Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

Habitats Regulations Derogation: Provision of Evidence

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Prepared by:		
Royal HaskoningDHV		
Approved by:		Date:
Sarah Chandler, Equinor		August 2022

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Glossary of Acronyms

AA	Appropriate Assessment
AC	Alternating Current
BEIS	Department for Business, Energy and Industrial Strategy
c.	Circa
CCC	Committee on Climate Change
CCRA	Climate Change Risk Assessment
CI	Confidence Interval
CfD	Contracts for Difference
COP	Conference of the Parties
DCO	Development Consent Order
DECC	Department for Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
DEP	Dudgeon Offshore Wind Farm Extension Project
DOW	Dudgeon Offshore Wind Farm
EC	European Commission
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
GVA	Gross Value Added
GW	Gigawatt
HAT	Highest Astronomical Tide
HM	Her Majesty's
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
IROPI	Imperative Reasons of Overriding Public Interest

km	Kilometre
LSE	Likely Significant Effect
m	Metre
MCA	Maximum Curvature Analysis
MGN	Marine Guidance Note
MW	Megawatt
NASA	National Aeronautics and Space Administration
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
ORE	Offshore Renewable Energy
OSP	Offshore Substation Platform
RIAA	Report to Inform Appropriate Assessment
SEP	Sheringham Shoal Offshore Wind Farm Extension Project
SOW	Sheringham Shoal Offshore Wind Farm
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
TCE	The Crown Estate
UK	United Kingdom
WMO	World Meteorological Organisation

Glossary of Terms

Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
DEP offshore site	The Dudgeon Offshore Wind Farm Extension consisting of the DEP wind farm site, interlink cable corridors and offshore export cable corridor (up to mean high water springs).
DEP onshore site	The Dudgeon Offshore Wind Farm Extension onshore area consisting of the DEP onshore substation site, onshore cable corridor, construction compounds, temporary working areas and onshore landfall area.
DEP North array area	The wind farm site area of the DEP offshore site located to the north of the existing Dudgeon Offshore Wind Farm
DEP South array area	The wind farm site area of the DEP offshore site located to the south of the existing Dudgeon Offshore Wind Farm
DEP wind farm site	The offshore area of DEP within which wind turbines, infield cables and offshore substation platform/s will be located and the adjacent Offshore Temporary Works Area. This is also the collective term for the DEP North and South array areas.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive. This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation, potential Special Protection Areas, Special Protection Areas, Ramsar sites, proposed Ramsar sites and sites compensating for damage to a European site and is defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017, although some of the sites listed here are afforded equivalent policy protection under the National Planning Policy Framework (2021) (paragraph 176) and joint Defra/Welsh Government/Natural England/NRW Guidance (February 2021).
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the EIA and HRA for certain topics.

Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Infield cables	Cables which link the wind turbine generators to the offshore substation platform(s).
Interlink cables	Cables linking two separate project areas. This can be cables linking: 1) DEP South array area and DEP North array area 2) DEP South array area and SEP 3) DEP North array area and SEP 1 is relevant if DEP is constructed in isolation or first in a phased development. 2 and 3 are relevant where both SEP and DEP are built.
Interlink cable corridor	This is the area which will contain the interlink cables between offshore substation platform/s and the adjacent Offshore Temporary Works Area.
Integrated Grid Option	Transmission infrastructure which serves both extension projects.
Landfall	The point at the coastline at which the offshore export cables are brought onshore and connected to the onshore export cables.
Offshore cable corridors	This is the area which will contain the offshore export cables or interlink cables, including the adjacent Offshore Temporary Works Area.
Offshore export cable corridor	This is the area which will contain the offshore export cables between offshore substation platform/s and landfall, including the adjacent Offshore Temporary Works Area.
Offshore export cables	The cables which would bring electricity from the offshore substation platform(s) to the landfall. 220 – 230kV.
Offshore substation platform	A fixed structure located within the wind farm area, containing electrical equipment to aggregate the power

	from the wind turbine generators and convert it into a more suitable form for export to shore.
Offshore Temporary Works Area	An Offshore Temporary Works Area within the offshore Order Limits in which vessels are permitted to carry out activities during construction, operation and decommissioning encompassing a 200m buffer around the wind farm sites and a 750m buffer around the offshore cable corridors. No permanent infrastructure would be installed within the Offshore Temporary Works Area.
Onshore Substation	Compound containing electrical equipment to enable connection to the National Grid.
Separated Grid Option	Transmission infrastructure which allows each project to transmit electricity entirely separately.
Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Shoal Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
SEP offshore site	Sheringham Shoal Offshore Wind Farm Extension consisting of the SEP wind farm site and offshore export cable corridor (up to mean high water springs).
SEP onshore site	The Sheringham Shoal Wind Farm Extension onshore area consisting of the SEP onshore substation site, onshore cable corridor, construction compounds, temporary working areas and onshore landfall area.
SEP wind farm site	The offshore area of SEP within which wind turbines, infield cables and offshore substation platform/s will be located and the adjacent Offshore Temporary Works Area.
The Applicant	Equinor New Energy Limited. As the owners of SEP and DEP, Scira Extension Limited (SEL) and Dudgeon Extension Limited (DEL) are the named undertakers that have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of SEL and DEL as the undertakers of SEP and DEP.

