be met by those projects currently under consideration by developers. Within this context, the importance of all offshore wind projects currently under development, to the achievement of Government policy and pledges, is clear. Without the CIP, it is very possible that delivery of the Sector Deal and the UK government's 2030 ambition will fall short. As set out in the National Policy Statement for Energy EN-1, Government has

confirmed that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure and that there is a need for a significant number of deliverable locations for CNP Infrastructure and for each location to maximise its capacity.

10.3.10. In October 2021, the UK government published The Net Zero Strategy: Build back Greener which set out the measures the former UK government planned to take to keep the UK on a path to net zero. In 2023 the UK Government also published Powering Up Britain: The Net Zero Growth Plan which set out an update to the existing strategies, focusing on the scale-up and deployment of technologies for decarbonising homes, power, industry and transport (Burnett et al., 2024). The former UK Government concluded that to reach these targets could require having to build out all currently known low carbon technologies in the power sector at or close to their maximum technical limits by 2035. Furthermore, as indicated above, in its recommendations to Government for the Sixth Carbon Budget, the Committee on Climate Change concluded that offshore wind is expected to become the “backbone” of the whole UK energy system, providing 65-70% of total generation by 2050; generating capacity for offshore wind is expected to be 100GW or more by 2050, with the CCC's five different scenarios ranging from 65GW to 140GW.

10.3.11. Another key objective of government policy is to ensure the security of UK electricity supply. The British Energy Security Strategy (HM Government, 2022) and Powering Up Britain – Energy Security Plan (HM Government, 2023) identify the importance of accelerating the delivery of clean energy, recognising its importance in delivering climate goals whilst simultaneously providing energy security and securing greater energy independence.

10.3.12. The Strategy includes various targets and ambitions, including raising the previous 40GW by 2030 target to 50GW by 2030, and the ambition that offshore wind will provide over half of the UK’s renewable generation capacity by 2030. It is the expectation, as outlined within the Strategy, that the offshore wind sector will grow to support around 90,000 jobs by 2030, help to reduce cost of energy to individual households and help to reduce reliance on Russian energy through an increase in domestic energy generation and clean jobs. The Plan supports this strategy and makes a significant contribution to the acceleration of clean energy generating capacity.

10.3.13. In July 2024, GBE was established, and their mission is to drive clean energy deployment, creating jobs, boosting energy independence and ensuring that communities experience the benefits of clean, secure home-grown energy. GBE is a government owned company and will be underpinned by statute. The GBE bill completed passage through the House of Commons in late October and is currently going through the House of Lords. The bill will give the Secretary of State for Department for Energy Security and Net Zero the ability to provide financial assistance to GBE to be set up and deliver benefits for the whole of the UK. It is the UK Government’s expectation that GBE will help to make Britain a clean energy superpower, deliver clean power by 2030 and accelerate to net zero. Among other

things, GBE will work in partnership with The Crown Estate in the pursuit of these objectives. The Plan supports this strategy.

10.3.14. In December 2024 the Government published the Clean Power Action Plan which set out the pathway and actions to deliver clean power by 2030 so that in a typical weather year:

- clean sources of energy produce at least as much power as Great Britain consumes in total and
- clean sources produce at least 95% of Great Britain's generation.

10.3.15. The CIP makes a significant contribution to the pathway set out in this Action Plan.

10.3.16. There is a clear public interest in the Plan proceeding. The Plan will provide a substantial contribution in the late 2020s towards achieving UK government policies, in particular achieving 50GW of offshore wind generating capacity by 2030 and more widely, the Government's Net Zero Strategy, the commitment to the decarbonisation of power generation by 2035 (and the recently announced target of clean power by 2030). The Plan implements national policy and will provide an essential public benefit.

Conservation Interest potentially at risk

Dogger Bank SAC and Margate and Long Sands SAC

10.3.17. The RIAA calculated for habitat loss and disturbance the impact from the Plan within the Dogger Bank SAC alone is 2.23 km^2, which equates to 0.018% of this feature's distribution within the Protected site and within Margate and Long Sands the impact from the Plan alone is 0.63 km^2, which equates to 0.15% of this feature's distribution within the Protected site. JNCC (undated) report that there are 20 sites in the UK where sandbanks which are slightly covered by sea water all the time (sandbanks) are a primary reason for site selection and a further 16 sites where this Annex I habitat is a qualifying feature, but not a primary reason for site selection - totalling 36 sites across the UK National Site Network.

10.3.18. Dogger Bank SAC is understood to comprise more than 70% of the UK Annex I sandbank resource (Barnfield et al, 2021). Based on the figure for the total estimated area of Annex I sandbank in the UK of 17,090 km^2 (JNCC, 2013), Dogger Bank (area of 12,331 km^2) is calculated to represent 72.2% of all UK Annex I sandbank resource. On this basis, loss of an estimated worst case 2.23 km^2 of sandbank habitat from Dogger Bank would represent 0.013% of total UK Annex I sandbank. This estimate may need to be considered in the context of the particular importance of Dogger Bank to the Marine Protection Area (MPA) network arising from the fact that Dogger Bank was formed by geological, glacial processes prior to being submerged through sea level rise and is therefore a different sub-type of Annex I sandbank feature compared to other sites (Barnfield et al, 2021).

10.3.19. The in-combination assessment has considered the current unfavourable condition of the Annex 1 sandbank feature of Dogger Bank SAC and the existing pressures on the feature, as set out in the supplementary advice on conservation objectives, including the development of offshore wind, historic fishing activities and oil and gas activities. It is noted that measures have been put in place (including the management of mobile demersal fisheries through a fisheries bylaw) which seek to address some of the pressures and encourage recovery of the feature.

10.3.20. Margate and Long Sands SAC is understood to comprise between 2-15% of the national Annex I sandbank resource (Natural England, 2010). Based on the figure for the total estimated area of Annex I sandbank in the UK of 17,090 km^2 (JNCC, 2013), Margate and Long Sands SAC (area of 410km^2) is calculated to represent 2.39% of all UK Annex I sandbank resource. On this basis, loss of an estimated worst case 0.63 km^2 of sandbank habitat from Margate and Long Sands would represent 0.0036% of total UK Annex I sandbank.

10.3.21. All offshore sandbanks are within five SACs that all have restore conservation objectives for the Annex I feature and condition assessments (low confidence) undertaken suggest that sandbanks are highly disturbed due to widespread fishing (JNCC, 2019). Feature condition of Annex I sandbank habitats across the National Site Network is noted as under half of the coverage is in good condition (8260 km^2) and over half is in not-good condition (8865 km^2). The remaining coverage condition was not known (15km^2). JNCC (2019) noted that the short-term trend of habitat area in good condition is decreasing, and this was based on mainly expert opinion with very limited data.

Alde-Ore Estuary SPA

10.3.22. Worst case mortalities reported in the RIAA (not including mitigation) have been used (6.55 –24.77) to establish percentage loss of lesser black-backed gull at the SPA. Using the population listed on the SPA citation results in 0.05 -0.18% (6.55 – 24.77/14070*100 = 0.05 - 0.18%); using the latest count data from Burnell et al (2023) results in 0.37 – 1.4% (6.55 – 24.77/1767*100= 0.37 – 1.4%). There are a total of 8 sites (as of January 2025) across the UK National Site Network where lesser black-backed gulls are a feature within an SPA.

10.3.23. Based on the figures above the total estimated impact from collision risk on lesser black-backed gull population, within the National Site Network, in the UK is 0.02-0.06%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for lesser black-backed gull demonstrates a +40.3% increase in population, unfortunately the short-term trend (1999 to 2011) for UK populations is unknown for lesser black-backed gull.

Farne Islands SPA

10.3.24. Worst case mortalities reported in the RIAA (not including mitigation) have been used (5.45 –27.42) to establish percentage loss of guillemot at the SPA. Using the population listed on the SPA citation results in 0.02- 0.08% (5.45 –27.42/32875*100 = 0.02- 0.08%); using the latest count data from Burnell et al (2023) results in 0.009 – 0.04% (5.45 – 27.42/64042*100= 0.009 – 0.04%). There are a total of 37 sites (as of 2025) across the UK National Site Network where guillemot are a feature within an SPA.

10.3.25. Based on the figures above the total estimated impact from collision risk on guillemot population, within the National Site Network, in the UK is 0.0009-0.005%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for guillemot demonstrates a 15.4 % decline in population and in the short term (1999 to 2011) there was a 6.6% increase in UK populations.

Flamborough and Filey Coast SPA

10.3.26. The worst-case collision mortalities reported in the RIAA (not including mitigation) have been used (58.06-115.08) to establish percentage loss of kittiwake at the SPA. Using the population listed on the SPA citation results in 0.07 - 0.13% (58.06-115.08/89,040*100 = 0.07 - 0.13%); using the latest count data from Aitken et al (2017) results in 0.06 –0.11% (58.06-115.08/103,070*100= 0.06 – 0.11%). There are a total of 32 sites (as of 2025) across the UK National Site Network where kittiwake are a feature within an SPA, with a total estimated population of 169,581 breeding pairs, of which Flamborough and Filey Coast SPA supports approximately 27%, and is the largest single colony within the SPA Network in England, Wales and Northern Ireland (JNCC, 2024a).

10.3.27. Based on the figures above the total estimated impact from collision risk on kittiwake population, within the National Site Network, in the UK is 0.02-0.05%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for kittiwake demonstrates a 24.8% decline in population and in the short term (1999 to 2011) there was a 46.6% decline in UK populations.

10.3.28. The worst-case collision mortalities reported in the RIAA (not including mitigation) have been used (4.39 – 29.69) to establish percentage loss of gannet at the SPA. Using the population listed on the SPA citation results in 0.05 - 0.35% (4.39 – 29.69/8469*100 = 0.05 - 0.35%); using the latest count data from Stroud et al (2023) results in 0.03 – 0.22% (4.39 – 29.69/13,393*100= 0.03 – 0.22%). There are a total of 12 sites (as of 2025) across the UK National Site Network where gannet are a feature within an SPA.

10.3.29. Based on the figures above the total estimated impact from collision risk on gannet population, within the National Site Network, in the UK is 0.002-0.01%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016)

noted that the long term (1985-1988 to 1998-2002) UK trend for gannet demonstrates a 39% increase in population and in the short term (1999 to 2011) there was a 11% increase in UK populations.

10.3.30. The worst-case collision mortalities reported in the RIAA (not including mitigation) have been used (8.15 – 39.68) to establish percentage loss of guillemot. Using the population listed on the SPA citation results in 0.02 - 0.1% (8.15 – 39.68/41,607*100 = 0.02 - 0.1%); using the latest count data from Stroud et al (2023) results in 0.01 – 0.05% (8.15 – 39.68/84647*100= 0.01 – 0.05%). There are a total of 37 sites (as of 2025) across the UK National Site Network where guillemot are a feature within an SPA.

10.3.31. Based on the figures above the total estimated impact from collision risk on guillemot population, within the National Site Network, in the UK is 0.001-0.007%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for guillemot demonstrates a 15.4 % decline in population and in the short term (1999 to 2011) there was a 6.6% increase in UK populations.

10.3.32. The worst-case collision mortalities reported in the RIAA (not including mitigation) have been used (3.63 – 19.21) to establish percentage loss of razorbill. Using the population listed on the SPA citation results in 0.03 - 0.18% (3.63 – 19.21/10,570*100 = 0.03 - 0.18%); using the latest count data from Stroud et al (2023) results in 0.01 – 0.07% (3.63 – 19.21/27,967*100= 0.01 – 0.07%). There are a total of 19 sites (as of 2025) across the UK National Site Network where razorbill are a feature within an SPA.

10.3.33. Based on the figures above the total estimated impact from collision risk on razorbill population, within the National Site Network, in the UK is 0.004-0.023%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for razorbill demonstrates a 21.3 % increase in population and in the short term (1999 to 2011) there was a 7.5% increase in UK populations.

Greater Wash SPA

10.3.34. Worst case mortalities for sandwich tern reported in the RIAA (not including mitigation) were listed as 0.6 – 16.47. As discussed above, however, where the Secretary of State has determined that a central value is suitably precautionary this has been considered and, if appropriate, used to determine the scale of impact. In this case, the SEP & DEP DCO estimate is 5.5 birds so to establish percentage loss of sandwich tern at the SPA the quantum accepted by the Secretary of State in the DCO has been used. Using the population listed on the SPA citation results in 0.14% (5.5/3,852*100 = 0.14%). There are a total of 23 sites (as of 2025) across the UK National Site Network where Sandwich tern are a feature within an SPA.

10.3.35. Based on the figures above the total estimated impact from collision risk on sandwich tern population, within the National Site Network, in the UK is 0.05%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for Sandwich tern demonstrates a 15.4% decline in population and in the short term (1999 to 2011) there was a 6.6% increase in UK populations.

North Norfolk Coast SPA and Ramsar

10.3.36. Worst case mortalities for sandwich tern reported in the RIAA (not including mitigation) were listed as 0.6 – 16.66. As discussed above, however, where the Secretary of State has determined that a central value is suitably precautionary this has been considered and, if appropriate, used to determine the scale of impact. In this case, the SEP & DEP DCO estimate is 5.54 birds so to establish percentage loss of Sandwich tern at the SPA the quantum accepted by the Secretary of State in the DCO estimate has been used. Using the population listed on the SPA citation results in 0.15% (5.54/3,700*100 = 0.15%); using the latest count data from Stroud et al (2023) results in 0.01 – 0.36% (5.54/4685*100= 0.12%). There are a total of 23 sites (as of 2025) across the UK National Site Network where Sandwich tern are a feature within an SPA.

10.3.37. Based on the figures above the total estimated impact from collision risk on sandwich tern population, within the National Site Network, in the UK is 0.05%. This calculation is based on the UK SPA population as reported in Stroud et al. (2016). Stroud et al. (2016) noted that the long term (1985-1988 to 1998-2002) UK trend for Sandwich tern demonstrates a 15.4% decline in population and in the short term (1999 to 2011) there was a 6.6% increase in UK populations.

Outer Thames Estuary SPA

10.3.38. The implications of disturbance reported in the RIAA (not including mitigation) identified that the North Falls array area (which falls outside of the Outer Thames Estuary SPA), is 4.5km away from the Protected site. The overlap between the SPA and the 12km buffer around North Falls covers 108.7km^2, which is equivalent to 2.8% of the SPA area. NIRAS identified (using Natural England's displacement gradients), the effective displacement area for North Falls is 35.64km^2, which represents approximately 0.9% of the SPA area. Using 1% mortality rate for displaced birds during the non-breeding season resulted in the maximum predicted increase in the SPA mortality rate from displacement at North Falls as 0.02%, equating to an additional 1.07 birds annually.

10.3.39. There are a total of 24 sites (as of 2025) across the UK National Site Network where red throated diver are a feature within an SPA, of which 6 are designated for overwintering (non-breeding) populations. Eaton et al. (2023) noted a weak increase in breeding birds (+38%) over 12 years from 1994-2006 for red throated divers and winter ranges over the long term (1981-1984 to 2007-2011) UK trend for red throated diver population increasing by 32% (Goodship and Furness, 2022).

Does the public interest 'override'?

10.3.40. The impacts outlined above for sandbank features of Dogger Bank SAC and Margate and Long Sands, and multiple ornithological species at Alde-Ore Estuary SPA, Farne Islands SPA, Flamborough and Filey Coast SPA, Greater Wash SPA, North Norfolk Coast SPA and Outer Thames Estuary SPA represent adverse effects on site integrity. However, considering these conservation interests across the UK National Site Network demonstrates that the percentage loss of these features is, in proportion terms, small across the UK. Notwithstanding this, for some of these features there are important considerations to take into account.

10.3.41. Annex I sandbanks slightly covered by seawater at all times are a relatively widespread habitat across the UK. However Dogger Bank SAC is a sub-type of Annex I sandbank (see 10.3.18) and is considered a one-of-a-kind habitat within the UK National Site Network with a number of recognised existing pressures, as such this carries a greater conservation interest than the main feature. The Supplementary Advice on Conservation Objectives for Dogger Bank notes that the Dogger Bank provides ecosystem services, including nutrition for fish species, seabirds and marine mammals, although it is not unique in this regard. To note Margate and Long Sands is only the main feature of Annex I sandbank and is dissimilar to Dogger Bank SAC.

10.3.42. Kittiwake have a widespread range across the UK but have experienced decline in abundance, with regional variations, since 1986. Abundance for the UK declined rapidly from 1995, reaching the lowest values in 2013. Since then, abundances have increased overall but are still 50% below the 1986 baseline (JNCC, 2021). Due to the decline of kittiwake populations and the increasing proportion of the total breeding population being present at Flamborough and Filey Coast SPA, this increases the conservation interest of the feature.

10.3.43. Lesser black backed gull are widespread across the UK but have experienced fluctuation in abundance since 1986 with regional variations. The UK trend between census data demonstrates an increase in population from 1985-2002, however in Wales two of the largest colonies have declined by 46 and 56%, with similar observations in England (98% decline at a major colony) and Scotland (64% decline at the largest colony in Scotland) (JNCC, 2021). Due to the relative decline of lesser black-backed gull populations this increases the conservation interest of the feature.

10.3.44. Gannet are present around much of the UK coastline and in large numbers in Scotland. The UK population of gannet has continued to increase since 1986, with significant increases in England (217%) Scotland (33%), and Wales (21%) between 2003/04 to 2013/4 (JNCC, 2021). In the longer term the UK population is experiencing a relative increase in abundance, not accounting for the implications of Highly Pathogenic Avian Influenza (HPAI) on gannet. Gannet were one of the worst hit species of the 2022 breeding season with 11,000 deaths recorded in Scotland and 5,000 recorded in Wales.

RSPB surveys highlight 25% decline in breeding numbers at sites surveyed across the UK in 2023 (RSPB, 2024). Due to the recent decline of gannet populations this increases the conservation interest of the feature.

10.3.45. Guillemot are present around much of the UK coastline and have experienced decline between 1986 and 1990 to the lowest point of 28% below the baseline. Following this, abundances increased gradually and reaching 41% above the baseline (2001). The UK abundance has been stable until 2015 when it began to increase again, reaching its highest value to date in 2019, at 98% above the 1986 baseline (JNCC, 2021). Regional variation masks significant declines in abundance in Scotland due to increases in England, Wales and Northern Ireland. In the shorter term the UK population is experiencing an increase in abundance.

10.3.46. Razorbill are found in large numbers in Scotland but generally widespread around the coast of the UK. The UK population of razorbill was relatively stable between 1986 and 1998, before declining to a low point in 2008. However, since then, the population has increased, but not to the level of the 1990s, and continues to increase (JNCC, 2021). As above regional variation masks significant declines in abundance in Scotland due to increases in England and Wales. In the shorter term the UK population is experiencing an increase in abundance.

10.3.47. Sandwich tern are a seasonal visitor to the UK and between 1986 and 2008 the UK population experienced decline from 20% above the 1986 baseline (1988) to 20% below (1995) but since then has gradually increased to 8% above the baseline (2002). Since 2002 the UK population has fluctuated considerably until 2015 when it was at the same level as 1986 (JNCC, 2021).

10.3.48. Red-throated diver have a small breeding population in Scotland (1250 pairs: 2006) and during the winter months a larger number of birds join the population (22,000: 2011 to 2015) and can be found all around the UK coastline and a high proportion of these off the east coast. Population ranges of red throated diver over the long-term during winter (1981-1984 to 2007-2011) increased by 32% (Goodship and Furness, 2022).

10.3.49. Turning to the public interest in the Plan proceeding, the strategy to significantly increase offshore wind generating capacity is part of a fundamental national policy with long term public benefit which protects the environment and public health from the consequences of climate change and ensures public safety. In addition, the Plan will:

- Provide a significant contribution to limiting the extent of climate change in accordance with the objectives of the Paris Agreement;
- Be essential for meeting the UK's NDC for the period 1 January 2021 - 31 December 2030 and contribute significantly to the trajectory for meeting the UK's NDC out to 2035;
- Help to achieve the UK government's ambitions in the British Energy Security Strategy (2022);

- Help to ensure the Government's Sixth Carbon Budget target is met to reduce greenhouse gas emissions by 78% from 1990 to 2035 (including international aviation and shipping emissions); and
- Help to enable the Government's Net Zero Strategy including the decarbonisation of power generation by 2035 (and the recently announced earlier target of clean power by 2030).

10.3.50. The Crown Estate has considered if there are IROPI for the Plan to proceed and is satisfied that there are. In arriving at this decision The Crown Estate has considered that the Plan provides a public benefit which is essential and urgent despite the harm to the integrity of sandbank features of Dogger Bank SAC and Margate and Long Sands, and multiple ornithological features at Alde-Ore Estuary SPA, Farne Islands SPA, Flamborough and Filey Coast SPA, Greater Wash SPA, North Norfolk Coast SPA and Outer Thames Estuary SPA.

10.3.51. Consequently, based on the reasons noted above The Crown Estate is satisfied that the Plan is supported by IROPI related to human health, public safety or beneficial consequences of primary importance to the environment.

10.4. Compensatory Measures

10.4.1. Where it is proposed to proceed with a plan or project notwithstanding AEOI in relation to a Protected site, Regulation 68 of the Habitats Regulations and Regulation 36 of the Offshore Habitats Regulations requires that the necessary compensatory measures are taken to offset the damage which will or could be caused to the site and ensure that the overall coherence of the UK National Site Network is protected and maintained.

10.4.2. The Crown Estate has now concluded that it cannot exclude an AEOI in relation to the following site / feature combinations:

- Dogger Bank SAC: Sandbanks which are slightly covered by seawater all the time;
- Margate and Long Sands SAC: Sandbanks which are slightly covered by seawater all the time;
- Flamborough and Filey Coast SPA: Kittiwake (breeding); guillemot (breeding); razorbill (breeding); gannet (breeding); seabird assemblage (breeding);
- Farne Islands SPA: Guillemot (breeding);
- Alde-Ore Estuary SPA: Lesser black-backed gull (breeding);
- Outer Thames Estuary SPA: Red-throated diver (wintering);
- North Norfolk Coast SPA: Sandwich tern (breeding); and
- Greater Wash SPA: Sandwich tern (breeding).

10.4.3. As this is a Plan-level HRA, detailed design and site-specific survey information is not yet available for all of the Projects. The Projects are at different stages in the consenting process (see Table 1). The conclusions of The Crown Estates AA are based on a combination of the project-level assessments that have already been carried out and higher-level assessments carried out where project level assessments are not available. While a precautionary, worst-case approach has been taken to the AA and the conclusions of the AA with regard to AEOSI are unlikely to change as a result of additional design and assessment work at project level, an adaptable approach to compensation is required to reflect the fact that the quantum of compensation could change once all of the projects have DCOs.

10.4.4. For projects that do not yet have a DCO, The Crown Estate has identified measures to compensate for the predicted adverse effects of the Plan that those projects contribute to based on the information available at the time of The Crown Estates AA. Once a DCO has been granted, the Plan-level compensation requirement for each project will be reviewed so that the quantum is consistent with the requirements secured in the DCO.

10.4.5. For projects with a DCO consent, The Crown Estate has already considered the findings of the Secretary of State for the scale and nature of compensation and agrees with these findings. These compensation measures have been referred to in Section 10.4 as evidence that compensation is available for the effects of the Plan that those projects contribute to.

10.4.6. All projects that contribute to an in-combination AEOI finding in relation to the Plan will be liable to compensate for those effects via conditions in the AfLs and/or Leases but the quantum of that compensation will be determined by a "Compensation Plan"; this will reflect the requirements of the DCOs, unless there is a need for additional compensation for an effect of the Plan. The Crown Estate will have oversight of the Compensation Plan, and the Compensation Plan can be adjusted accordingly to reflect the project DCOs once approved. The Compensation Plan will be secured in the legal agreements.

10.4.7. These conclusions are based on a precautionary, worst-case approach but The Crown Estate acknowledges that the Plan includes projects that are at different stages of the consenting process and consequently the project parameters, the project impacts, and their compensation requirements may be refined to a greater or lesser degree by the time that the projects are consented. As such, while all projects that contribute to the above AEOI findings in relation to the Plan will be liable to compensate for those effects, an adaptable approach to the scale and location of compensatory measures will be adopted. Measures will be secured in a Compensation Plan to which developers will be conditioned in the legal agreements and the Compensation Plan will be monitored and adapted to reflect the project DCOs.

10.4.8. To give confidence that compensatory measures will fully compensate for the negative effects of the Plan on Protected sites, The Crown Estate considers that the Plan must provide evidence that effective and deliverable compensatory measures are available. This section does, therefore, consider the scale of impacts; the nature of the adverse effects on the conservation objectives; the risks to the coherence of the network and potential compensatory measures.

10.4.9. In anticipation that it may have to consider a derogation for the Plan, The Crown Estate asked its technical advisors NIRAS to identify possible compensatory measures for the adverse effects identified in the RIAA. In response, NIRAS produced a technical note including potential compensatory measures for consultation with the EWG in October 2024 (NIRAS, 2024d). This work identified a range of measures to compensate for the impacts identified in the RIAA, without prejudice to the outcome of The Crown Estates AA.

10.4.10. Where compensation measures have been secured in the project DCOs already, or without prejudice compensation plans have been submitted for individual projects, these are summarised below.

10.4.11. It should be noted that when the projects are assessed together as a Plan, the predicted impacts may be greater than those predicted in the assessments of the individual projects. This is primarily due to the different plans and projects included in the in-combination assessments. Where this occurs, there will be a need for plan-level compensation in addition to any project-level compensation requirements. Any additional compensation required for the Plan will also be secured in the Compensation Plan referenced above, and to which developers will be conditioned in the legal agreements.

Dogger Bank SAC and Margate and Long Sands SAC: Sandbanks which are slightly covered by seawater all the time

10.4.12. The predicted effect of the Plan on sandbanks which are slightly covered by seawater all the time (sandbanks) at Dogger Bank SAC and Margate and Long Sands SAC is both loss and damage of sandbank habitat. The predicted scale of habitat loss and damage from the Plan is 2.23 km^2 and 22.3 km^2 respectively, for Dogger Bank SAC; and 5.4 km^2 and 0.63 km^2 respectively, for Margate and Long Sands SAC. This would undermine the conservation objectives of these sites due to a reduction in extent of this designated feature. The objective of compensation is to ensure that the ability to restore the sandbank features of the National Site Network to a favourable conservation status is not compromised.

10.4.13. The following measures were proposed at project level to compensate for the effects of Five Estuaries on Margate and Long Sands SAC (GoBe, 2024):

- Extending an SAC;
- Removal of anthropogenic pressures;
- Redundant infrastructure removal;
- Aggregate pressure removal; and
- Seagrass restoration.

10.4.14. NIRAS identified a range of compensatory measures for sandbanks in the Compensation Note that accompanied the RIAA. The following measures are potentially available to compensate for the identified effects:

- Removal of structures;
- Removal of debris;
- Enhancement of existing habitat;
- Reduction of other pressures from other activities (e.g. reserve creation and associated restrictions); and
- New SAC designation (including extension to existing sites).

Plan level measures

NIRAS identified the following measures which could compensate for the maximum effects predicted to result from the Plan.

SAC extensions/ new SAC Designation

10.4.15. The Crown Estate considered the options for compensating for effects on sandbanks during the development of the Round 4 Dogger Bank Strategic Compensation Plan (TCE, 2024). It concluded that MPA site extension or designation is the preferred option to compensate for effects on sandbanks. The Crown Estate remains of this view and considers that such compensation for the effects of the Plan could be implemented strategically. The implementation of this measure would be led by Defra.

10.4.16. Defra are responsible for new MPA designations and MPA extensions. The Government have committed to designating new MPAs and/or extending existing MPAs to deliver

sufficient strategic compensation to compensate for likely environmental effects of offshore wind development, including those for projects included within the Capacity Increases Plan related to Offshore Wind Leasing Round 3 and Offshore Wind Extensions programmes, amongst others (UK Government, 2025).

10.4.17. Defra, in collaboration with JNCC and Natural England, identify potential sites based on their ecological importance. Sandbanks that are slightly covered by seawater all the time are considered based on their ability to support marine life and contribute to the overall health of the marine ecosystem. Stakeholder consultations are used to ensure that the proposed MPAs have broad support and any potential social and economic impacts of are considered. The boundaries are drawn to encompass the areas of highest ecological value based on the data available at the time. However, boundaries can change based on new scientific information or changes in environmental conditions.

10.4.18. New site designations or extensions aim to provide protection to Annex I sandbank habitat that is not already inside of the existing Marine Protected Area (MPA) network. In doing so, the integrity of the MPA network can be maintained, despite the loss and damage to sandbank habitat within SACs. New sites would be afforded the same level of environmental protection as other designated sites, and newly designated areas of the marine environment would be subject to nature conservation law and enforcement.

10.4.19. The entire Dogger Bank SAC has been designated for Annex I sandbank habitat, therefore any new designation for sandbanks here would have to be located outside of the existing SAC boundary. Areas of search for site extension or new designations were identified in the Round 4 Dogger Bank Strategic Compensation Plan (NIRAS 2024e). It was determined that an area of over 3,000 km^2 to the north of Dogger Bank SAC contains habitat was consistent with Annex I sandbank and could be suitable for an extension to Dogger Bank SAC.

10.4.20. Cable routing for Dogger Bank D may overlap the area to the North. As such, any designation to the north of the current SAC would need to consider loss and damage associated with export cable routing through that area. However, there is sufficient available sandbank habitat to more than offset the loss and damage associated with the cable routing for Dogger Bank D.

10.4.21. Other areas of sandbank were identified that may be suitable for an extension to an existing site or new site designation, these include:

- Between North Norfolk Sandbanks and Saturn Reef SAC and Inner Dowsing, Race Bank and North Ridge SAC;
- North of Inner Dowsing, Race Bank and North Ridge SAC;
- West of Haisborough, Hammond and Winterton SAC;
- North and east of The Wash and North Norfolk Coast SAC;
- Between Essex Estuaries SAC and Margate and Long Sands SAC;

- From the Strait of Dover north to a point approximately 17 km east of Alde Ore and Butley Estuaries SAC.

10.4.22. Whilst The Crown Estate cannot designate or extend MPAs, it does have control over the seabed for the areas identified above and would support a designation in these areas.

10.4.23. There is confidence that sufficient compensation can be provided through site extensions or new site designations to compensate for the impacts to the sandbank features of Dogger Bank SAC and Margate and Long Sands SAC. This includes any compensation multiplier likely to apply, based on the Dogger Bank Strategic Compensation Plan (NIRAS, 2024a): however, it is noted that, in response to a consultation on the draft RIAA, JNCC/Natural England highlighted that '*whilst JNCC are working with Defra to find potential sites that could be designated as a means of providing compensation for benthic habitats, there is no guarantee that the most ecologically meaningful sites (i.e. those that directly benefit sandbank habitat) will be chosen for designation as a suite of sites will need to be put forward for consultation*.'

10.4.24. The information above on compensation measures demonstrates that individual measures are available to fully compensate for the effects of the Plan on sandbanks.

10.4.25. It should be noted that the designation and extension of Marine Protected Areas in English waters has been approved by Defra Secretary of State into the library of offshore wind strategic compensation measures as well as commitment in a Defra Ministerial Statement for the delivery of sufficient MPA designations and/or extensions to provide strategic compensation for likely benthic environmental impacts resulting from offshore wind developments (UK Goverment, 2025).The establishment of strategic compensation for offshore wind was provided for in the Energy Security Act 2023, and is being progressed by Defra, providing additional security that a delivery mechanism is available.

10.4.26. Several additional measures are available which could be included in a package of measures where a single measure cannot be secured. Details of these measures are presented below.

Site extension or designation combined with restriction of fishing activities

10.4.27. The use of byelaws to restrict fishing activity is being explored as a potential compensation measure by the Collaboration on Offshore Wind Strategic Compensation ("COWSC"). However, the use of byelaws to restrict fishing may not be possible in isolation from site extension or designation. This measure can only be delivered by Defra in conjunction with the Marine Management Organisation ("MMO"). The process for measuring the success of the restriction of activities will be determined by Defra in conjunction with the MMO (NIRAS 2024d). Defra has not yet committed to implementing this measure.

10.4.28. On 13th June 2022 the 'Dogger Bank Special Area of Conservation (Specified Area) Bottom Towed Fishing Gear Byelaw 2022' came into force, prohibiting towed fishing from

Dogger Bank SAC. As such, this measure would need to be delivered outside of Dogger Bank SAC to protect an area of Annex I Sandbank that is not already protected from fishing. However, there are SACs designated for the protection of Annex I sandbanks which are not covered by existing MMO or Inshore Fisheries and Conservation Authorities' (IFCA) byelaws, and for which there aren't currently plans for new byelaws. Moreover, there is variation in what is allowed under IFCA byelaws, and in some cases management measures stop short of prohibiting the use of bottom towed fishing gear, and such equipment can be used under licence. As such, there are sites within the MPA network where further restrictions could be put in place to prohibit the use of towed fishing gear. Furthermore, pressure from fishing activities, including the use of bottom towed gear, are prevalent throughout UK waters and have the potential to impact large areas of Annex I sandbank habitat. Existing evidence includes the use of multiple types of fishing gear and further work may be needed to understand where fishing gear are being deployed (Appendix D; NIRAS 2024d).

10.4.29. Whilst site extension or designation could provide 100% of the required compensation, for the effects of the Plan, restrictions to fishing activities could provide additional compensation if required. If fishing is not compatible with the conservation objectives of a site, the MMO will introduce management which may include making a byelaw (MMO, 2024). To meet the requirement of additionality, fishing byelaws must be implemented at a site or multiple sites with sufficient Annex I sandbank habitat, where fishing byelaws would not otherwise be implemented as part of regular site management. Site selection for the implementation of fishing byelaws as a compensation measure would be performed by the MMO.

10.4.30. There is a defined process for the implementation of fishing byelaws, which includes a public call for evidence and stakeholder consultation before the byelaw is made and submitted to the Secretary of State (MMO, 2024). This process can be time consuming, but the MMO can introduce an emergency or interim byelaws when there is urgent need to protect a feature. Emergency or interim byelaws do not require public consultation, can be implemented within 6 weeks and can remain in force for 12 months, although this can be extended by up to 6 months (MMO, 2024). However, emergency or interim byelaws are not intended to be used for the purpose of implementing compensation measures.

Site extension or designation combined with restriction of fishing activities and seagrass restoration

10.4.31. Whilst the implementation of seagrass restoration is improving, there remain uncertainties regarding the restorability of seagrass habitats, including the scale of habitat that can be restored, whether it could become self-sustaining and over what timeframe this could be achieved.

10.4.32. Given that seagrass is not present within Dogger Bank SAC, any seagrass restoration for compensation purposes would take place at other sites. Potential locations for seagrass restoration were mapped using the Environment Agency's 'Potential Seagrass' data layer (Environmental Agency, 2021) as part of the Round 4 compensation package (NIRAS, 2024e). The JNCC and Natural England recommended that any seagrass restoration

included within for Round 4 be subtidal because of the closer relevance to Annex I sandbank in terms of ecological function and position on the compensation hierarchy. Furthermore, in response to a consultation on the draft RIAA, JNCC stated that '*Seagrass restoration is not an adequate compensation measure for the loss of Annex I sandbank habitat (it is not and never has been present within the Dogger Bank SAC).*'

10.4.33. NIRAS advised that seagrass restoration could provide a small percentage of the required compensation for the effects on sandbanks and this measure could be delivered directly by project developers, or through developer funding of existing restoration schemes. Compensation delivered through an existing programme would need to demonstrate additionality beyond the exiting restoration activities. For example, funding could support a new or extended area.

10.4.34. Developer-led seagrass restoration would involve further investigation of the site conditions and pressures to select a suitable site. However, even sites with the most suitable conditions may require further reduction of pressures (e.g. relocating moorings, improving water quality, excluding trawling and dredging) to maximise the chances for successful establishment.

10.4.35. Delivering compensation through an existing project would place resources in the hands of those with the greatest knowledge and experience, who have already been through the site selection process and project planning stages. It should be noted that, in either case, there are uncertainties regarding the timescale for a seagrass meadow to be restored and become self-sustaining.

Summary

10.4.36. The Crown Estate has considered the information presented in the Compensation Note (NIRAS, 2024d) and is content that MPA designations or extensions have the potential to meet the key criteria for compensation outlined in the draft Defra guidance (2021). The application of this measure to offshore wind development has been approved by the Defra Secretary of State within the library of offshore wind compensatory measures. In the recent Ministerial Statement (UK Government, 2025) Defra also committed to the delivery of sufficient MPA designations and/or extensions to provide strategic compensation for likely benthic environmental impacts resulting from offshore wind developments. Alternatively, new designations/ SAC extensions could be combined with other measures that reduce other pressures known to adversely affect sandbank habitats, or habitat restoration measures. In a review of potential compensation measures Five Estuaries concluded that MPA designations or enhancements are the most viable compensation measures for the effects of the Project but can only be delivered strategically by Defra (GoBe, 2024). The review undertaken for the Round 4 Dogger Bank Strategic Compensation Plan (NIRAS 2024e) provides evidence that there is a mechanism for this measure to be delivered strategically through government initiatives that are currently being established.

Flamborough and Filey Coast SPA: Kittiwake

10.4.37. The predicted effect of the Plan on the kittiwake feature of the Flamborough and Filey Coast SPA is a collision mortality of up to 115.08 birds per annum. The AA concluded that this would undermine the conservation objective to restore or maintain the kittiwake population and result in an AEOI for the Plan alone and in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain or restore the population of kittiwake is not compromised.

10.4.38. Measures identified by the projects in the Plan include collaborating with RWE on the Dogger Bank South OWF project (Leasing Round 4) to modify or increase the capacity of the 'Gateshead Tower' artificial nesting structure, which is already installed at Saltmeadows on the River Tyne. This measure has been approved by the Secretary of State and secured through the DCO for the Sheringham Shoal and Dudgeon Offshore Wind Farm Extension projects. It is envisaged that a steering group (the Offshore Ornithology Engagement Group) will oversee the delivery of the implementation and maintenance of this compensation measure, as well as any ongoing monitoring and reporting.

10.4.39. Other measures considered by the projects include:

- Increasing prey availability through fishery management;
- Providing a monetary contribution to strategic compensation through the Marine Recovery Fund (MRF);
- Improving key kittiwake habitat within Flamborough and Filey Coast SPA;
- Improving key kittiwake habitat outside the Flamborough and Filey Coast SPA;
- Improving kittiwake breeding success through reducing avian predation; and
- Improving kittiwake breeding success through supplementary feeding.

10.4.40. NIRAS identified the following compensatory measures for the kittiwake feature of Flamborough and Filey Coast SPA in its Compensation Note:

- Offshore artificial nesting structures;
- Management of fisheries/ enhancements to increase prey availability;
- Predator eradication/exclusion and biosecurity;
- Improving nesting locations; and
- Reduction of recreational activity disturbance and visitor pressure.