1 INTRODUCTION

1.1 Project Background

1. Equinor New Energy Limited ('the Applicant') is applying for a Development Consent Order (DCO) for the Sheringham Shoal Offshore Wind Farm Extension Project (hereafter 'SEP') and the Dudgeon Offshore Wind Farm Extension Project (hereafter 'DEP'). As set out in the Environmental Statement (ES) **Chapter 1 Introduction** (document reference 6.1.1), whilst SEP and DEP have different ownership and are each Nationally Significant Infrastructure Projects (NSIPs) in their own right, a single coordinated application for development consent has been developed and is made to address both wind farms, and the associated transmission infrastructure. A single planning process and DCO application is intended to provide for consistency in the approach to the assessment, consultation and examination and maximise the opportunities for coordinated offshore wind farm development in the region.
2. As owners of SEP and DEP, Scira Extension Limited (SEL) and Dudgeon Extension Limited (DEL) are the named undertakers that have the benefit of the DCO. References throughout this document and any supporting annexes to obligations on, or commitments by, 'the Applicant' are given on behalf of SEL and DEL as the undertakers of SEP and DEP.
3. When operational, SEP and DEP combined would have the potential to generate renewable power for approximately 785,000 United Kingdom (UK) homes from up to 30 wind turbines at DEP and up to 23 wind turbines at SEP.
4. Electricity will flow from the wind turbines via infield (array) cables to offshore substation platform/s. There will be up to two offshore substation platforms (OSP) with one in the DEP North array area and one in the SEP wind farm site, located to optimise the length of the offshore cables. Interlink cables will link the separate project areas. At the OSP/s, the generated power will be transformed to a higher alternating current (AC) voltage. The power will be exported through up to two export cables, in two separate trenches, to a landfall in Weybourne on the North Norfolk coast.
5. At the landfall location, the offshore export cables will meet and be joined up with the onshore export cables in a transition joint bay. From there, the onshore export cables travel approximately 60km inland to a new high voltage alternating current (HVAC) onshore substation near to the existing Norwich Main substation. The onshore substation will be constructed to accommodate the connection of both SEP and DEP to the transmission grid.
6. As discussed in **ES Chapter 4 Project Description** (document reference 6.1.4), the Applicant is seeking to coordinate the development of SEP and DEP as far as possible. The preferred option is a development scenario with an integrated transmission system, providing transmission infrastructure serving both of the wind farms, where both Projects are built concurrently. However, given the different commercial ownerships of each Project, alternative development scenarios such as a separated grid option (i.e. transmission infrastructure which allows each Project to transmit electricity entirely separately) will allow SEP and DEP to be constructed in a phased approach, if necessary. Therefore, the DCO application seeks to

consent a range of development scenarios in the same overall corridors to allow for separate development if required, and to accommodate either sequential or concurrent build of the two Projects.

7. Reasons for the requirement to retain separate and phased (sequential) development scenarios alongside more coordinated approaches are further described in the **Scenarios Statement** (document reference 9.28).

1.2 Purpose of this Document

8. This document provides evidence to support Stage 3 (Derogation) of the Habitats Regulations Assessment (HRA) Process (**Plate 3-1**) in relation to the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (SPA) and the Sandwich tern feature of the North Norfolk Coast SPA and Greater Wash SPA.

9. This document is informed by the **Report to Inform Appropriate Assessment (RIAA)** (document reference 5.4) which concludes for the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (SPA) and the Sandwich tern feature of the North Norfolk Coast SPA and Greater Wash SPA, that an adverse effect on site integrity cannot be ruled out due to in-combination collision risk impacts for kittiwake and in-combination collision impacts and in-combination combined displacement and collision risk impacts for Sandwich tern. For all other sites and features assessed in the **RIAA**, a conclusion of no adverse effect on site integrity is reached.