Plan level measures

10.4.41. NIRAS identified the following measures which could compensate for the maximum impacts predicted to result from the Plan (>100 individuals). Other measures, which could compensate for the effects of an individual project or could form part of a package of measures, are presented in a separate section below.

Offshore artificial nesting structures

10.4.42. Kittiwake breed on offshore structures such as oil and gas platforms. Newly constructed offshore artificial nesting structures were one of the proposed measures to offset collision mortality for kittiwake associated with the Round 4 plan level strategic compensation (NIRAS, 2024e).

10.4.43. Despite multiple offshore wind farms proposing offshore artificial nesting structures as compensation (such as Hornsea Four (Ørsted, 2022a)), there remains a large amount of uncertainty about the extent of kittiwake nesting on existing offshore platforms, and the design features that encourage colonisation. Furthermore, it is essential to consider platform location and the potential for inadvertently increasing collision risk at nearby wind farms, or posing an elevated bird strike risk, such as with helicopters if using operational oil and gas platforms. When considering the feasibility of re-purposing marine infrastructure as a compensation measure, difficulties relating to the reclassification of oil and gas infrastructure, existing decommissioning obligations, health and safety risks and liability concerns have prevented progress. If new artificial nesting structures are to be erected offshore, further impacts must be considered, including construction disturbance impacts and the location of MPAs. These factors could limit the number of suitable locations, particularly when the location of future offshore windfarms is considered.

10.4.44. The colonisation timeline for offshore artificial nesting structures is more uncertain compared to onshore structures. A newly constructed oil platform in northern Norway was colonised by breeding kittiwakes within four years (MacArthur Green, 2021), suggesting that colonisation rates offshore could be comparable to those onshore. In this case, the colonisation of the offshore platform occurred despite a decline in breeding at natural sites in the region, potentially indicating a preference for offshore nesting structures. However, most information regarding kittiwake colonisation of offshore structures remains anecdotal.

10.4.45. It should be noted that the establishment of offshore artificial nesting structures has been approved by Defra Secretary of State into the Library of Offshore Wind Strategic Compensation measures for projects up to and including Round 4, encompassing CIP. This measure is being progressed with the development of an Implementation and Delivery plan, under the COWSC.

Management of fisheries/ measures to increase prey availability

10.4.46. Reduced sand eel abundance due to fishing pressures in the Dogger Bank and southern North Sea (Lindegren et al., 2018) is considered largely responsible for the decreased breeding success of kittiwakes at Flamborough and Filey Coast SPA (Carroll et al., 2017). Closing the sand eel fishery or managing the fishery to reduce its impact in areas where kittiwakes forage would facilitate the recovery of sand eel stocks, thereby increasing prey availability for kittiwakes and potentially enhancing regional colony productivity, including at Flamborough and Filey Coast SPA. In this context, managing the local sand eel fishery could strengthen the southern North Sea kittiwake metapopulation, resulting

in a higher number of breeding adults recruiting to colonies along the east coast of England. This measure could directly benefit the kittiwake population currently breeding at Flamborough and Filey Coast SPA. This measure could be considered a form of compensation that fulfils the highest level of the preference hierarchy as defined in Defra (2021a).

10.4.47. Management of fisheries to increase prey availability was recommended by the Round 4 Strategic Kittiwake Compensation Plan (NIRAS, 2024e) as the most ecologically beneficial measure to offset the impacts associated with the Round 4 Plan, with potential to also serve as a measure for impacts associated with additional projects.

10.4.48. Defra announced new plans on 31 January 2024 for a permanent closure of sand eel fisheries in English waters of the North Sea. As such, there is potential that the management of fisheries to increase prey availability may not be available as a compensation measure.

10.4.49. If the measure was deemed permissible as compensation, monitoring can utilise the kittiwake breeding and population trends at Flamborough and Filey Coast SPA, which have been extensively monitored, with comprehensive long-term metrics of breeding success available. The impact of reducing local sand eel fishery pressure should therefore allow assessment through changes in the breeding success and population of Flamborough and Filey Coast kittiwakes, thereby providing a potential indication of compensation success.

10.4.50. The benefits of local sand eel fishery closures on kittiwakes has been demonstrated off the east coast of Scotland. The exclusion of fisheries from a designated area (the “sand eel box”) resulted in higher sand eel stock biomass (Greenstreet et al., 2006) and an increase in kittiwake breeding success at colonies within the closed area compared to those outside it (Daunt et al., 2008; Frederiksen et al., 2008). According to Carroll et al. (2017), a 50% reduction in fishing mortality of the southern North Sea sand eel stock would increase local kittiwake productivity by an average of 0.2 chicks per nest. Therefore, reducing sand eel fishery pressure offers a strategic opportunity for developers to collaborate in compensating for the cumulative and in-combination impacts of offshore wind farms on the southern North Sea kittiwake population.

10.4.51. Both English and Scottish Governments permanently closed sand eel fisheries within relevant waters on the 31st January 2024 and 26th March 2024 respectively.

Predator eradication/exclusion and biosecurity

10.4.52. Kittiwake have evolved strong predator avoidance tactics, opting for nests on sheer cliffs and ledges which are typically out of reach. As a result, kittiwake rarely face threats from some mammalian predators, such as rats. However, kittiwake are still subject to predation from invasive mammals such as mink, and potentially also predation from stoat, domestic or feral cats, red foxes (hereafter fox) and otters. Kittiwakes that are protected from predation, in the North Sea metapopulation, will increase the number of

breeding adults that recruit to colonies along the east coast of England, including Flamborough and Filey Coast SPA. As a result, mammalian predator control or eradication, even if implemented at other sites within the UK National Site Network, can contribute kittiwakes to the SPA population, by offsetting collision mortalities and potentially serving as a compensation measure that fulfils the highest or second-highest position on the preference hierarchy as defined by Defra (2021a).

10.4.53. Presently, there is no evidence for the predation of kittiwake from mammalian predators at Flamborough and Filey Coast SPA. There is more evidence for the impact of this at sites within the wider UK National Site Network, including Scotland. In addition to mink, other common predators of kittiwakes such as stoat, otters, foxes and feral cats should not be ruled out as potential targets for control or eradication where their impact is identified. This measure is unlikely to be deliverable at Flamborough and Filey Coast SPA due to a lack of evidence that mammalian predators are impacting kittiwake at the SPA. It is noted that Natural England, in response to a consultation on the draft RIAA, questioned the relevance of this measure for kittiwake stating that '*though there are some locations where fox predation has been observed (Lowestoft pier, Scarborough cliffs). In general, kittiwake preferentially select inaccessible nest sites, so any issues may be very site-specific and perhaps unlikely to yield significant benefits*'.

10.4.54. Mink, stoats, otters, foxes, and cats are all known to predate seabirds at extremely high rates. Additionally, the eradication of cats has been linked with widespread seabird recolonisation (Ratcliffe et al., 2010). Ossian Wind Farm has proposed the potential for mink control to protect hundreds of seabirds at targeted SPAs, which could potentially be replicated within England for mink or a different mammalian predator species. Increases in kittiwake numbers are expected to exceed the compensation requirements for multiple projects, offering a potential opportunity for developer collaboration on implementing these measures. Additionally, since colonies exhibit high levels of connectivity both within and outside of SPAs (Coulson, 2011; Horswill and Robinson 2015), the overall scale of compensation could be evaluated in the context of productivity across the entire SPA and the broader North Sea population.

10.4.55. Currently, the Flamborough and Filey Coast SPA does not include predator eradication or control within its site management plans. It is likely that if these measures were demonstrated to have potential benefit and were to be implemented at Flamborough and Filey Coast SPA, they would not be subject to concerns about additionality as the measure has the potential to deliver benefits that are above and beyond normal site management for the colony.

10.4.56. The information above on compensation measures demonstrates that individual measures are available to fully compensate for the effects of the Plan on kittiwake. However, several additional measures are available which would compensate for lower numbers of birds, and these could be included in a package of measures or be drawn upon by to compensate for the effects of individual projects. Details of these measures are presented below.

Improving nesting locations

10.4.57. Kittiwakes have been observed nesting on artificial structures such as window ledges, harbour walls, buildings, bridges, oil and gas platforms, and purpose-built structures where natural sites are not available (Coulson, 2011; Royal Haskoning DHV, 2022). Improving or modifying these existing artificial nest sites to increase colony size and breeding success could compensate for the effects of the Plan. Kittiwake raised in these artificial nesting structures will enhance the metapopulation, thereby increasing the number of breeding adults that recruit to the National Site Network. There would also be potential to add nests at natural breeding sites, as demonstrated by the RSPB who, in 2019, carved out 50 new ledges into cliffs on Coquet Island to create more suitable nesting habitat. This measure therefore has the potential to fulfil the highest or second-highest level of the preference hierarchy as defined by Defra (2021a), depending on the selected location and connectivity to the impacted SPA.

10.4.58. Natural nest sites used by kittiwake in England, specifically sheer cliff faces, are unlikely to be suitable targets for improvements due to their inaccessibility. Furthermore, these sites are likely to already be within a Protected site subject to management practices aimed at maintaining favourable conditions for nesting kittiwake. As such, the enhancement of artificial nesting structures, such as those at Gateshead in Tyne and Wear, may be more viable.

10.4.59. Optimal locations for nest site improvements are those with minimal collision risk from windfarms, proximity to existing colonies, and sufficient distance from Flamborough and Filey Coast SPA to avoid competition. These sites should also offer abundant prey resources within the foraging range, such as sand eel aggregations on Dogger Bank, and be currently constrained by limited nesting space.

10.4.60. Depending on the site selected for improvement, the potential compensation returns for this measure are moderate to large (Pizzolla *et al*., 2024). In the case of the BT building, where six extra ledges were installed to increase capacity, 20 pairs of kittiwake adopted the site within a few weeks, although it is recognised that this may have been supported by disturbance elsewhere on the building (SSD OWF Extension Projects, 2022). In the RSPB example, providing additional nesting space at a natural site increased the colony size by 100 pairs (RSPB, 2022). There is potential for this measure to compensate for multiple projects. By utilising demographic parameters such as productivity, survival, and dispersal, the required number of pairs needed to compensate for offshore wind farm related collision mortality through nest site improvements can be calculated.

10.4.61. Nest site improvements should be undertaken outside of the kittiwake breeding season (March to August inclusive) to avoid disturbance to existing nesting. Previous evidence on nest sites suggests that colonisation of additional or improved nests at existing sites will take weeks or months (RSPB, 2022; SSD OWF Extension Projects, 2022). Assuming successful colonisation by kittiwakes in the first breeding season and adequate chicks

fledged, the first cohort of chicks will reach breeding age after four years (Horswill and Robinson, 2015). At this stage kittiwakes raised in the additional or modified nests will have integrated into the regional population and can potentially recruit into breeding colonies, such as Flamborough and Filey Coast SPA, thereby offsetting collision mortality. The precedent set by the non-material change to the Hornsea Four Offshore Wind Farm DCO (DESNZ, 2024) indicates that a reduction to timelines may also be possible, subject to approval by the SoS.

Reduction of recreational activity disturbance and visitor pressure

10.4.62. There is evidence to suggest that human disturbance can affect kittiwake breeding success and survival (Arctic Council, 2020), and recreational activity and visitor pressure can have detrimental effects on kittiwake populations. Possible mechanisms behind these negative effects include increased stress experienced by the birds, and disturbance events flushing breeding adults, leaving nests vulnerable to opportunistic predators (Frederiksen, 2010). For example, a study at St Abbs Head National Nature Reserve in south-east Scotland found that the breeding success of kittiwakes was negatively affected by increased visitor numbers, with an 8.5% increase in human visitors resulting in a 22% increase in nest failure rate (Beale and Monaghan, 2004). Reducing human disturbance could have beneficial effects on kittiwake productivity and potentially serve as a compensation measure that fulfils the highest level of the preference hierarchy as defined by Defra (2021a) if delivered at the impacted SPA.

10.4.63. Evidence from other breeding colonies is limited, with potential corrective measures largely untested in their ability to improve breeding success despite action being taken to reduce disturbance. Untangling the impact of disturbance and visitor pressure from other influencing factors will be required to understand the extent of any compensation delivered. Furthermore, the position of this measure on the preference hierarchy is uncertain if it was to be delivered at a site within the UK National Site Network other than the impacted SPA.

10.4.64. Measures aimed at reducing recreational disturbance and visitor pressure directly at Flamborough and Filey SPA may be limited due to additionality concerns. However, there are possible alternative sites along the north-eastern coast of England where delivery of this measure could be feasible and would provide connectivity with the National Site Network. Any measure that reduces anthropogenic disturbance can be considered; examples include introducing visitor codes of conduct, restricted areas for watercraft, and agreements with local organisations that use the area around the colony (e.g. Lloyd et al., 2019). Footpath improvements, for example making them clearer, can improve the control of visitors' movements, keeping them at distances from colonies that minimise disturbance. This can be further supported by guide barriers such as ropes or stakes, if not already in place. Clear signs have also been shown to improve visitor behaviour and reduce disturbance (e.g. Allbrook and Quinn, 2020).

10.4.65. Flamborough and Filey Coast SPA is already managed to mitigate the effects of anthropogenic disturbance (Butcher et al., 2023), and there is limited scope for additional measures. Other alternative sites within England where the measure could be feasible include breeding colonies further up the north-eastern coast of England, although further evidence would need to be collected to understand site-specific impacts. Non-SPA sites may also provide opportunities to alleviate disturbance effects and fulfil compensation requirements, but again would need to be selected subject to the same selection and assessment process as SPA sites.

10.4.66. In response to a consultation on the draft RIAA, Natural England confirmed that whilst English SPAs were appropriately managed with respect to recreational disturbance, non-SPA colonies may provide opportunities to alleviate disturbance effects. Furthermore, Natural England confirmed that they are broadly supportive of the exploration of the potential to reduce recreational disturbance at seabird colonies in southwest England.

10.4.67. Locations for the delivery of this compensation measure are limited to sites where disturbance has been identified as having a negative effect on colony breeding success. In addition, the types of compensation implemented will depend on the location chosen and the specific disturbance pressures and their causes at the site. Moreover, there is a chance that the implementation of disturbance-reduction measures could face challenges in support and agreement from relevant landowners, organisations or businesses. It should also be noted that there have been reports that human presence deters avian predators from kittiwake colonies (Arctic Council, 2020), emphasising the requirement for site-specific assessments of human disturbance and its consequences. Any measures to reduce human disturbance should be additional to current or planned activities at the site. This could be achieved through funding to increase impacts of an existing initiative, accelerate delivery which is not possible otherwise or extend the timescales of existing successful initiatives aimed at reducing disturbance, where finances to do this are otherwise unavailable.

10.4.68. Calculating the scale of the measure would require knowledge of the quantitative differences in kittiwake breeding success post-implementation, such as those of Beale and Monaghan (2004), whose models provide figures for increased breeding success rates with particular decreases in visitor numbers. New juveniles added into populations via the increase in breeding success would need to be converted into equivalent breeding adult birds, for example using the age-specific survival rates recommended in Horswill and Robinson (2015). Additionally, if measures are implemented away from Flamborough and Filey Coast SPA at nearby colonies, the scale may have to be further adjusted according to the connectivity of birds with Flamborough and Filey Coast SPA.

10.4.69. Any disturbance reduction methods that are introduced would need to undergo trial and monitoring periods to ascertain their effectiveness. They should be implemented prior to and potentially during the breeding season to reduce disturbance. Kittiwakes breed for the first time when they are four years old (Horswill and Robinson, 2015) and, as such, it

would take four years for any increases in productivity to be converted into new breeding adults in the population at the impacted SPA.

Summary

10.4.70. The Crown Estate has considered the compensation measures available for the kittiwake feature of the Flamborough and Filey Coast SPA and is content that there is enough information available to demonstrate that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan which is estimated to be a collision mortality of 115.08 birds per annum.

10.4.71. For Flamborough and Filey Coast SPA, the following projects have presented measures that could compensate for 19.3 adult kittiwake per year: Sheringham and Dudgeon Extension Projects (17), North Falls (0.76), Five Estuaries (0.82) and Rampion 2 (0.72). These measures include modifications to an existing artificial nesting structure (Gateshead Tower). It should be noted that not all of the projects which the Plan predicts will contribute to the total effect on kittiwakes have as yet presented compensation plans for their impacts. This accounts for much of the difference between the predicted compensation requirements of the Plan and the secured or without prejudice compensation measures that are cited above.

10.4.72. There is evidence that offshore structures can support over 1,000 pairs of nesting kittiwake (Pizzolla, et. al., (2024). This provides confidence that the provision of an offshore artificial nesting structure(s) can provide compensation for all the projects in the Plan. There are multiple delivery mechanisms available, including developer led or strategic approaches. These delivery mechanisms will be identified and managed through the Compensation Plan.

10.4.73. Alternatively, if offshore nesting structures are not available to deliver the required compensation, it can be delivered through a package of predator eradication and/ or reduction of recreational disturbance measures where these pressures are identified as suppressing kittiwake breeding success. These measures and the detail of the delivery mechanisms would be identified and managed through the Compensation Plan.

Flamborough and Filey Coast SPA and Farne Islands SPA: Guillemot

10.4.74. The predicted effect of the Plan on guillemot is a displacement mortality of up to158.45 birds per annum for Flamborough and Filey Coast SPA, and 122.57 birds per annum for the Farne Islands SPA. The AA concluded that this would undermine the conservation objectives to restore or maintain these guillemot populations and this could result in an AEOI for the Plan in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain the integrity of the guillemot feature is not compromised.

10.4.75. Measures identified by the projects in the Plan include reducing the numbers of birds killed as fishery bycatch through the deployment of Looming Eye Buoys (LEB) on fishing gear; and predator eradication at breeding colonies. Whilst bycatch measures were considered novel, they were approved by the Secretary of State as compensation for low

numbers of birds and this measure was secured in the DCO for the Sheringham Shoal and Dudgeon Offshore Wind Farm Extension projects, with predator eradication secured as an adaptive management measure.

10.4.76. Other measures considered by the projects include:
- Increase prey availability through fishery management;
- Artificial nesting sites; and
- Reductions in recreational disturbance.

10.4.77. NIRAS identified the following compensatory measures in its Compensation Note for the guillemot feature of Flamborough and Filey Coast SPA:

- Management of fisheries to increase prey availability;
- Offshore artificial nesting structure or repurposed nesting structure;
- Predator eradication and/or exclusion and biosecurity;
- Reduction of recreational activity disturbance and visitor pressure; and
- Seabird bycatch reduction.

Plan level measures

10.4.78. NIRAS identified the following measures which could compensate for the maximum impacts predicted to result from the Plan (>100 individuals). Other measures, which could compensate for the effects of an individual project or could form part of a package of measures, are presented in a separate section below.

Management of fisheries to increase prey availability

10.4.79. Storey et al. (2017) demonstrated that guillemot body mass and chick-feeding rates were higher in years of abundant food compared to years of scarcity. Additionally, heavier guillemots were more likely to successfully fledge a chick than their lighter counterparts. Therefore, a reduction in the activities or closure of the local sand eel fishery could strengthen the UK guillemot metapopulation, resulting in higher numbers of breeding adults recruiting to colonies in England. This measure could directly benefit guillemot colonies within the impacted SPAs and therefore be considered a compensation measure that fulfils the highest level of the preference hierarchy as defined in Defra (2021a) as addressing the same impact at the same location.

10.4.80. There is substantial evidence indicating that permitting sandeel stocks to recover from their currently depleted state would significantly enhance seabird populations within a few years. Ecopath-Ecosim modelling by Natural England predicts a 42% increase in seabird numbers in the North Sea within 15 years of the closure of the North Sea sand eel fishery (Bayes and Kharadi, 2022) and could compensate for the impacts of multiple projects.

10.4.81. Both English and Scottish Governments permanently closed sand eel fisheries within relevant waters on the 31st January 2024 and 26th March 2024 respectively.

10.4.82. It is noted that at Flamborough and Filey coast the guillemot population has been observed having a dietary preference for sprats (Cope et al, 2022), and therefore improving availability of sprat as part of fisheries management measures could compensate for the impact on this population.

Predator eradication and/or exclusion and biosecurity

10.4.83. Guillemots are susceptible to a range of invasive mammalian predators, such as American mink (hereafter mink) and rat species, with brown rats having shown to be a factor in reducing productivity at some guillemot colonies (Furness et al., 2013). The eradication of invasive mammalian predators is a well-established management practice that has significantly benefited seabird conservation at numerous sites within the UK and as such is considered as a compensation measure here. For example, the eradication of rats from Lundy resulted in guillemot breeding numbers increasing from 2,348 to 6,198 individuals, as well as an expansion in breeding distribution of guillemots into areas that would have been occupied by rats (Booker et al., 2019). While this measure is unlikely to be deliverable at the impacted SPAs due to existing management practices already in place, it would be deliverable at other colonies vulnerable to invasive predators that form a part of the UK National Site Network. This measure therefore has the potential to fulfil the highest or second-highest level of the preference hierarchy as defined by Defra (2021a).

10.4.84. It is uncertain whether rats and other mammalian predators are limiting the breeding success or survival of guillemots at the impacted SPAs, particularly where the birds have sufficient cliff nesting habitat available that is inaccessible to mammalian predators, where existing control or exclusion measures are already in place, or where there are no invasive predators present. However, there are other guillemot colonies within the UK National Site Network that depend on the use of boulder field and cave nesting habitat that are vulnerable to mammalian, particularly rat, predation, where this measure would be deliverable. Furthermore, the success of this measure depends on whether other factors, such as food availability, limit guillemot productivity and survival at the compensation site.

10.4.85. Predator eradication or control could be delivered as a compensation measure at any site where there is conclusive evidence that invasive mammal predators are limiting guillemot reproduction and survival, which would contribute to the overall UK National Site Network for guillemots. For example, Ørsted (2022b) has evaluated the potential for compensating for the impacts of Hornsea Four offshore wind farm on auks via the eradication of rats from seabird colonies in the Bailiwick of Guernsey in the Channel Islands. If measures are delivered outside of impacted SPAs, demonstrating connectivity between colonies would require further research to demonstrate benefits to the impacted sites and the wider UK National Site Network.

10.4.86. Additionality concerns would need to be assessed on a site-by-site basis. Where predator control interventions are not additional to normal site management practices, such as at Farne Islands SPA, this measure may not be suitable as compensation.

10.4.87. Predator control must be initiated with sufficient lead-in time to ensure the complete removal of predators. Following eradication, it would take an additional six years for guillemots to reach breeding age (Horswill and Robinson, 2015), although increases in productivity may be observed immediately after complete eradication. Continuous monitoring would be required to confirm that predators remain absent from breeding colonies. If predators recolonise, control measures would need to be resumed. Predator control and monitoring efforts would be maintained throughout the operational lifespan of the project.

10.4.88. It should be noted that the predator management has been accepted by the Defra Secretary of State into the Library of Offshore Wind Strategic Compensation measures.

Seabird bycatch reduction

10.4.89. A recent review of European seabird bycatch data found guillemots to be the most bycaught seabird species in European waters, with an estimated 31,000 birds killed annually (Ramírez et al., 2024). This finding is supported by a preliminary study in the UK, which confirms guillemots as the most bycaught species in the North Sea, particularly in gillnet and midwater trawl fisheries (Northridge et al., 2020). Estimates indicate that between 1,800 and 3,300 guillemots are likely caught each year in UK static net fisheries (Northridge et al., 2020). Studies into bycatch reduction techniques have indicated various degrees of effectiveness in reducing seabird mortality across different fisheries by modifying vessel/gear or operational procedures, increasing deterrence, reducing attraction, or decreasing the likelihood of birds being hooked by fishing lines (ACAP, 2023; Melvin et al., 2014). Their applicability to reducing bycatch of guillemot in certain fisheries is currently being tested by multiple projects along the south coast of England. Consequently, reducing guillemot bycatch in UK waters would benefit guillemot across the UK National Site Network, serving as a compensation measure that could fulfil the highest level of the preference hierarchy as defined by Defra (2021a) if, through the application of this measure, birds are delivered to the impacted SPAs.

10.4.90. Understanding the contribution of any guillemot protected from bycatch in UK fisheries to the UK metapopulation and UK National Site Network remains challenging, and thus there is uncertainty regarding which level of the preference hierarchy the measure would fulfil. Current connectivity studies are lacking for this species, which creates a challenge for demonstrating linkages between guillemot bycatch in specific fisheries and the UK National Site Network, including the impacted SPAs. Furthermore, if this measure delivered benefits to sites other than the impacted SPAs, it would still fulfil the second level of the preference hierarchy as defined in Defra (2021a) that is to address the same ecological function at a different location.

10.4.91. The UK bycatch monitoring programme (BMP) estimates that bycatch from UK vessels operating in gillnet and midwater trawl fisheries results in the deaths of approximately 1,984 guillemots annually (Miles et al., 2020). Most guillemot bycatch occurs in southwest England and the English Channel, with a notable hotspot off the east coast of England near Flamborough and Filey Coast SPA. Based on these analyses, the Hornsea Project Four and Sheringham Shoal and Dudgeon Offshore Wind Farm Extension

Projects targeted the south coast of England bycatch hotspot for additional monitoring and trials of bycatch reduction techniques. While guillemots in this area may not be from colonies with direct connectivity to impacted SPAs, they would be in the dispersal range of large colonies such as those on Lundy and Skomer. Therefore, bycatch reduction measures implemented in these areas that would benefit smaller colonies would still contribute to protecting the UK National Site Network via connectivity to these larger colonies.

10.4.92. Several techniques have proven effective in reducing guillemot mortality in fisheries. For static net fisheries, such as gillnets, enhancing net visibility and employing acoustic and visual deterrents are effective strategies (Wiedenfeld et al., 2015; Parker, 2017). The "scarybird", a visual deterrent mimicking a bird of prey, has also successfully decreased seabird presence around fishing vessels by 72% without affecting catch sizes or revenue (Almeida et al., 2023). In trawl fisheries, recommended bycatch reduction methods include streamer lines, bafflers, and offal management to lessen bird attraction (Melvin et al., 2011; Løkkeborg, 2011; Wiedenfeld, 2016; Paz et al., 2018). These techniques have been well-received by the fishing industry, evidenced by high participation rates in pilot studies and collaborative trials (Hornsea 4, 2021; Marine Directorate, 2023). Natural England have advised that they do not consider there to be compelling evidence for the effectiveness in reducing bycatch but are supportive of continued investigation into this measure.

10.4.93. Currently, the Bycatch Mitigation Initiative (BMP) is the main bycatch dataset in the UK, but it covers less than 1% of the total annual UK static net effort, about 5% of the annual UK midwater trawl effort, and only 1-2% of the annual UK longline effort (Northridge et al., 2020). Bycatch sampling in the UK has mostly been opportunistic and this results in substantial uncertainty when determining suitable locations for delivering bycatch reduction interventions.

10.4.94. Potential compensation returns depend largely on the bycatch reduction technology implemented, the fishery type targeted, and the location at which the technology is introduced. However, bycatch reductions of approximately 94% were recorded at the gillnet fishery at Filey Bay in 2010. Here guillemot bycatch was reduced from around 200 guillemots per year to 11 between 2010 – 2014 (Quayle, 2015).

10.4.95. If this measure was proven to work, the potential benefits present an opportunity for collaboration between developers, where the predicted compensation returns exceed the compensation requirements for individual projects. However, it is noted that Natural England, in response to a consultation on the draft RIAA stated that '*There have been trials of potential fisheries bycatch reduction measures for guillemot and razorbill, but to date these have not yielded promising results. Even if the techniques are found to be weakly effective (i.e. bycatch rates are reduced but remain substantial), there is a risk that financial incentives for fishers to participate will increase fishing effort and therefore negate any benefits. At present, NE does not support bycatch reduction as a compensatory measure for guillemot and razorbill.*'

10.4.96. The most effective techniques for reducing guillemot bycatch, and therefore those with the greatest potential compensation returns, will be specific to the technology chosen, the fishery type selected and the location of implementation. Furthermore, the substance of the measure will also be determined by the scale of uptake within the fisheries industry, which cannot be predicted and therefore remains a substantial source of uncertainty. As such, compensation returns are not possible to estimate at this stage of the planning process.

10.4.97. Defra has assigned the Joint Nature Conservation Committee (JNCC) the task of developing a UK marine bycatch Plan of Action (PoA) under the Fisheries Act 2020 and the Joint Fisheries Statement (JFS). The BMP work now falls under the JNCC's, which has replaced the previous bycatch reduction efforts and will need to supplement government actions on bycatch. Bycatch reduction efforts outside the UK face similar additionality considerations as government bycatch plans. Currently, government plans have limited resources and there is an opportunity for a compensation plan to provide additional benefits beyond existing initiatives.

10.4.98. Seabird bycatch monitoring and implementation are managed by the JNCC, which plans to develop bycatch 'toolkits' as practical guides for the fishing industry. However, this initiative is still in its early stages. The use of bycatch reduction as a compensation measure must consider future changes in government bycatch plans.

10.4.99. The information above on compensation measures demonstrates that individual measures are available to fully compensate for the effects of the Plan on guillemot. However, several additional measures are available which would compensate for lower numbers of birds, and these could be included in a package of measures or be drawn upon to compensate for the effects of individual projects. Details of these measures are presented below.

Offshore artificial nesting structures

10.4.100. Guillemots are known to breed on offshore structures within an exclusively marine environment such as oil and gas platforms, and those colonised in the southern North Sea form part of the southern North Sea metapopulation. Surveys covering sixteen offshore structures in the southern North Sea found evidence of approximately 100 guillemots nesting on one structure (Ørsted, 2021). More recently, in surveys commissioned by the Outer Dowsing Offshore Wind project, guillemot were observed occupying suitable breeding locations on at least one structure (ODOW, 2023). Furthermore, guillemots have been recorded breeding on an artificial structure on the Swedish island of Gotland (Hentati-Sundberg *et al.*, 2012). Despite the availability of natural nesting spaces on Gotland, approximately 75 pairs of guillemots were observed breeding on the structure. This supports the idea that some individuals prefer to colonise an artificial structure over natural nesting sites (Stockholm Resilience Centre, 2020). As such, offshore artificial nesting structures could provide compensation that fulfils the highest level of the preference hierarchy as defined in Defra (2021a), as guillemots raised

in artificial nesting structures will enhance the southern North Sea metapopulation, and increase the number of breeding adults that recruit to colonies along the east coast of England, including the impacted SPAs as well as more widely within the UK National Site Network.

10.4.101. There remains uncertainty around the scalability of the measure in terms of birds likely to colonise given limited availability of data on numbers or productivity, as well as the logistical challenges of monitoring the number of guillemots fledging from offshore artificial nesting structures. Theoretical estimates of connectivity (immigration/emigration rates) between guillemot populations can be derived through metapopulation modelling. However, more robust evidence is needed to confirm their efficacy at specific impacted sites, thereby determining the measure's position on the preference hierarchy as defined by Defra (2021a).

10.4.102. There is limited evidence that a lack of available nesting space is a limiting resource for guillemot populations in the UK. However, there is research to suggest that colonially breeding guillemots are subject to site-dependent regulation, in which individuals breed disproportionately at highest quality sites at smaller sub-colony sizes which results in higher average site quality and breeding success at lower population sizes (Bennett et al., 2022). This infers that even if birds breeding on offshore ANS were redistributed from other breeding colonies, their breeding success may be greater if the offshore ANS offered a higher quality nest site and smaller colony size (and inferred lower nesting density) than that of onshore colonies at natural sites.

10.4.103. Sites should be selected based on their proximity to existing breeding colonies (to ensure that an artificial nesting structure could be located in areas where breeding birds would be unlikely to face significant competition from other breeding birds), their proximity to offshore wind farms (to avoid creating a colony at high risk from collisions and/or the impacts of displacement or barrier effects), and their overlap with areas of high densities of core forage fish such as sand eels. Additionally, sites should be chosen that are within the prospecting range of the recruitment pool of first-time breeders and dispersing adult breeders, to maintain connectivity with impacted SPAs and form part of the North Sea guillemot metapopulation.

10.4.104. The colony size required to compensate for the effects of a project can be calculated utilising demographic parameters such as productivity, survival, predicted colonisation rate, and dispersal.

10.4.105. There remains some uncertainty regarding the optimal design of offshore artificial nesting structures. Consequently, compensation plans must incorporate a degree of precaution and adaptive management, such as changing location should colonisation fail or incorporating predator deterrents.

10.4.106. Prior to the construction or modification of offshore artificial nesting structures, baseline breeding season monitoring of nearby colonies that are likely to form the recruitment

pool should be conducted. If applications for licensing/consent and site procurement proceed without issues, the construction or modification of artificial nesting structures can be completed over the winter, making them available by the subsequent breeding season. Assuming successful colonisation by guillemots in the first breeding season and adequate chicks fledged, the first cohort of chicks will reach breeding age after six years. At this stage, guillemots raised on the offshore nesting structures will have integrated into the regional population and can potentially recruit into breeding colonies, including those at the impacted SPAs, thereby offsetting displacement mortality. However, it is possible that timelines could be reduced given the precedent set by the accepted non-material change to the Hornsea Four Offshore Wind Farm DCO (DESNZ, 2024). In this case, the length of time required for an offshore artificial nesting structure for kittiwake to be in place before turbine operation was reduced from four full breeding seasons to two full breeding seasons.

Reduction of recreational activity disturbance and visitor pressure

10.4.107. Guillemots are susceptible to disturbance both in the marine environment, where the species forage, and on their cliff breeding sites. Disturbance may result in flushing of birds and subsequent nest abandonment, exerting an energetic cost on adult individuals as well as direct mortality to chicks, as eggs and young are more vulnerable to predation and exposure to the elements (Buckley, 2004). Flushing events may increase spillage, where eggs are displaced from the nest and therefore lost when the adult is flushed. Tourists may also directly crush nests or eggs, if encroaching into the colony (Harris and Wanless, 1995). These disturbance events can ultimately result in population-level consequences for guillemots, as repeated instances may cause individuals to alter their nest-site selection, opting for inferior nesting sites, and reduce overall colony productivity via chick loss (Carney and Sydeman, 1999; Buckley, 2004; Huddart, 2019). Reducing human disturbance could have beneficial effects for guillemot productivity and therefore serve as a potential compensation measure that fulfils the highest level of the preference hierarchy as defined in Defra (2021a) if implemented at the impacted SPAs.

10.4.108. Designated SPAs are already managed to mitigate effects of human disturbance and visitor pressure (Butcher et al., 2023), therefore there may be limited scope for delivery of this measure at the impacted SPAs. However, the measure is still deliverable at a range of colonies with connectivity to the UK National Site Network (Rampion 2 OWF, 2024). Suitable colonies to target for disturbance-reduction measures would need to be assessed during the planning stage and selected based on various factors, including the types of disturbance at that location, and the impact of this on the productivity and success of the colony, to maximise potential conservation returns. In terms of types of compensation, any measures that reduce anthropogenic disturbance can be considered for compensation; examples include introducing visitor codes of conduct, restricted areas for watercraft, and agreements with local organisations that use the area around the colony (e.g., Lloyd et al., 2019). The most appropriate type of disturbance reduction method will ultimately be determined by the location of implementation and the specific pressures at that site.

10.4.109. Implementing schemes to reduce recreational disturbance may face challenges in gaining support and agreement from relevant landowners and management organisations. Therefore, careful planning and early engagement with key stakeholders is essential in the successful implementation of the measure at any selected site.

10.4.110. Any measures aimed at reducing recreational disturbance and visitor pressure will have a greater impact at sites with higher visitor footfall on land and or at sea, and monitoring efforts that include recording productivity will be needed to quantify the effects of any given measure at the population level. Based on the demographic rates recommended for guillemot in Horswill and Robinson (2015), juveniles have a survival rate of 0.560 and immature birds have a survival rate of between 0.792 and 0.917, with individuals reaching breeding age at six years. Depending on compensation requirements, the exact number of birds to deliver as compensation could be calculated using the above parameters. Furthermore, the potential substance of the measure presents a collaborative opportunity as strategic compensation between developers with similar predicted impacts, should the predicted compensation returns exceed the compensation requirements for multiple projects.

10.4.111. Accurate calculations to quantify the benefit of any measure aimed at reducing human disturbance would likely be difficult given the number of variables affecting the size of guillemot colonies beyond disturbance, such as predation pressure, the potential influence of HPAI, and environmental variables, such as food availability. As such, a pragmatic approach to defining measure success should be taken.

10.4.112. During planning, it is important that any measures identified under the umbrella of reducing human disturbance are additional to current or planned activities at the selected site. This should be assessed on a site-by-site basis and might be achieved by delivering additional funding to increase or maximise the success of an existing initiative, accelerate delivery which is not possible otherwise or extend the timescales of existing successful initiatives aimed at reducing disturbance, where finances to do this are otherwise unavailable.

10.4.113. Measures will likely be subject to a trial and installation period, after which the impact of the measure can be monitored. The time taken for this would then be added to the period taken for guillemots to reach breeding age six years, as guillemots raised in colonies subject to human disturbance reduction measures will have integrated into the regional population and can potentially recruit into breeding colonies, contributing to the maintenance of the UK National Site Network.

Summary

10.4.114. The Crown Estate has considered the compensation measures available for the guillemot feature of the Flamborough and Filey Coast SPA and the Farne Islands SPA and is content that the information demonstrates that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan, which are estimated to be a displacement mortality of 158.45 birds per annum for the

Flamborough and Filey Coast SPA, and 122.57 birds per annum for the Farne Islands SPA.

10.4.115. For the Flamborough and Filey Coast SPA, the following projects have presented measures that could compensate for 21.36 birds per year: Sheringham and Dudgeon Extension Projects (16), Rampion 2 (1.26), North Falls (3.3), and Five Estuaries (0.8), through bycatch reduction, predator control, and reductions in recreational disturbance. For the Farne Islands SPA, Rampion has presented a without prejudice compensation case to compensate for 1.07 adult guillemot per year though reducing recreational disturbance.

10.4.116. It should be noted that not all of the projects which the Plan predicts will contribute to the total effect on guillemot have as yet presented compensation plans for their impacts. This accounts for much of the difference between the predicted compensation requirements of the Plan and the secured or without prejudice compensation measures proposed by the project developers that are cited above.

10.4.117. The additional compensation requirement can be addressed by expanding one or more of the project measures to provide additional capacity to compensate for the full effects of the Plan. There is evidence that fishery bycatch kills over 1,000 guillemot per year (Northridge *et al.*, 2020). Furthermore, trials of bycatch reduction measures in UK waters demonstrated that bycatch of guillemots could be reduced by 94% in a year (Quayle, 2015). Similarly, significant increases in populations of guillemot were recorded on Lundy after rats were removed (Booker, et.al., 2019). These studies demonstrate that the measures can be scaled up to provide compensation for the full effects of the Plan.