10. In light of the Applicant's conclusions for kittiwake and Sandwich tern, the Applicant is providing an HRA derogation case. Additionally, in response to feedback from consultation undertaken during the pre-application period (including on the draft RIAA provided as part of the section 42 consultation) and discussions with the ornithology compensation Expert Topic Group (ETG), a derogation case has also been provided with respect to the gannet, guillemot and razorbill features of the Flamborough and Filey Coast SPA. However, the Applicant's **RIAA** concludes no adverse effect on integrity for these features and therefore this HRA derogation case and associated compensatory measures are provided on a 'without prejudice' basis for these species. This approach is in accordance with the draft Overarching National Policy Statement for Energy (NPS EN-1), the draft National Policy Statement for Renewable Energy (NPS EN-3) and statements from the Secretary of State in the Hornsea Project Three and Norfolk Boreas decisions (**Section 2.2**).

11. This document includes the Applicant's submission in relation to alternative solutions (**Section 4**), Imperative Reasons of Overriding Public Interest (IROPI) (**Section 5**) and proposed compensatory measures in respect of the North Norfolk Coast SPA, Greater Wash SPA and Flamborough and Filey Coast SPA (**Section 6** and **Appendices 1, 2**, **3** and **4** (document reference 5.5.1 – 5.5.5)). **Sections 2** and **4.4** respectively provide the legislative context and information on the relevant designated sites and interest features.

2 LEGISLATIVE AND POLICY CONTEXT

2.1 Legislation

2.1.1 UK Legislation

12. In England and Wales, the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'), the Wildlife and Countryside Act 1981 and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Marine Habitats Regulations) (which applies outside of 12nm) transposed the Habitats Directive and Birds Directive into UK law.

13. Regulation 63 of the Habitats Regulations and Regulation 28 of the Marine Habitats Regulations provide the requirement for AA and align with Article 6(3) of the Habitats Directive (**Table 2-1**).

14. Regulations 64 and 68 of the Habitats Regulations and Regulations 29 and 36 of the Marine Habitats Regulations provide the HRA derogation procedure and are aligned with the requirements of Article 6(4) of the Habitats Directive (**Table 2-1**).

Table 2-1: Relevant Regulations

Regulation	Requirement
Regulations transposing Article 6(3)	
Habitats Regulations Regulation 63	*"(1) 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 of the plan or project for that site in view of that site's conservation objectives.* *(2) A person applying for any such consent, permission or other authorisation must provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable it to determine whether an appropriate assessment is required.* *(3) The competent authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.* *(4) It must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.* *(5) In the light of the conclusions of the assessment, and subject to regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).* *(6) In considering whether a plan or project will adversely affect the integrity of the site, the competent authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given….* *…(8) Where a plan or project requires an appropriate assessment both under this regulation and under the Offshore Marine Conservation Regulations, the assessment required by this regulation need not identify those effects of the plan or project that are specifically attributable to that part of it that is to be carried out in the United Kingdom, provided that an assessment made for the purpose of this*

Regulation	Requirement
	regulation and the Offshore Marine Conservation Regulations assesses the effects of the plan or project as a whole."
Marine Habitats Regulations Regulation 28	*"(1) Before deciding to undertake, or give any consent, permission or other authorisation for, a relevant plan or project, a competent authority must make an appropriate assessment of the implications of the plan or project for the site in view of that site's conservation objectives.* *(2) In paragraph (1), a "relevant plan or project" is a plan or project which—* *(a) is to be carried out on or in any part of the waters or on or in any part of the seabed or subsoil comprising the offshore marine area, or on or in relation to an offshore marine installation;* *(b) is likely to have a significant effect on a European offshore marine site or a European site (either alone or in combination with other plans or projects); and* *(c) is not directly connected with or necessary to the management of the site.* *(3) A person applying to a competent authority for any consent, permission or other authorisation for a plan or project in the offshore marine area must provide such information as the competent authority may reasonably require—* *(a)to enable it to determine whether an assessment under paragraph (1) is required; or* *(b)for the purposes of an assessment under paragraph (1).* *(4) The competent authority must for the purposes of the assessment—* *(a)where it relates to a European offshore marine site, consult the Joint Committee;* *(b)where it relates to a European site in England, consult Natural England;…* *…(f)if it considers it appropriate, take the opinion of the general public and if it does so, take such steps for that purpose as it considers appropriate.* *(5) In the light of the conclusions of the assessment, and subject to regulation 29, the competent authority may agree to the plan or project only if it has ascertained that it will not adversely affect the integrity of the European offshore marine site or European site (as the case may be).* *(6) In considering whether a plan or project will adversely affect the integrity of a site, the competent authority must have regard to the manner in which it is proposed to be carried out and to any conditions or restrictions subject to which the competent authority proposes that the consent, permission or other authorisation should be given"*
Regulations transposing Article 6(4)	
Habitats Regulations Regulation 64	*"(1) If the competent authority is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), it may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be).* *(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—* *(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or* *(b) any other reasons which the competent authority, having due regard to the opinion of the appropriate authority, considers to be imperative reasons of overriding public interest.* *(3) Where a competent authority other than the Secretary of State or the Welsh Ministers desires to obtain the opinion of the appropriate authority as to whether reasons are to be considered imperative reasons of overriding public interest, it may submit a written request to the appropriate authority—* *(a) identifying the matter on which an opinion is sought; and* *(b) accompanied by any documents or information which may be required.*