10.4.118. Alternatively, offshore artificial nesting structures, which have been shown to support high numbers of guillemot (Ørsted, 2021), can provide compensation for the additional compensation requirement. There are multiple delivery mechanisms available, including developer led or strategic approaches. If required, these delivery mechanisms will be identified and managed through the Compensation Plan.

Flamborough and Filey Coast SPA: Razorbill

10.4.119. The predicted effect of the Plan on the razorbill feature of the Flamborough and Filey Coast SPA is a displacement mortality of up to 83.47 birds per annum. The AA concluded that this would undermine the conservation objective to restore or maintain the razorbill populations and result in an AEOI for the Plan in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain the integrity of the network for razorbill is not compromised.

10.4.120. Measures identified by the projects in the Plan include:

- Reduction in recreational disturbance;
- Predator eradication from a breeding colony;
- Fishery bycatch prevention; and

- Artificial nesting sites.

10.4.121. NIRAS identified the following compensatory measures in its Compensation Note for the razorbill feature of Flamborough and Filey Coast SPA:

- Offshore artificial nesting structures or repurpose nesting structures;
- Reduction of recreational activity disturbance and visitor pressure;
- Seabird bycatch reduction;
- Management of fisheries to increase prey availability; and
- Predator eradication/exclusion and biosecurity.

Plan level measures

10.4.122. NIRAS identified the following measures which could compensate for the quantum of impacts predicted to result from the Plan (>50 individuals). Other measures, which could compensate for the effects of an individual project or could form part of a package of measures, are presented in a separate section below.

Management of fisheries to increase prey availability

10.4.123. In the North Sea, breeding razorbills primarily consume sand eels and sprats when these fish are available. Therefore, a reduction in the activities or closure of the local sand eel fishery could increase the UK razorbill metapopulation, resulting in higher numbers of breeding adults recruiting to colonies across the UK National Site Network. This measure could directly benefit razorbill colonies within the impacted SPA and therefore be considered a form of compensation that fulfils the highest level of the preference hierarchy as defined by Defra (2021a).

10.4.124. Reducing local sand eel fishing pressure, although occurring outside of Flamborough and Filey Coast SPA, but within foraging range, is anticipated to directly benefit razorbill populations within the SPA (MacArthur Green and Royal Haskoning DHV, 2023).

10.4.125. Ecopath-Ecosim modelling by Natural England predicts a 42% increase in seabird numbers in the North Sea within 15 years of the closure of the North Sea sand eel fishery (Bayes and Kharadi, 2022). Given the dependence of razorbill on sand eel during the breeding season, a rapid recovery of sand eel stocks within the foraging range of razorbills at Flamborough and Filey Coast SPA is expected to result in a correspondingly swift increase in razorbill productivity. Should a reduction in the local sand eel fishery enhance razorbill breeding productivity at regional colonies, the resulting fledglings would reach breeding age after five years. This suggests a minimum timescale of six years for the compensation measure to become effective.

10.4.126. Both English and Scottish Governments permanently closed sand eel fisheries within relevant waters on the 31st January 2024 and 26th March 2024 respectively. Whether or not this measure is perceived by relevant governments as compensation remains to be confirmed.

Predator eradication and/or exclusion and biosecurity

10.4.127. Razorbills are susceptible to a range of mammalian predators, such as mink and rat species, with brown rats known to be a factor in reducing productivity at some razorbill colonies (Furness et al., 2013). The eradication of invasive mammalian predators is a well-established practice that has significantly benefited seabird conservation at numerous sites within the UK and as such is considered as a compensation measure here. For example, the eradication of rats from Lundy resulted in razorbill breeding numbers increasing from 950 individuals in 2000, to 3,533 individuals in 2021 (St Pierre et al., 2023). While this measure may have lower applicability to the SPA, noting a lack of evidence of mammalian predation at Flamborough and Filey Coast SPA, it is also likely be deliverable at other colonies vulnerable to invasive predators that form a part of the UK National Site Network.

10.4.128. It is uncertain whether rats and other mammalian predators are considered significant factors affecting the breeding success or survival of razorbills at Flamborough and Filey Coast SPA. However, there may be other razorbill colonies within the UK National Site Network where this measure would be an effective measure. Following a site-selection process, predator eradication or control could be delivered as a compensation measure at another site to contribute to the overall UK National Site Network for razorbills. For example, Ørsted (2022b) has evaluated the potential for compensating for the impacts of Hornsea Four offshore wind farm on auks via the eradication rats from seabird colonies in the Bailiwick of Guernsey in the Channel Islands. Their assessment revealed that although many islands in this area have suitable habitats for razorbills, rat presence appears to be suppressing population growth and colonisation. Therefore, there may be scope for a potential collaborative opportunity between projects on predator eradication actions at this site, should the predicted compensation returns from this measure be sufficient to compensate for multiple projects.

10.4.129. Additionally, if the measure is delivered outside of Flamborough and Filey Coast SPA, demonstrating connectivity between colonies would require further research to demonstrate benefits to the impacted site and the wider National Site Network.

10.4.130. There is a moderate degree of confidence that the effective delivery of predator control measures will result in increased razorbill breeding success and survival at the targeted site, and subsequently an increased UK breeding population (Pizzolla *et al.*, 2024). However, monitoring of razorbill populations prior to, during and following any implementation of predator eradication measures will be an important component of the eradication programme to accurately assess the success of the measure and the response of razorbill populations to it.

10.4.131. Precedent has been set for predator eradication as a compensation measure for the Hornsea Four offshore wind farm in the Bailiwick of Guernsey in the Channel Islands, suggesting that the implementation of the measure would be additional to standard, required management practices at the site.

10.4.132. Predator control must be initiated with sufficient lead-in time to ensure the complete removal of predators. Following eradication, it would take an additional five years for razorbills to reach breeding age (Horswill and Robinson, 2015). Continuous monitoring would furthermore be required to confirm that predators remain absent from breeding colonies. If predators recolonise, control measures would need to be resumed.

Seabird bycatch reduction

10.4.133. Reducing bycatch is a potentially important compensation measure for razorbill due to their susceptibility to bycatch in coastal static net fisheries, midwater trawls and occasionally longline fisheries. Estimates indicate that between 100 to 200 razorbills are caught each year across these fishery types within UK waters, although this is likely an underestimation due to the poor coverage of bycatch events across UK fisheries (Northridge et al., 2020). Various bycatch reduction techniques have indicated varying degrees of effectiveness in reducing seabird mortality across different fisheries by modifying vessel/gear or operational procedures, increasing deterrence, reducing attraction, or decreasing the likelihood of birds being hooked by fishing lines (ACAP, 2023; Melvin et al., 2014). Consequently, reducing razorbill bycatch in UK waters would benefit razorbill populations within the UK National Site Network and potentially Flamborough and Filey Coast SPA, fulfilling the highest or second-highest level of the preference hierarchy as defined by Defra (2021a).

10.4.134. The primary uncertainty in establishing razorbill bycatch reduction as a compensation measure lies in determining the method's effectiveness in compensating Flamborough and Filey Coast SPA. Furthermore, understanding the contribution of any razorbill protected from bycatch in UK fisheries to the UK metapopulation and UK National Site Network remains challenging, and thus there is uncertainty regarding which level of the preference hierarchy the measure would fulfil. However, if this measure delivered benefits to sites other than the impacted SPA, it would still fulfil at least the second level of the preference hierarchy as defined in Defra (2021a) that is to address the same ecological function at a different location.

10.4.135. Most razorbill bycatch occurs in southwest England and the English Channel (Northridge et al., 2020), with a notable hotspot off the east coast of England near the Flamborough and Filey Coast SPA and a large aggregation of recorded razorbill bycatch that coincides with a high concentration of gillnet fisheries off the southern coast of England. While razorbills in this area may not be from colonies with direct connectivity to Flamborough and Filey Coast SPA and would likely be from smaller colonies in the dispersal range of large colonies such as those on Lundy and Skomer. Therefore, bycatch reduction measures implemented in these areas that would benefit smaller colonies would still contribute to protecting the UK National Site Network via connectivity to these larger colonies.

10.4.136. A range of suitable bycatch reduction technologies are available, and several techniques have proven effective in reducing razorbill mortality. For static net fisheries, such as gillnets, enhancing net visibility and employing acoustic and visual deterrents are effective strategies (Wiedenfeld et al., 2015; Parker, 2017). The "scarybird", a visual

deterrent mimicking a bird of prey, also successfully decreased seabird presence around fishing vessels by 72% without affecting catch sizes or revenue (Almeida et al., 2023). In trawl fisheries, recommended bycatch reduction methods include streamer lines, bafflers, and offal management to lessen bird attraction (Melvin et al., 2011; Løkkeborg, 2011; Wiedenfeld, 2016; Paz et al., 2018). These techniques have been well-received by the fishing industry, evidenced by high participation rates in pilot studies and collaborative trials (Hornsea 4, 2021; Marine Directorate, 2023). Natural England have advised that they do not consider there to be compelling evidence for the effectiveness in reducing bycatch but are supportive of continued investigation into this measure.

10.4.137. Currently, the BMP is the predominant bycatch dataset in the UK, but it covers less than 1% of the total annual UK static net effort, about 5% of the annual UK midwater trawl effort, and only 1-2% of the annual UK longline effort (Northridge et al., 2020). Furthermore, the type of bycatch reduction technology to be implemented will depend on the location of delivery and the fishery type targeted, which cannot be determined prior to a detailed planning process.

10.4.138. Potential compensation returns depend largely on the bycatch reduction technology implemented, the fishery type targeted, and the location at which the technology is introduced. However, compensation returns can be expected to be moderate to large based on indicative evidence from previous bycatch reduction interventions deployed in UK fisheries. For example, before bycatch reduction measures were put into place in the gillnet fishery at Filey Bay in 2010, razorbill bycatch was estimated at 323 individuals in 2008 and 277 in 2009. Following the introduction of bycatch reduction measures in 2010, razorbill bycatch was reduced to 43 razorbills per year between 2010 – 2014 (Quayle, 2015). This is an average reduction in bycaught razorbills of approximately 86% after just one year of implementation. If this measure was proven to work, the potential benefits presents an opportunity for collaboration between developers, where the predicted compensation returns exceed the compensation requirements for individual projects. However, it is noted that Natural England, in response to a consultation on the draft RIAA stated that '*There have been trials of potential fisheries bycatch reduction measures for guillemot and razorbill, but to date these have not yielded promising results. Even if the techniques are found to be weakly effective (i.e. bycatch rates are reduced but remain substantial), there is a risk that financial incentives for fishers to participate will increase fishing effort and therefore negate any benefits. At present, NE does not support bycatch reduction as a compensatory measure for guillemot and razorbill'.*

10.4.139. Defra has assigned the Joint Nature Conservation Committee (JNCC) the task of developing a UK marine bycatch PoA under the Fisheries Act 2020 and the Joint Fisheries Statement (JFS). The BMP work now falls under the JNCC's Bycatch Mitigation Initiative, which has replaced the previous bycatch reduction efforts and will need to supplement government actions on bycatch. Bycatch reduction efforts outside the UK face similar additionality considerations as government bycatch plans. Currently, government plans have allocated limited resources and there is an opportunity for a compensation plan to provide additionality beyond existing initiatives.

10.4.140. Seabird bycatch monitoring and implementation are managed by the JNCC, which plans to develop bycatch 'toolkits' as practical guides for the fishing industry. However, this initiative is still in its early stages.

10.4.141. The information above on compensation measures demonstrates that individual measures are available to fully compensate for the effects of the Plan on razorbill. However, several additional measures are available which would compensate for low numbers of birds and these could be included in a package of measures or be drawn upon by to compensate for the effects of individual projects. Details of these measures are presented below.

Offshore artificial nesting structure

10.4.142. Razorbills are known to breed on offshore structures within an exclusively marine environment such as oil and gas platforms, and those colonised in the southern North Sea form part of the southern North Sea metapopulation. Surveys covering sixteen offshore structures in the southern North Sea found evidence of approximately 13 razorbills nesting on one structure (Ørsted, 2021). More recently, in surveys commissioned by the Outer Dowsing Offshore Wind project, razorbills were observed occupying suitable breeding locations on at least one structure (ODOW, 2023). Furthermore, razorbills have been recorded breeding on an artificial structure on the Swedish island of Gotland (Hentati-Sundberg *et al.,* 2012). Despite the availability of natural nesting spaces on Gotland, approximately ten pairs of razorbills were observed breeding on the structure. This supports the idea that some individuals will prefer to colonise an artificial structure over natural nesting sites (Stockholm Resilience Centre, 2020). As such, offshore artificial nesting structures may potentially serve as a suitable compensation measure, as razorbills raised in artificial nesting structures will enhance the southern North Sea metapopulation, thereby increasing the number of breeding adults that recruit to breeding colonies within the UK National Site Network.

10.4.143. There remains uncertainty regarding the scalability of the measure in terms of birds likely to colonise given limited availability of data on numbers or productivity, as well as the logistical challenges of monitoring the number of razorbills fledging from offshore artificial nesting structures. In the absence of empirical data, theoretical estimates of connectivity (immigration/emigration rates) between razorbill populations can be derived through metapopulation modelling.

10.4.144. There is limited evidence that nesting space is a limiting factor for razorbill populations in the UK. However, evidence from observations of an ANS on the Swedish island of Gotland, suggests that artificial nesting structures may offer higher quality nest sites than natural habitats, and therefore result in increased breeding success.

10.4.145. Sites should be selected based on their proximity to existing breeding colonies (to ensure that an artificial nesting structure could be located in areas where breeding birds would be unlikely to face significant competition from other breeding birds), their proximity to offshore wind farms (to avoid creating a colony at high risk from collisions and/or the

impacts of displacement or barrier effects), and their overlap with areas of high densities of core forage fish such as sand eels. Additionally, sites should be chosen that are within the prospecting range of the recruitment pool of first-time breeders and dispersing adult breeders, such as those within Flamborough and Filey Coast SPA, to maintain connectivity with the impacted SPA and from part of the North Sea razorbill metapopulation.

10.4.146. The location of offshore artificial nesting structures is key in determining successful colonisation and breeding, but these structures must be designed or modified to produce sufficient razorbill for the required compensation. By utilising demographic parameters such as productivity, survival, predicted colonisation rate, and dispersal, the required colony size required at these structures to compensate for offshore wind farm mortality can be calculated.

10.4.147. There remains some uncertainty regarding the optimal design of offshore artificial nesting structures. Consequently, compensation plans must incorporate a degree of precaution and adaptive management, such as changing location should colonisation fail or incorporating predator deterrents.

10.4.148. Prior to the construction or modification of offshore artificial nesting structures, baseline breeding season monitoring of nearby colonies that are likely to form the recruitment pool should be conducted. Assuming successful colonisation by razorbills in the first breeding season and adequate chicks fledged, the first cohort of chicks will reach breeding age after five years. At this stage, razorbills raised on the offshore nesting structures will have integrated into the regional population and can potentially recruit into breeding colonies, including within Flamborough and Filey Coast SPA.

10.4.149. The colonisation timeline for offshore artificial nesting structures is more uncertain for razorbills compared to kittiwakes due to the lack of monitoring, with most UK evidence being anecdotal and observed numbers being small (< 20 pairs). For example, monitoring at the Stockholm Resilience Centre (2020) over 12 years showed that razorbill numbers at an artificial nesting structure rose to just ten pairs.

Reduction of recreational activity disturbance and visitor pressure

10.4.150. Razorbills are susceptible to disturbance both in the marine environment, where the species forage, and at their breeding sites. Disturbance may result in flushing of birds and subsequent nest abandonment, exerting an energetic cost on adult individuals as well as direct mortality to chicks, as eggs and young are more vulnerable to predation and exposure to the elements (Buckley, 2004). Flushing events may increase spillage, where eggs are displaced from the nest and therefore lost when the adult is flushed (Carney and Sydeman, 1999). Tourists may also directly crush nests or eggs, if encroaching into the colony (Harris and Wanless, 1995). These disturbance events can ultimately result in population-level consequences for razorbills, as repeated instances may cause individuals to alter their nest-site selection, opting for inferior nesting sites, and reduce overall colony productivity via chick loss (Carney and Sydeman, 1999; Buckley, 2004; Huddart, 2019).

10.4.151. Designated SPAs are already highly managed to mitigate effects of human disturbance and visitor pressure (Butcher et al., 2023), therefore there may be limited scope for delivery of this measure at Flamborough and Filey Coast SPA. Other sites within the UK National Site Network where disturbance is not currently managed could provide compensation sites. Suitable colonies to target for disturbance-reduction measures would need to be assessed during the planning stage and selected based on various factors, including the types of disturbance at that location, and the impact of this on the productivity and success of the colony, in order to maximise potential conservation returns. In terms of types of compensation, any measures that reduce anthropogenic disturbance can be considered for compensation; examples include introducing visitor codes of conduct, restricted areas for watercraft, and agreements with local organisations that use the area around the colony (e.g., Lloyd *et al.,* 2019). The most appropriate type of disturbance reduction method will ultimately be determined by the location of implementation and the specific pressures at that site. In response to a consultation on the draft RIAA, Natural England confirmed that whilst English SPAs were appropriately managed with respect to recreational disturbance, non-SPA colonies may provide opportunities to alleviate disturbance effects. Furthermore, Natural England confirmed that they are broadly supportive of the exploration of the potential to reduce recreational disturbance at seabird colonies in Southwest England.

10.4.152. Implementing schemes to reduce recreational disturbance may face challenges in gaining support and agreement from relevant landowners and management organisations. Therefore, careful planning and early engagement with key stakeholders is essential in the successful implementation of the measure at any selected site. Non-SPA sites may also provide opportunities to alleviate disturbance effects and fulfil compensation requirements but again would need to be selected subject to the same selection and assessment process as SPA sites.

10.4.153. Any measures aimed at reducing recreational disturbance and visitor pressure will have a greater impact at sites with higher visitor footfall from land and or sea, and monitoring efforts that include recording productivity will be needed to quantify the effects of any given measure at the population level. Based on the demographic rates recommended for razorbill in Horswill and Robinson (2015), immature birds have an average survival rate of 0.630, and individuals reach breeding age after five years. Depending on compensation requirements, the exact number of birds to deliver as compensation could be calculated using the above parameters. Furthermore, the potential substance of the measure presents a collaborative opportunity as strategic compensation between developers with similar predicted impacts, should the predicted compensation returns exceed the compensation requirements for multiple projects.

10.4.154. Measures will likely be subject to a trial and installation period, after which the impact of the measure can be monitored. The time taken for this would then be added to the period taken for razorbills to reach breeding age (five years), after which razorbills raised in colonies subject to human disturbance reduction measures will have integrated into the

regional population and can potentially recruit into breeding colonies, contributing to the maintenance of the UK National Site Network.

Summary

10.4.155. The Crown Estate has considered the compensation measures available for the razorbill feature of the Flamborough and Filey Coast SPA and is content that there is enough information available to demonstrate that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan which are estimated to be a displacement mortality of 83.47 birds per annum.

10.4.156. The following projects have presented measures that could compensate for 3.03 birds per year: North Falls (1.6), Five Estuaries (0.2) and Rampion 2 (1.23), through bycatch reduction, and reductions in recreational disturbance. It should be noted that not all of the projects which the Plan predicts will contribute to the total effect on razorbill have as yet presented compensation plans for their impacts. This accounts for much of the difference between the predicted compensation requirements of the Plan and the secured or without prejudice compensation measures that are cited above. Any additional compensation required can be addressed by expanding one or more of the project measures to provide additional capacity to compensate for the full effects of the Plan. There is evidence that fishery bycatch kills up to 200 razorbills per year in UK waters (Northridge et al., 2020) and bycatch reduction measures could reduce these mortalities. Similarly, razorbill are known to be susceptible to disturbance at sea and at breeding sites (Cairns, 1980) and reductions in disturbance could increase productivity in these locations. Such studies provide confidence that these measures can deliver the scale of compensation required for this Plan.

10.4.157. Alternatively, the delivery of predator eradication measures can provide compensation for all the entire effects of the Plan. There is strong evidence that predator eradication can benefit razorbills where mammalian predators are a limiting factor to productivity. Rat eradication on Lundy resulted in the breeding population of razorbill increasing from 950 individuals in 2000 to 3,533 individuals in 2021 (St Pierre et al., 2023) which gives confidence that this measure can be deployed at the scale required to fully compensate for the Plan, if required. There are multiple delivery mechanisms available, including developer led or strategic approaches. If required, these delivery mechanisms will be identified and managed through the Compensation Plan.

Flamborough and Filey Coast SPA: Gannet

10.4.158. The predicted effect of the Plan on the gannet feature of the Flamborough and Filey Coast SPA is a collision and displacement mortality of 28.46 birds per annum. The AA concluded that this would undermine the conservation objective to restore or maintain the gannet population and result in an AEOI for the Plan in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain the integrity of the population of gannet is not compromised. No compensation measures were identified by the projects in the Plan.

10.4.159. NIRAS identified the following compensatory measures in its Compensation Note for the gannet feature of Flamborough and Filey Coast SPA:

- Reduction of recreational activity disturbance and visitor pressure;
- Seabird bycatch reduction; and
- Plastic waste removal.

Plan level measures

10.4.160. NIRAS identified the following measures which could compensate for low number of birds predicted to be impacted by the Plan.

Plastic waste removal

10.4.161. Gannet have been documented to be particularly susceptible to the threat of plastic entanglement and ingestion, with reported cases of emaciated and dehydrated individuals due to plastic obstructing the oesophagus (Pierce et al., 2004). A study of 29 gannet colonies found plastic in 46% of the 7,280 analysed gannet nests indicating widespread gannet exposure to plastic debris (O'Hanlon et al., 2019). Another study found 18.46 tonnes of plastic in the nests of just one gannet colony, which resulted in the entanglement of between 33 and 109 gannets each year, with a total of 525 individuals entangled over 8 years (Votier *et al*., 2011). The reduction of plastic waste at a gannet colony could be undertaken directly at the impacted SPA or another SPA within the UK National Site Network if potential opportunities exist to reduce the risk of plastic entanglement and ingestion. This would provide a compensation measure that could fulfil the highest level of the preference hierarchy as defined in Defra (2021a) that is to address the same impact at the same location, or the second highest level in the preference hierarchy to address the same ecological function at a different location.

10.4.162. There are limited examples of large-scale, long-standing and consistent plastic removal from within seabird colonies. The direct removal of plastic woven into nests is also likely to result in the nest being destroyed. However, clean up actions could focus on the pieces of plastic posing the greatest risk of entanglement to gannet rather than all embedded plastic. Additionally, while compensation can focus on the plastic waste within a colony itself, much of the plastic is being picked up during foraging trips (Grant *et al*., 2021). There remains additional uncertainty on whether this measure is deliverable at Flamborough and Filey Coast SPA and consequently whether it could fulfil the highest or second highest level of the preference hierarchy. The position of this measure on the preference hierarchy will ultimately be determined by the site selected for measure implementation and whether it can be demonstrated that birds delivered to a site other than Flamborough and Filey Coast SPA have connectivity to the impacted SPA.

10.4.163. The removal of plastic from nesting sites could be implemented at gannet colonies throughout the UK National Site Network where evidence supports its application, and where it is not already in place, as at Grassholm SPA where there is an annual initiative to release young gannets trapped in entangling materials to support fledging. Additionally, while the removal of plastic from a colony can perhaps perceptibly decrease the risk of

plastic entanglement, there may also be benefits that are less easy to monitor such as ingestion or harmful secondary impacts of plastic ingestion from the chemical pollutants that attach to plastic and may have toxicological effects. It is noted that Natural England, in response to a consultation on the draft RIAA confirmed that whilst gannet young are regularly entangled in plastic waste included in their nest material, removal of that waste is likely to result in the nest being destroyed. And given the prevalence of plastic waste in the marine environment, it is likely that nests will be rebuilt with the same proportion of plastic waste, and therefore the removal will not address the core issue. Furthermore, Natural England stated that it was '*not aware that entanglement was a significant issue at Flamborough and Filey Coast SPA*.'

10.4.164. There is currently no large-scale coastal UK plastic cleanup legislation or action, and especially none that specifically target plastic within seabird colonies. Plastic waste removal is also not currently part of SPA management plans. As a result, the additionality component is expected to be easily fulfilled.

10.4.165. Votier et *al*. (2011) found that the majority of entangled birds were nestlings, though the risk is still present for adult birds, and ingestion is a threat to all ages. The proportion of birds threatened by plastic as juveniles will have to be a consideration, potentially involving a conversion using juvenile gannet survival rate and the time that it takes for a nestling to recruit into the breeding population.

Reduction of recreational activity disturbance and visitor pressure

10.4.166. There is evidence that human disturbance, particularly from visitors to colonies, can affect breeding success in gannets. Allbrook and Quinn (2020) found that nest failure rates in gannets breeding on Great Saltee Island were greater at nests in closer proximity to visitors, likely due to disturbance effects, including (increased stress, and also the predation of eggs from nests that have been left vacant as a result of disturbance). Reducing human disturbance could have beneficial effects for gannet productivity and therefore serve as a compensation measure that fulfils the top level of the preference hierarchy as defined by Defra (2021a) if implemented at the impacted SPA.

10.4.167. Flamborough and Filey Coast SPA is managed to mitigate the effects of human disturbance and visitor pressure (Butcher et al., 2023). The SPA supports the only gannet colony in England (Wanless et al., 2023), so other sites in the UK where disturbance-reduction methods could be targeted may not have direct connectivity with the SPA, but would contribute to the UK National Site Network, as 97% of the UK gannet population breeds within colonies situated within a designated SPA (Mitchell et al., 2004). However, if this measure was implemented at a site other than the impacted SPA, it would no longer fulfil the top level of the preference hierarchy in addressing the same impact at the same location. It would, nonetheless, still fulfil the second level of the preference hierarchy as defined in Defra (2021a) - that is, address the same ecological function at a different location.

10.4.168. Theoretically, any measures that reduce anthropogenic disturbance can be considered for compensation; examples include introducing visitor codes of conduct, restricted

areas for watercraft, and agreements with local organisations that use the area around the colony (e.g., Lloyd et al., 2019). Allbrook and Quinn (2020), in their study of gannet disturbance on Great Saltee Island, found that signage had a major effect on visitor behaviour around the gannet colony and on the number of gannets disturbed. Introducing new explanatory signage could also therefore be a viable measure. In all cases, recreational disturbance reduction measures should be implemented in locations within the UK National Site Network, preferably those sites with connectivity to the impacted SPA. This could be achieved by delivering additional funding to increase or maximise the success of an existing initiative, accelerate delivery which is not possible otherwise or extend the timescales of existing successful initiatives aimed at reducing disturbance, where finances to do this are otherwise unavailable.

10.4.169. Targeting non-SPA sites for measure delivery would also not be suitable for this species, as > 99% of UK gannets form part of a gannetry within an SPA (Burnell et al., 2023).

10.4.170. Gannets breed for the first time when they are five years old (Horswill and Robinson, 2015) and, as such, it would take five years for any increases in productivity to be converted into new breeding adults in the population at the impacted SPA.

Seabird bycatch reduction

10.4.171. Gannet are subject to high levels of bycatch and there is potential for bycatch reduction techniques to decrease direct mortality. Various bycatch reduction techniques have been identified as effective for reducing gannet mortality across different types of fisheries through modifications that alter the vessel and/or gear or operational procedures, increase deterrence, reduce attraction, or decrease the likelihood of a bird being hooked by a fishing line (ACAP, 2023; Melvin et al., 2014). The reduction of gannet bycatch both directly within the North Sea and the European biogeographic region will contribute to the North Sea metapopulation of gannet. Additionally, 97% of the UK breeding population of gannet belong to a colony within an SPA (Mitchell et al., 2004). As a result, this measure may contribute to the reduction of direct gannet mortality to individuals connected with the impacted SPA, potentially serving as a compensation measure that fulfils the top level of the preference hierarchy as defined in Defra (2021a).

10.4.172. The majority of gannets breeding in the UK National Site Network migrate or disperse down the coast of Western Europe to wintering locations off the Iberian coast and Mediterranean Sea or further south to West Africa (Grecian et al., 2019). As a result, birds caught within the European biogeographic region may be breeding gannets from the UK National Site Network, including the impacted SPA. However, geolocators, isotope analyses or other methods are required to establish the connectivity of gannets to North Sea breeding populations. Furthermore, if this measure delivered benefits to sites other than the impacted SPA, it would still fulfil the second level of the preference hierarchy as defined in Defra (2021a) to address the same ecological function at a different location.

10.4.173. The UK BMP estimates that bycatch from UK vessels operating in longline, gillnet, and midwater trawl fisheries could result in the deaths of thousands of seabirds annually (Northridge *et al*., 2020). Specific to gannet, longline and static net pose the greatest

bycatch risk across the UK. Recent estimates from longlining vessels in Scotland provide updated estimates relevant to gannet, along with potential techniques to reduce bycatch, although the authors note further testing is required (Marine Directorate, 2023). Additionally, after the breeding season, when gannet disperse and migrate down the coast of Western Europe and into the waters off West Africa they interact with a significant number of international fisheries. As a result, there is a considerable amount of gannet bycatch outside of the UK that is within the gannet biogeographic range with high likelihood of connectivity to the UK National Site Network due to the high percentage (97%) of gannet covered by the SPA network (Mitchell et al., 2004).

10.4.174. A range of suitable bycatch reduction technologies have proven effective in reducing gannet mortality. In longline fisheries, combining branchline weighting, setting lines at night, and using bird scaring lines is considered best practice (ACAP, 2023; Melvin et al., 2014). Additionally, the Hookpod, which encases baited hooks, has shown a 95% reduction in seabird bycatch without affecting target fish catch rates (Sullivan et al., 2018). For static net fisheries, such as gillnets, increasing net visibility and using acoustic and visual deterrents are key strategies (Wiedenfeld et al., 2015; Parker, 2017). The "scarybird", a visual deterrent resembling a bird of prey, has successfully reduced gannet presence around fishing vessels by 72% without impacting catch sizes or revenue (Almeida et al., 2023). In trawl fisheries, suggested bycatch reduction methods include streamer lines, bafflers, and offal management to reduce bird attraction (Melvin et al., 2011; Løkkeborg, 2011; Wiedenfeld, 2016; Paz et al., 2018). These techniques have been positively received by the fishing industry, with high participation rates in pilot studies and collaborative trials (Hornsea 4, 2021; Marine Directorate, 2023). Furthermore, in response to a consultation on the draft RIAA Natural England stated that they considered this measure '*may represent the best opportunity to compensate for impacts to this species'*.

10.4.175. Currently, the BMP is the predominant bycatch dataset in the UK, but it covers less than 1% of the total annual UK static net effort, approximately 5% of the annual UK midwater trawl effort, and only 1-2% of the annual UK longline effort (Northridge et al., 2020). Based on this limited sample size, it is estimated that approximately 100 gannets are caught in static nets and around 200 in longline fisheries each year (Northridge *et al.*, 2020).

10.4.176. If appropriate technology is implemented, the compensation returns can be expected to be moderate to large. For example, a trial using the "scarybird" visual deterrent reduced gannet presence around fishing vessels by 72%, compared to vessels that did not employ the deterrent.

10.4.177. Defra has tasked the Joint Nature Conservation Committee (JNCC) with developing a UK marine bycatch PoA under the Fisheries Act 2020 and the Joint Fisheries Statement (JFS). Any action to reduce bycatch must therefore be additional to the work planned within the PoA. Bycatch reduction outside of the UK has similar additionality considerations to government bycatch plans.

Summary

10.4.178. The Crown Estate has considered the compensation measures available for the gannet feature of the Flamborough and Filey Coast SPA and is content that there is enough information available to demonstrate that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan, which are estimated to be a combined collision and displacement mortality of 28.46 birds per annum. It should be noted that none of the projects in the Plan have submitted compensation plans for effects on gannet.

10.4.179. As the Flamborough and Filey Coast SPA is the only breeding colony of gannet in England and recreational pressure is already managed here, so the reduction of recreational pressure would not be additional to current site management. Furthermore, Natural England questioned whether plastic removal would be beneficial at Flamborough and Filey Coast SPA. Natural England were in support of bycatch reduction as a measure that could compensate for effects on gannet, subject to feasibility studies and trials.

10.4.180. It is estimated that approximately 100 gannets are caught in static nets and 200 in longline fisheries around the UK each year (Northridge et al., 2020): however, most gannet bycatch occurs outside of UK waters. A range of bycatch reduction technologies have been proven to reduce gannet mortalities by up to 95% without reducing fish catch rates (ACAP, 2023; Melvin et al., 2014). These studies demonstrate that this measure could deliver the scale of returns required to compensate for the full effects of the Plan. There are multiple delivery mechanisms available, including developer led or strategic approaches. If required, these delivery mechanisms will be identified and managed through the Compensation Plan.

Flamborough and Filey Coast SPA- Seabird Assemblage

10.4.181. NIRAS advised that it was unable to rule out an AEOI on the seabird assemblage based on conclusions reached for the individual species components of the assemblage (namely kittiwake, guillemot, razorbill and gannet). However, as species-specific compensation for these species is available, this would also address the compensation requirement for the seabird assemblage as a whole, and no further compensation measures are required. Natural England agreed with this approach.

Alde-Ore Estuary SPA: Lesser Black-Backed Gull

10.4.182. The predicted effect of the Plan on the lesser black-backed gull feature of the Alde Ore Estuary SPA is a collision mortality of up to 23.79 birds per annum. The AA concluded that this would undermine the conservation objective to restore or maintain the lesser black-backed gull population and result in an AEOI for the Plan alone and in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain the integrity of the lesser black-backed gull feature is not compromised.

10.4.183. Measures identified by the projects in the Plan include:

- Predator control;
- Habitat enhancement; and

- Reduction in recreational disturbance.

10.4.184. NIRAS identified the following compensatory measures in its Compensation Note for the lesser black-backed gull feature of Alde Ore Estuary SPA:

- Enhance breeding success by improving existing nesting locations
- Reduction of recreational activity disturbance and visitor pressure
- Predator eradication/ exclusion and biosecurity

Plan level measures

10.4.185. NIRAS identified the following measures which could compensate for low number of birds predicted to be impacted by the Plan.

Enhance breeding success by improving existing nesting locations

10.4.186. Lesser black-backed gull show a preference for flat, level ground that is covered by close, short vegetation when selecting nesting locations. A crucial component of suitable nesting sites is adequate shelter that reduces exposure to predators and extreme weather (Partridge, 1978). There is potential for a variety of habitat management measures to be implemented, such as grassland improvement, sand dune restoration and moorland restoration, to compensate for the impacts of the Plan. Precedent has already been set by the Norfolk Projects Offshore Wind Farms (MacArthur Green and Royal Haskoning DHV, 2022) for habitat management as a compensation measure at Alde-Ore Estuary SPA, which has achieved stakeholder and Natural England agreement, providing a strong foundation to guide future compensation plans at this site. If implemented at the site of impact, this measure could potentially fulfil the highest position on the preference hierarchy as defined by Defra (2021a).

10.4.187. The main uncertainty in establishing the preference hierarchy of enhancing breeding success by improving existing nesting locations through habitat management derives from determining its ability to place higher in the hierarchy by effectively compensating the affected site, if it were implemented at sites other than the Alde-Ore Estuary SPA. Furthermore, uncertainty remains around the efficacy of habitat management interventions as a standalone measure; other projects have proposed this as a supplementary measure to predator-exclusionary fencing, which is the main lesser black-backed gull compensation measure for the Norfolk Projects Offshore Wind Farms (MacArthur Green and Royal Haskoning DHV, 2022). Further research is needed to conclude whether this would be a suitable standalone measure or needs to be delivered as a supporting measure to predator eradication.

10.4.188. Improvement of existing nesting sites via habitat management could be implemented at colonies within the Alde-Ore Estuary SPA, as has been proposed for the Norfolk Projects Offshore Wind Farms, Five Estuaries Offshore Wind Farm (Five Estuaries Offshore Wind Farm, 2023) and North Falls Offshore Wind Farm (North Falls Offshore Wind Farm, 2023). However, an understanding of potential headroom for further compensation projects to be delivered within the SPA would need to be explored. Furthermore, there are likely to be several colonies that may benefit from habitat improvement, at both SPA and non-SPA

sites. Even if not delivered at SPA sites, this measure would likely benefit the broader regional population and consequently contribute to the UK National Site Network.

10.4.189. Habitat management is likely to be standard practice at many lesser black-backed gull breeding colonies and therefore the additionality question requires consideration. However, this measure was supplementary to predator-exclusion fencing at Alde-Ore Estuary SPA as proposed (and accepted) by Norfolk Projects Offshore Wind Farms (MacArthur Green and Royal Haskoning DHV, 2022).

10.4.190. Any birds produced will take three or four full breeding seasons to reach maturity and recruit into the breeding population (Horswill and Robinson, 2015; BTO BirdFacts, 2024). Habitat maintenance may need to be carried out regularly, both prior to, during and following the breeding season, to ensure nest sites remain in optimal condition.

Predator eradication/exclusion and biosecurity

10.4.191. Lesser black-backed gull eggs and chicks are at risk of predation by a range of predators, with the main mammalian predator in England being the fox. Predation has been demonstrated to impact lesser black-backed gulls at the population level, with reduced population growth observed in six colonies across the UK where foxes are present, including the Alde-Ore Estuary SPA where a decline from 23,400 pairs of lesser black-backed gulls in 2000 to a five-year mean of 1,940 pairs between 2011 and 2015 has been attributed to large-scale colony abandonment due to fox predation (Ross-Smith et al., 2014; Mavor et al., 2002, 2003). Predator exclusion fencing has proven to be an effective conservation measure, as previous studies have indicated that nest survival rates can improve by reducing chick predation. Therefore, this measure has the potential to substantially decrease lesser black-backed gull mortality due to fox predation at breeding colonies, serving as a compensation measure that fulfils the highest level of the preference hierarchy as defined by Defra (2021a).

10.4.192. Predator exclusion could be undertaken at colonies within impacted SPAs, such as Alde-Ore Estuary SPA. Furthermore, other SPAs within the UK National Site Network may also be candidate sites for predator exclusion and/or control. Several colonies that have been impacted by foxes, but not in SPAs, were identified by Davis et al. (2018). Fox-exclusion areas may be suitable at one or more of these sites, although further research would be needed to confirm this. It is likely that the measure, even if not implemented at SPA sites, would benefit the wider regional population and subsequently produce birds that provide recruits into the UK National Site Network. It is noted that Natural England, in response to a consultation on the draft RIAA, stated that predator eradication and/or exclusion and biosecurity measures are '*highly relevant for lesser black-backed gull*'.

10.4.193. The exclusion area at Alde-Ore Estuary SPA proposed by other developers will be at least 6 ha in size. Using a nesting density of 0.04 m^2 (Ross-Smith et al., 2015), in line with the methods used by other developers to inform lesser black-backed gull compensation strategies, the size of area with predator fencing installed has the potential to produce a breeding population much greater than estimated mortalities associated with offshore

wind development, and there may be opportunities for developers to collaborate on measures at Alde-Ore Estuary SPA.

10.4.194. Assuming the measure is a success from the first breeding season, the first cohort of chicks fledged will reach breeding age after four years, if assuming the precautionary upper limit of breeding age for this species (BTO BirdFacts, 2024).

Reduction of recreational activity disturbance and visitor pressure

10.4.195. Recreational activity and visitor pressure can negatively impact the breeding success of lesser black-backed gulls. One study on lesser black-backed gulls in Lancashire suggests that disturbance significantly reduced the number of gull nests by as much as 86% (O'Connell, 1995). At Orford Ness National Nature Reserve, within the SPA boundary, the lesser black-backed gull colony declined by 98% between Seabird 2000 and 2018 (JNCC, 2021). Causes of this decline are discussed as being predation of chicks and eggs by foxes (JNCC, 2021), and human disturbance caused by increased human activity at the site in the last two decades (BBC News, 2022). As such, there is potential for a reduction in human disturbance to the breeding gulls at the site to have beneficial effects on the gulls' productivity and for this measure to fulfil the highest level of the preference hierarchy if delivered at the impacted SPA.

10.4.196. There may be opportunities for disturbance-reduction methods to be implemented at Alde-Orde Estuary SPA. Examples include introducing visitor codes of conduct, signage, restricted areas for watercraft around colonies, and agreements with any local organisations that use areas surrounding colonies (e.g., Lloyd et al., 2019; at FFC SPA). Footpath improvements, for example making them clearer, can improve control of visitors' movements and keep them at safe distances from colonies to minimise disturbance, supported by barriers such as ropes or stakes. In all cases, recreational disturbance reduction measures should be implemented in locations within the UK National Site Network, preferably those sites with connectivity to the impacted SPA.

10.4.197. It is important that any implemented disturbance-reduction measures be additional to current or planned activities at the site. The Alde-Orde Estuary SPA covers an area that includes sites managed by different stakeholders, for example the Orford Ness National Nature Reserve managed by the National Trust. The National Trust have stated in previous press releases their intention to address lesser black-backed gull declines through disturbance reduction, and recommendations that visitors keep to existing waymarked paths and follow existing signs (East Anglian Daily Times, 2022). Additionality concerns would be addressed on a site-by-site basis where other locations for potential implementation are considered. Additionality concerns may also be addressed by delivering additional funding to increase or maximise the success of an existing initiative where finances to do this are otherwise unavailable.

10.4.198. Lesser black-backed gulls breed for the first time when they are three or four years old (Horswill and Robinson, 2015; BTO BirdFacts, 2024), therefore it would take three to four years for any increases in breeding success to be converted into new breeding adults introduced into the UK National Site Network following measure delivery.

Summary

10.4.199. The Crown Estate has considered the compensation measures available for the Alde Ore Estuary SPA and is content that there is enough information available to demonstrate that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan which are estimated to be a collision mortality of 23.79 birds per annum.

10.4.200. The following projects have presented measures that could compensate for 8.8 birds per year: North Falls (3.1), and Five Estuaries (5.7), through enhancements to breeding habitat and predator control measures. Given Natural England's endorsement of this measure, it would be appropriate to address the additional compensation requirements by expanding the project-led measures compensate for the full effects of the Plan. Alternatively, if required, the delivery of predator reduction measures can provide compensation for all the projects in the Plan. If required, the delivery mechanisms will be identified and managed through the Compensation Plan.

Outer Thames Estuary SPA: Red-throated diver

10.4.201. The predicted effect of the Plan on the red-throated diver feature of the Outer Thames Estuary SPA is the displacement of birds from up to 108.7km^2 of the Outer Thames Estuary SPA. The AA concluded that this would undermine the conservation objective to maintain the distribution of the red-throated diver population within the site and result in an AEOI for the Plan alone and in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain the integrity of the population of red-throated diver is not compromised.

10.4.202. Measures identified by the projects in the Plan include:

- Reducing disturbance from vessel activity;
- Reduction of fisheries bycatch;
- Closure of sandeel and sprat fisheries;
- Enhance breeding habitat (e.g. with nesting rafts and/or habitat management);
- Creation of 'sanctuary' or 'reserve' areas within the SPA;
- Collection of data to support the development of a sanctuary/reserve area;
- Designation of additional SPAs; and
- Contribution to a strategic fund.

10.4.203. NIRAS identified the following compensatory measures in its Compensation Note for the red-throated diver feature of Outer Thames Estuary SPA:

- Enhance breeding success by improving existing nesting locations;
- Reduction of recreational activity disturbance and visitor pressure; and
- Artificial nesting rafts.

Plan level measures

10.4.204. NIRAS identified the following measures which could compensate for the scale of the impacts predicted to be exerted by the Plan.

Artificial nesting rafts

10.4.205. Artificial nesting structures, in the form of nesting rafts, are a well-established technique for increasing red-throated diver productivity and could act as a compensation measure for the species. Red-throated divers typically breed on the shores of inland bodies of freshwater, such as ponds, lakes and lochs. However, at waterbodies with islands, they will preferentially nest on islands over the shoreline (Eberl and Picman, 1993). Once deployed, artificial nesting rafts provide comparable benefits to an island i.e. attract breeding divers and improve productivity. A study of Finnish red-throated diver populations compared the use of nesting rafts over 15 years and found that when rafts were installed, red throated divers produced 1.04 juveniles per pair, whereas only 0.65 juveniles per pair were produced in the absence of rafts (Nummi et al., 2013). The diver population with rafts also saw a steady increase in the number of breeding pairs over the course of the study, whereas the number of breeding pairs at the other population remained low (Nummi et al., 2013). A similar result was seen in Argyll, Scotland, where red-throated diver productivity increased from 0.35 to 0.75 chicks per year five years after implementing artificial nesting rafts (Merrie 1996; Rheinallt et al., 2007). Artificial nesting rafts implemented at red-throated diver breeding sites could contribute to Outer Thames Estuary SPA by bolstering populations with wintering connectivity to the SPA as well as directly increasing the number of red-throated divers recruiting into the UK National Site Network. The energetic and fitness costs of displaced red-throated divers can increase over-winter mortality, leading to possible population level consequences (Nehls et al. 2018). Contributing to a larger diver population in Outer Thames Estuary SPA will ultimately make it more resilient to the impacts associated with displacement by offsetting displacement mortality.

10.4.206. Site selection should support breeding red-throated divers that recruit into the Outer Thames Estuary SPA or the National Site Network. In the UK, red-throated divers only breed in Scotland (Dillon et al., 2009). Sites should be prioritised if there is already a high density of breeding divers and there are known constraints on breeding such as water level fluctuation, disturbance and predation. These sites would see the greatest benefits to productivity from artificial rafts. Additionally, studies have shown that sites which contain small waterbodies are preferentially selected by red-throated divers for breeding and exhibit higher breeding success (Bundy, 1978; Gibbons et al., 1994), suggesting that potential compensation should consider smaller bodies of water first. Sites located in an SPA or within 68 km of an SPA (maximum distance for natal dispersal) provide the highest chances of red-throated divers recruiting into an SPA population and the UK National Site Network (Okill, 1992). Red-throated divers that winter in Outer Thames Estuary SPA also breed in Greenland, Iceland, Scandinavia, and Russia (Kleinschmidt et al., 2022), and compensation at non-UK sites with high connectivity to UK SPAs could also benefit the UK National Site Network.

10.4.207. The provisioning of artificial nesting rafts for red-throated divers in Scotland has been considered as a compensation option by North Falls Offshore Wind Farm. Whilst NatureScot advised North Falls that this would not be considered additional to management already planned for the relevant SPAs (MacArthur Green and Royal Haskoning DHV, 2024), as red-throated divers typically breed within a 68 km radius of their natal sites, compensation could be delivered outside of an SPA (Okill, 1992). Furthermore, in response to a consultation on the draft RIAA, Natural England stated that '*The provision of artificial nest rafts in the vicinity of Scottish breeding red-throated diver SPAs could be considered as part of a package of measures for this species, as per our advice to North Falls, but in order to address the impact of effective habitat loss arising from operational displacement effects, Natural England considers that the primary compensatory measure for RTD should be the creation of 'sanctuary areas' within non-breeding diver SPAs*.'

10.4.208. Studies showed that during the first breeding season after raft installation, 51% of artificial rafts were used by divers, and 90% utilisation was achieved after three years (DeSorbo et al., 2007). Therefore, improvements to productivity could be observed during the first breeding season of deployment. Assuming measure success from the first breeding season, the first cohort of chicks fledged will reach breeding age after three years, when they can be expected to recruit into the National Site Network (Horswill and Robinson, 2015).

Enhance breeding success by improving existing nesting locations

10.4.209. Lochans are bodies of water that form within peatlands and are important habitat for breeding red-throated divers in Scotland. However, poor peatland management, including over-grazing and uncontrolled burning, have resulted in water drainage, heighted peat erosion, and bank collapse (Li et al., 2018). These processes have contributed to a subsequent drop in water level from direct water seepage and sediment infill. During studies conducted by Viking Wind Farm, it was found that active and ongoing peat erosion had destroyed several lochans and made them unsuitable for red-throated diver nesting, with several other lochans deteriorating at a rapid speed (Viking Energy Partnership, 2010b). Therefore, peatland management and restoration could be undertaken at nesting sites to improve red-throated diver nesting capacity and productivity. Viking Wind Farm is currently undertaking a peatland restoration and management project in Shetland for red-throated divers breeding on lochans (Viking Energy Partnership, 2010b; Plantecol Ltd, 2019), and NatureScot has successively restored 1,421ha of peatland in Lochrosque, Scotland, raising the water level of the impacted sites and contributing to the formation of small waterbodies (NatureScot, 2023).

10.4.210. The principal restoration technique is damming drainage channels and gullies to increase the water level, size, and quantity of connected lochans. Peat restoration could also include restoring vegetation around the lochan to prevent downward erosion and seepage, blocking or reprofiling eroding gullies, and excavating lochans that are currently too small to support breeding red-throated divers.

10.4.211. Peat restoration at breeding sites would contribute to Outer Thames Estuary SPA by bolstering populations with wintering connectivity to the SPA as well as directly increasing the number of red-throated divers recruiting into the UK National Site Network. For Outer Thames Estuary SPA, the measure would not directly offset the impact to red-throated diver distribution, but would offset any displacement mortalities.

10.4.212. The ability of this compensation measure to produce adequate birds for compensation will largely depend on whether it is implemented as a standalone measure or alongside artificial nesting rafts. If implemented in-combination with nesting raft, as proposed by Viking Wind Farm (Viking Energy Partnership, 2010b) and North Falls Offshore Wind Farm (MacArthur Green and Royal Haskoning DHV, 2024), disentangling the birds produced from this measure alone would be difficult. However, the efficacy of both measures would likely be greatly increased if employed together, with each measure producing fewer birds if delivered in isolation.

10.4.213. Timelines associated with this measure will depend on the measure or suite of measures selected for implementation. For example, Viking Wind Farm has predicted it to take three years to construct dams or enlarge lochans and five years to block or reprofile eroding gullies (Plentecol Ltd, 2019). Habitat maintenance/ monitoring may also need to be carried out regularly prior to, during, and following the breeding seasons, to ensure nest sites remain in optimal condition. Any birds produced from adults with higher breeding success or that colonise newly suitable nesting areas will take three years to reach maturity and recruit into the breeding population (Horswill and Robinson, 2015).

Reduction of recreational activity disturbance and visitor pressure

10.4.214. Red-throated divers are susceptible to disturbance both in the marine environment, where the species winters, and at their breeding sites. Various recreational activities, including walking (especially with dogs), bird watching, kayaking or use of other watercraft, and fishing, can cause disturbance to this species (Bundy, 1978; Nummi et al., 2013). At their breeding grounds, disturbance may result in flushing of birds and subsequent nest abandonment, exerting an energetic cost on adult individuals as well as direct mortality to chicks, as eggs and young are more vulnerable to predation and exposure to the elements (Buckley, 2004). At their wintering grounds, red-throated divers are known to be sensitive to vessel and watercraft (Burt et al., 2022; Natural England, 2010). The Port of London serves 30% of the UK population with many boats passing through the SPA every day (Natural England 2010). Additionally, the large coastal areas along the SPA attract tourists who, along with locals, engage in sailing, kayaking, fishing, diving, and other recreational water activities. Red-throated divers exhibit a disturbance response distance up to 10 km, which can displace them from their wintering habitat and impact their over-winter survival (Nehls, et. al., 2018). Together, these disturbance events can ultimately result in displacement and population-level consequences for red-throated divers, as repeated disturbance may reduce overall colony productivity via egg/chick loss and higher over-winter mortality (Bundy, 1978; Nummi et al., 2013; Buckley, 2004).

10.4.215. Management of shipping vessels, not including those used for the wind farms, in Outer Thames Estuary SPA would require government intervention. Furthermore, management is already in place to address some of the effects of transportation and recreation on birds in the SPA (Natural England, 2015). If disturbance reduction measures were implemented at a breeding site, it would not directly offset the impact to red-throated diver distribution at Outer Thames Estuary SPA, but it could benefit the overall population, making it more robust to change.

10.4.216. Measures aimed at reducing recreational disturbance directly at Outer Thames Estuary SPA may be limited due to additionality concerns, although cannot be ruled out completely. However, the measure is still deliverable at a range of breeding colonies with connectivity to the SPA's wintering red-throated diver population and other wintering populations that would contribute to protecting and maintaining the coherence of the UK National Site Network.

10.4.217. Any measures that reduce anthropogenic disturbance can be considered for compensation; examples include introducing visitor codes of conduct, restricted areas for watercraft, and agreements with local organisations that use the area around the breeding colony or wintering population (e.g., Lloyd et al., 2019). The most appropriate type of disturbance reduction method will ultimately be determined by the location of implementation and the specific pressures at that site. For example, North Falls Offshore Wind Farm has previously suggested designating sanctuary areas within Outer Thames Estuary SPA where vessel and recreational watercraft were restricted to minimise disturbance during the non-breeding season (MacArthur Green and Royal Haskoning DHV, 2024). However, they were advised by Natural England that Defra was considering sanctuary areas as a strategic compensation measure for red-throated divers and that it would not be suitable as a compensation measure for a single windfarm (MacArthur Green and Royal Haskoning DHV, 2024). Natural England suggests that establishing "sanctuary areas" within non-breeding SPAs at a strategic level should be the main compensation measure for this species, and a COWSC group has been formed to examine whether this approach could be recommended for inclusion in the Defra Library of Strategic Compensation Measures at some point in the future.

10.4.218. Based on the demographic rates recommended for red-throated diver in Horswill and Robinson (2015), juveniles have a survival rate of 0.560 and immature birds have a survival rate of 0.620, with individuals reach breeding age after three years. Depending on compensation requirements, the exact number of birds needed to deliver compensation could be calculated using the above parameters. At a wintering site, the population size, density, and distribution of red-throated divers in the area will need to be monitored in order to assess if the measures adequately address displacement, and to what extent they are improving over-winter survival. Furthermore, the potential substance of the measure presents an opportunity as for developers to collaborate to deliver the measures, if the predicted compensation returns exceed the compensation requirements for a single project.

10.4.219. The Outer Thames Estuary SPA already has some management to limit human disturbance, but this does not necessarily encompass all forms of disturbance, and there may be ways to implement additional targeted measures (Natural England, 2015). For breeding site disturbance, additionality should be assessed on a site-by-site basis and might be achieved by delivering additional funding to increase or maximise the success of an existing initiative, accelerate delivery which is not possible otherwise, or extend the timescales of existing successful initiatives aimed at reducing disturbance, where finances to do this are otherwise unavailable. Non-SPA sites may also host breeding populations of red-throated divers that experience high levels of visitor disturbance and may be suitable sites to deliver compensation measures.

10.4.220. Red-throated divers breed for the first time when they are three years old (Horswill and Robinson, 2015), therefore, it would take three years for any increases in productivity to benefit the UK National Site Network; however, measures addressing the wintering colonies would provide benefit to the adult wintering population immediately.

Summary

10.4.221. The Crown Estate has considered the compensation measures available for the Outer Thames Estuary SPA and is content that there is enough information available to demonstrate that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan which are estimated to be a displacement of birds from up to 108.7km^2 of the SPA.

10.4.222. Furthermore, North Falls has submitted a without prejudice compensation case including details of measures to fully compensate for the effects of that Project on red-throated divers through the delivery of nesting rafts or habitat management at breeding colonies to increase breeding success. A number of studied have shown nesting rafts to increase the productivity of breeding red-throated divers (Merrie 1996; Rheinallt *et al.*, 2007), which provides confidence in the efficacy of this measure. North Falls is the only project that contributes to the AEOI of the Plan and therefore no additional compensation, beyond that secured at project level, is required.

North Norfolk Coast SPA and Greater Wash SPA: sandwich tern

10.4.223. The predicted effect of the Plan on the sandwich tern feature of the North Norfolk Coast SPA is a collision mortality of up to 5.54 birds per annum and for the Greater Wash SPA up to 5.5 birds per annum. The AA concluded that this would undermine the conservation objective to restore or maintain these sandwich tern populations and result in an AEOI for the Plan in combination with other plans and projects. The objective of compensatory measures is to ensure that the ability of the National Site Network to maintain or restore the populations of sandwich terns is not compromised.

10.4.224. Measures identified by the projects in the Plan include the creation of new breeding habitat at Loch Ryan and predator control measures at the North Norfolk Coast SPA, Blakeney Point. These measures were approved by the Secretary of State as compensation and secured through the DCO for the Sheringham Shoal and Dudgeon Offshore Wind Farm Extension projects.

10.4.225. Other measures considered by the projects include:
- Installation of nest boxes and shelters on the Farne Islands SPA, with erection of bamboo canes to deter predation; and
- Potential payment into a strategic fund as alternative to project-led compensatory measures should the Government establish such a fund.

10.4.226. NIRAS identified the following compensatory measures in its Compensation Note for the sandwich tern feature of North Norfolk Coast SPA and Greater Wash SPA:
- Reduction of recreational activity disturbance and visitor pressure;
- Predator eradication/ exclusion and biosecurity;
- Sea level/ storm defences;
- Management of fisheries to increase prey availability; and
- Colony establishment/ enhancement.

Plan level measures

10.4.227. NIRAS identified the following measures which could compensate for the low number of birds predicted to be impacted by the Plan.

Colony establishment/ enhancement

10.4.228. This measure encompasses the restoration of lost breeding range and/or breeding sites either within or outside the impacted SPA/s; the establishment of new colonies at natural sites either within or outside the impacted SPA/s; and any supplementary measure used to support colonisation e.g. social attractants including use of decoy birds and sound lures. Measures could include a combination of engineering, vegetation control, habitat management, and predator exclusion. If delivery is targeted at SPA sites, having more breeding sites within an SPA that can be used by sandwich terns will increase the resilience and stability of the SPA population. If delivery is targeted at non-SPA sites, increasing the number of nesting habitat across the UK National Site Network will contribute to the resilience and stability of the sandwich tern population across its breeding range within the UK. For the latter, establishing new colonies of tern species at natural sites is considered a relatively straightforward and rapid process, as terns respond well to social attraction techniques and colonies may establish within the first year of implementation (Pizzolla et al., 2024). The position of this measure in the preference hierarchy as defined by Defra (2021a) will be determined by the selected location for the measure.

10.4.229. This measure may be deliverable within the impacted SPAs, if suitable locations for colony expansion or colonisation are identified and it is established that breeding numbers within the SPAs are constrained by limited nesting habitat, or at other sites within the UK National Site Network, whether SPA or non-SPA. For example, Forrester et al. (2007) suggested 31 sites in Scotland where sandwich terns once bred but have since deserted, with only four sites identified as continuing to hold regular sandwich tern breeding colonies. Therefore, there is considerable potential to manage sites in Scotland to increase breeding numbers of sandwich tern, which would contribute to protecting and reinforcing the coherence of the UK National Site Network and fill a substantial gap

in sandwich tern breeding distribution. The Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects MacArthur Green and Royal Haskoning DHV (2023a) proposed the establishment of an isolated lagoon near a historically occupied nesting site in Scotland, as part of the suite of measures for sandwich tern.

10.4.230. Following the identification of suitable sites, nest sites for hundreds of pairs could potentially be created. As a result, the compensation returns are generally expected to be moderate to large (Pizzolla et al., 2024), and the potential for collaboration between developers to deliver this measure as compensation is high. Furthermore, this measure is not currently being applied as part of regular site management.

10.4.231. Tern colonies establish quickly, often within the first or second year of deploying social attractants (Hartman et al. 2019, Hartman et al. 2020). As sandwich terns reach breeding age after three years (Horswill and Robinson, 2015), and assuming successful colonisation of any new site by the second breeding season following measure implementation, the first cohort of chicks fledged will reach breeding age after five years. At this stage, sandwich terns raised in newly established colonies will have integrated into the regional population and can potentially recruit into breeding colonies.

Management of fisheries to increase prey availability

10.4.232. Evidence from the North Norfolk Coast indicates that breeding sandwich terns primarily feed chicks sand eels and clupeids (especially sprats) (MacArthur Green, 2022). Food shortages have been identified as a factor contributing to reduced productivity in several sandwich tern colonies in the UK (Furness et al., 2013). Therefore, measures to reduce the activity of the local sand eel fishery could strengthen the UK sandwich tern metapopulation, resulting in higher numbers of breeding adults recruiting to colonies in England. This measure could directly benefit the sandwich tern colonies within the North Norfolk Coast and Greater Wash SPAs and therefore be fulfil the highest level of the preference hierarchy as defined by Defra (2021a).

10.4.233. Reducing local sand eel fishing pressure, although occurring outside of the North Norfolk Coast and Greater Wash SPAs, is anticipated to directly benefit the sandwich tern populations within these SPAs (MacArthur Green, 2022).

10.4.234. Following the closure of the sand eel fishery in the "sand eel box" off the east coast of Scotland, a significant increase in sand eel abundance was observed in the subsequent year (Greenstreet et al., 2006). Given the dependence of sandwich tern on sand eel during the breeding season, a rapid recovery of sand eel stocks within the foraging range of a sandwich tern colony is expected to result in a correspondingly swift increase in sandwich tern productivity. Should a reduction in the local sand eel fishery enhance sandwich tern breeding productivity at regional colonies, the resulting fledglings would reach breeding age after three years. This suggests a minimum timescale of five years for the compensation measure to become effective, however this does not take account of potential increases in adult survival or associated factors related to improved breeding condition.

10.4.235. Both English and Scottish Governments permanently closed sand eel fisheries within relevant waters on the 31st January 2024 and 26th March 2024 respectively. Whether or not this measure is perceived by relevant governments as compensation remains to be confirmed.

Predator eradication/exclusion and biosecurity

10.4.236. Sandwich tern are ground-nesting species and vulnerable to a range of predators at nesting colonies, including rats, foxes, stoats, and large gulls, which can reduce chick and adult survival, reducing overall colony productivity (Furness et al., 2013). Rats and foxes in particular have been implicated as key drivers of sandwich tern declines at some mainland colonies, including those within the North Norfolk Coast and Greater Wash SPAs (Perrow et al., 2017; MacArthur Green and Royal Haskoning DHV, 2023). Predator control and exclusion measures, such as fences, can be effective in increasing sandwich tern breeding success (Short, 2020; MacArthur Green, 2022), although the effectiveness of any selected measures will depend on the predator species targeted. However, there is potential for this measure to fulfil the highest or second-highest level of the preference hierarchy as defined in Defra (2021a), depending on the site of delivery and whether this is within or outside of the impacted SPAs.

10.4.237. Predator eradication is unlikely to be a feasible option for delivering compensation at mainland sandwich tern colonies, such as the North Norfolk Coast and Greater Wash SPAs, due to the tendency of predator populations to re-establish (Furness et al., 2013). Predator control measures are more likely to be effective, although would be required throughout the lifetime of any planned projects. Furthermore, it is possible that a suite of predator control measures would need to be implemented in combination to target different predator species. For example, whilst predator-exclusion fences are effective in reducing fox predation at sandwich tern colonies, these have no effect on rat populations, which require a range of trapping methods to reduce predation pressure (Furness et al., 2013; MacArthur Green and Royal Haskoning DHV, 2023). Targeting predator control and/or eradication measures at gull species presents a further logistical challenge; gull impacts on sandwich terns are thought to be low, and gull movements are sporadic and difficult to assess, making any measures aimed at these species difficult to plan. In addition to the above uncertainties relating to this measure, the main remaining uncertainty in establishing the preference hierarchy of this measure derives from determining its ability to compensate the affected site if implemented outside of the impacted SPA, and thus its position on the preference hierarchy as defined by Defra (2021a).

10.4.238. Predator control measures could be implemented at colonies within the North Norfolk Coast and Greater Wash SPAs, as has been proposed for the Sheringham Shoal and Dudgeon Extensions Offshore Wind Farm Projects (MacArthur Green and Royal Haskoning DHV, 2023). However, there are likely to be several colonies across the UK that would benefit from predator control measures. Research demonstrates that the metapopulation structure of UK sandwich terns includes strong connectivity between colonies throughout most of the North Sea, UK and Irish waters, highlighting the

potential for any measures delivered outside of impacted SPAs to deliver benefits to the UK National Site Network (Hughes et al., 2021).

10.4.239. There is a high degree of confidence that effective delivery of predator control measures will result in increased sandwich tern breeding success, and subsequently an increased breeding population. Evidence suggests that breeding success of sandwich tern colonies where predation is not a major influence tends to be around 0.8 chicks per pair, in contrast to colonies subject to predation, where it is often below 0.5 chicks per pair - a reduction of around 62.5% (Babcock and Booth 2020,b; Steel and Outram, 2020; JNCC, 2021). Therefore, using survival and demographic rates from Horswill and Robinson (2015), productivity gains from this measure could be estimated. Gains in terms of increases of sandwich tern numbers are likely to be larger than compensation requirements for multiple projects, presenting an option for developers to collaborate. Furthermore, as colonies show high levels of connectivity both within and outside of SPAs (Hughes et al., 2021), the overall scale of compensation could be considered within the context of productivity across the whole SPA and wider North Sea population.

10.4.240. It is likely that if these measures are implemented at sites with decreasing or extirpated sandwich tern colonies, such as Blakeney Point within the North Norfolk Coast SPA, they would not be subject to additionality concerns and this measure would have the potential to deliver benefits that are above and beyond normal site management. This has been stipulated by Natural England in the recent application by the Sheringham Shoal and Dudgeon Offshore Wind Farm Projects (MacArthur Green and Royal Haskoning DHV, 2023).

10.4.241. An expert panel for the Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects suggested a minimum of two breeding seasons of trials be undertaken, although this could be done in parallel with implementation if deemed appropriate (MacArthur Green and Royal Haskoning DHV, 2023). As sandwich terns reach breeding age at three (Horswill and Robinson, 2015), and assuming measured success after two years of trials, the first cohort of chicks will reach breeding age after five years. At this stage, sandwich terns raised in colonies subject to predator control measures will have integrated into the regional population and can potentially recruit into breeding colonies, such as those within the North Norfolk Coast and Greater Wash SPAs.

Reduction of recreational activity disturbance and visitor pressure

10.4.242. Sandwich terns typically nest on exposed ground along marine coastlines, preferentially selecting areas that are remote from human activity. Colonies of sandwich terns are highly susceptible to human disturbance, such as dog walkers and recreational sporting activities, which can result in colony abandonment and breeding failure (Brown and Grice, 2005; Gregersen, 2006; Forrester et al., 2007; Garthe and Flore, 2007; Herrmann et al., 2008; Spaans et al., 2018). Reduction in disturbance could fulfil the highest or second-highest level of the preference hierarchy as defined in Defra (2021a), depending on where these threats are identified, along with their impact, and whether this is within or outside of the impacted SPAs.

10.4.243. There is currently a lack of publicly available data on the impact of human disturbance on the breeding success of colonies within the impacted SPAs, highlighting a need for further investigation of this prior to measure selection. An additional uncertainty is the interplay with predation pressure; colonies that are more vulnerable to human disturbance are likely to be more vulnerable to predators (MacArthur Green and Royal Haskoning DHV, 2023), inferring a need for this measure to be considered in combination with predator control and/or exclusion measures to yield most benefit for colony productivity.

10.4.244. Measures to reduce human disturbance could theoretically be implemented at any site containing nesting sandwich tern colonies that are accessible by the public where the impact of the pressure or disturbance has been identified as negative. This may be within or outside of the impacted SPAs.

10.4.245. Breeding success of sandwich tern colonies where human disturbance is not a major influence is estimated to be around 0.8 chicks per pair (MacArthur Green and Royal Haskoning DHV, 2023). This could be compared to the productivity estimates of sandwich terns breeding at colonies identified to be impacted by human disturbance and visitor pressure, although this would need to be determined on a site-by-site basis. Using this information and based on the juvenile and immature survival rates recommended in Horswill and Robinson (2015), the exact number of birds to deliver as compensation could be calculated.

10.4.246. Any disturbance reduction measure, such as signage installation or fencing, must be additional to current or planned activities at the selected site. This might be achieved by delivering additional funding to increase or maximise the success of an existing initiative, accelerate delivery not possible otherwise or extend the timescales of existing successful initiatives aimed at reducing disturbance, where finances to do this are otherwise unavailable.

10.4.247. Sandwich terns take three years to reach breeding age, after which sandwich terns raised in colonies subject to human disturbance reduction measures will have integrated into the regional population and can potentially recruit into breeding colonies, such as those within the North Norfolk Coast and Greater Wash SPAs.

Sea level/storm defences

10.4.248. Flooding, typically due to unusually high tides and storm-driven waves, can reduce sandwich tern productivity at certain colonies. There is some scope for compensation through site engineering to reduce risk of flooding either within the impacted SPAs where risk is identified or at other sites within the UK National Site Network. Engineering work to improve sea defences at colonies, as well as further work to increase the amount of suitable nesting habitat in areas less at risk from flooding could greatly enhance productivity by providing safer nesting sites and is therefore considered as a feasible compensation measure. However, the position of this measure on the preference hierarchy as defined by Defra (2021a) depends on the where the measure is implemented.

10.4.249. There remains substantial uncertainty regarding the cost of implementing any flood defence measures, which are site-specific, as well as the suitability of any such works at sites where natural processes are encouraged as part of normal site management. In these cases, flood defence measures may interfere with such natural processes. Furthermore, Natural England, in response to a consultation on the draft RIAA, stated that '*some sandwich tern colonies sit within other designated coastal sites the features which may require natural processes, including inundation, to function freely e.g. SAC vegetated shingle. Such constraints have the potential to introduce considerable complexity into compensation proposals.*'

10.4.250. The measure could theoretically be implemented at any site identified as having previously been affected by, or is at current risk of, flooding events that put existing sandwich tern colonies at risk. Ideally, sites where such engineering work might be most cost-effective should be selected based on the recent history of flooding and the feasibility of carrying out the engineering.

10.4.251. Following the identification of suitable sites, colonies of hundreds of birds could be protected from future flooding events. As a result, the compensation returns are generally expected to be moderate to large, and there are opportunities for collaboration between developers to deliver this measure.

10.4.252. Accurate calculations to quantify the benefit of any measure aimed at reducing flood risk would likely be very difficult given the nature of this measure as preventative, i.e. eliminating future risk of sandwich tern loss, rather than delivering new birds into the SPA population. As flood risk and coastal degradation is the result of stochastic processes, many of which are likely to become more volatile and unpredictable in the wake of climate change, some uncertainty is not resolvable. However, site history and characteristics, such as previous flood events and structural integrity, can provide indicative evidence as to the potential compensation returns of the measure, taking into account flood risk at that specific site and therefore inferred future benefits from minimising or eliminating that risk.

10.4.253. Additionality concerns would need to be assessed on a site-by-site basis, following selection of a suitable site and the subsequent measures to be implemented.

10.4.254. Measures will likely be subject to a trial and installation period, after which the impact of the measures can be monitored. The time taken for this would then be added to the period taken for sandwich terns to reach breeding age (three years; Horswill and Robinson, 2015), after which sandwich terns raised in colonies subject to flood risk reduction or engineering measures will have integrated into the regional population and can potentially recruit into breeding colonies, such as those within the North Norfolk Coast and Greater Wash SPAs.

Summary

10.4.255. The Crown Estate has considered the compensation measures available for the North Norfolk Coast SPA and Greater Wash SPA and is content that there is enough information available to demonstrate that there are effective and deliverable measures available to fully compensate for the adverse effects of the Plan which are estimated to be a collision mortality of 5.54 birds per annum for the North Norfolk Coast SPA, and 5.5 birds per annum for the Greater Wash SPA.

10.4.256. The Sheringham and Dudgeon projects have compensation measures secured in the DCO to compensate for 5.54 birds per year for the for the North Norfolk Coast SPA, and 5.5 birds per year for the Greater Wash SPA. This will be delivered through the creation of a new habitat at Loch Ryan in Scotland (comprising a new inland lagoon for nesting and predator prevention measures) and a programme of research and predator control measures at Blakeney Point in the North Norfolk Coast SPA. The Crown Estate has reviewed the information presented in the DCO and is confident that the measures will fully compensate for the effects of the Plan on the sandwich tern feature of these Protected sites and the integrity of the National Site Network for sandwich tern will be maintained.

Conclusions on Compensation Measures

10.4.257. The Crown Estate agrees with NIRAS that there are effective and deliverable measures available to fully compensate for the predicted effects of the Plan that give rise to AEOI of the Protected sites identified above.

10.4.258. The identification and delivery of compensatory measures strategically has wide support amongst SNCBs and environmental NGOs and has been identified as the most appropriate approach to address the effects of multiple windfarms (HM Government, 2023b). The Crown Estate notes that there are measures available to deliver compensation for adverse effects from multiple projects. In these cases, compensation could be delivered through existing strategic mechanisms, such as those for benthic habitats at Dogger Bank SAC (using the same mechanisms as the Round 4 leasing programme); or through several projects collaborating to deliver large-scale compensation measures.

10.4.259. The Crown Estate will coordinate compensation measures for the Plan. A single overarching Compensation Plan will be developed which will include both Project-level and Plan-level compensation. The Compensation Plan must be adhered to by the relevant Projects. The requirement to adhere to the Compensation Plan will be secured in the legal agreements.

10.4.260. The development of the Compensation Plan will be overseen by a steering group established and chaired by The Crown Estate. Membership will include the Department for Energy Security & Net Zero (“DESNZ”), Department for Environment, Food & Rural Affairs (“Defra”), Natural England, the Joint Nature Conservation Committee (“JNCC”), and the relevant developers of projects. The terms of reference will be agreed with

Steering Group members before it commences operation. The Steering Group will engage on the development of the Compensation Plan with The Crown Estates HRA Expert Working Group.

10.4.261. The objective of the Compensation Plan will be the development and delivery of compensation measures to ensure the coherence of the UK National Site Network; the Compensation Plan and Steering Group will be in place as soon as practicable following the entering of projects into Agreement for Lease. The Compensation Plan will be required to include details of:

- Roles and responsibilities of involved parties
- The compensation measures
- Scale and location of proposed strategic compensation
- Consultation and engagement with stakeholders and relevant scientific experts
- Delivery mechanism and funding agreements
- Commercial agreements (if required)
- Monitoring and adaptive management
- Programme for proposed implementation and delivery

These requirements will be secured through Agreements for Lease and the Lease

10.4.262. Each developer will be responsible for delivering the compensation for the Plan-level effects to which their project contributes. For each project, the requirement for compensation will be proportionate to the contribution made by that project to the Plan-level effects. For the purposes of the Compensation Plan, this will be based on the worst-case scenario (as assessed in this AA) but there will be flexibility within the Compensation Plan for the scale and nature of compensation to be refined to reflect the requirements of the project DCOs, when these are obtained.

10.4.263. It is noted that where individual projects have prepared actual, or without prejudice, compensation plans for a feature that may need additional compensation at the Plan level, it may be possible for the relevant developers to increase the quantum of compensation measures to account for the additional impacts of the Plan.

11. Conclusions

11.1.1. Consideration has been given to the derogation tests set out in the Habitat Regulations for the demonstration of the absence of alternative solutions and IROPI as well as the identification of measures which could compensate for the adverse impacts of the Plan. The Crown Estate has demonstrated there are no alternative solutions that would be less damaging or avoid damage to the Protected sites and would meet the objectives of the Plan, and that there are IROPI for the Plan to proceed. Furthermore, effective and deliverable compensation measures have been identified and these can be secured through the legal agreements to ensure that the overall coherence of the UK National Site Network is protected and maintained.

11.1.2. The Crown Estate will coordinate with the developers of projects included in the CIP, and the wider Steering Group to produce a Compensation Plan which must be adhered to by the relevant projects. The Compensation Plan will identify the quantum of compensation requirements and the measures required to compensate this. The Compensation Plan will make provision to encompass the measures adopted at project level after more detailed design and assessment work has been undertaken and consents have been obtained. This will allow the scale and nature of compensation required for the Plan to adapt accordingly. The Compensation Plan will also make provision for continued monitoring of projects to determine the success of the measures to compensate for the Plan.

11.1.3. The Crown Estate considers that the three tests for reliance on a derogation under the Habitats Regulations have been met and as such the Plan can proceed to the next stage where a notification of derogation is sent to the Secretary of State.

11.1.4. The Crown Estate will complete the 'Notice of a proposed Habitats Regulations Assessment (HRA) derogation in England and Wales' to notify the relevant government department (Department for Energy Security and Net Zero), and the Department for Environment, Food and Rural Affairs, that the HRA for the Plan has been completed and that The Crown Estate intends to proceed with the Plan notwithstanding the AEOI on the following Protected sites/ features in reliance on a derogation:

- Dogger Bank SAC: Sandbanks which are slightly covered by seawater all the time;
- Margate and Long Sands SAC: Sandbanks which are slightly covered by seawater all the time;
- Flamborough and Filey Coast SPA: Kittiwake (breeding), guillemot (breeding), razorbill (breeding), gannet (breeding), and seabird assemblage (breeding);
- Farne Islands SPA: Guillemot (breeding);
- Alde-Ore Estuary SPA: Lesser black-backed gull (breeding);
- Outer Thames Estuary SPA: Red-throated diver (wintering);
- North Norfolk Coast SPA: Sandwich tern (breeding); and
- Greater Wash SPA: Sandwich tern (breeding).

11.1.5. Following submission of the notice of derogation, The Crown Estate will wait 21 days (unless advised otherwise) before adopting the Plan.

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