Regulation	Requirement
	(4) In giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the appropriate authority must have regard to the national interest, and provide its opinion to the competent authority. *(4A) Before giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the appropriate authority must consult the following, and have regard to their opinion—* *(a) the Joint Nature Conservation Committee;* *(b) where the appropriate authority is the Secretary of State, the devolved administrations;* *(c) where the appropriate authority is the Welsh Ministers, the Secretary of State, and the other devolved administrations; and* *(d) any other person the appropriate authority considers appropriate.* *(5) Where a competent authority other than the Secretary of State or the Welsh Ministers proposes to agree to a plan or project under this regulation notwithstanding a negative assessment of the implications for the site concerned—* *(a) it must notify the appropriate authority; and* *(b) it must not agree to the plan or project before the end of the period of 21 days beginning with the day notified by the appropriate authority as that on which its notification was received, unless the appropriate authority notifies it that it may do so.* *(6) Without prejudice to any other power, the appropriate authority may give directions to the competent authority in any such case prohibiting it from agreeing to the plan or project, either indefinitely or during such period as may be specified in the direction."*
Habitats Regulations Regulation 68	*"Where in accordance with regulation 64—* *(a) a plan or project is agreed to, notwithstanding a negative assessment of the implications for a European site or a European offshore marine site, or* *(b) a decision, or a consent, permission or other authorisation, is affirmed on review, notwithstanding such an assessment,* *the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected."*
Marine Habitats Regulations Regulation 29	*"(1) If it is satisfied that, there being no alternative solutions, the plan or project referred to in regulation 28(1) must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), the competent authority may agree to the plan or project notwithstanding a negative assessment of the implications for the site.* *(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—* *(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or* *(b) any other imperative reasons of overriding public interest.* *(3) A competent authority other than the relevant administration may not agree to a plan or project under paragraph (1) for any reason referred to in paragraph (2)(b) unless it has had due regard to the opinion of the relevant administration in satisfying itself that there are such reasons.* *(4) Where a competent authority other than the relevant administration desires to obtain the opinion of the relevant administration as to whether reasons are to be considered imperative reasons of overriding public interest, it must submit a request to the relevant administration —* *(a) identifying the matter on which an opinion is sought; and* *(b) accompanied by any documents or information that may be required.*

Regulation	Requirement
	(5) In giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the relevant administration must have regard to the national interest, and provide its opinion to the competent authority. *(6) Before giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the relevant administration must consult the following, and have regard to their opinion—* *(a) the Joint Nature Conservation Committee;* *(b) where the relevant administration is the Secretary of State, the devolved administrations;* *(c) where the relevant administration is a devolved administration, the Secretary of State and the other devolved administrations; and* *(d) any other person the relevant administration considers appropriate.* *(7) In this regulation, "the relevant administration" means—* *(a) in relation to a plan or project relating to an activity other than one specified in regulation 55(16)—* *(i) where the plan or project is to be carried out in the Scottish offshore region, the Scottish Ministers; and* *(ii) where the plan or project is to be carried out in the Welsh offshore region, the Welsh Ministers; and* *(b) in relation to a plan or project relating to an activity specified in regulation 55(16), or in any case not falling within sub-paragraph (a)(i) or (ii), the Secretary of State."*
Marine Habitats Regulations Regulation 36	*"(1) This regulation applies where, notwithstanding a negative assessment of the implications for a European offshore marine site or European site—* *(a) a plan or project is agreed to in accordance with regulation 29; or* *(b)a decision, or a consent, permission or other authorisation, is affirmed on review in accordance with regulations 29 and 34(3).* *(2) The appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected."*

15. It is noted that in May 2021 the Environment Secretary signalled the Government's intention to reform the Habitats Regulations to ensure that legislation supports the Government's nature recovery targets. The Government convened an HRA working group and has released a summary of its findings in 2022 (Defra, 2022a). Additionally, the Nature Recovery Green Paper: Protected Sites and Species (Defra, 2022b) which outlines the recommendations of the HRA working group and proposes changes to existing legislation, was consulted upon from March – May 2022.

16. The Applicant has prepared the Applications for SEP and DEP based upon legislation in place at the time of the DCO application submission.

2.1.2 The Habitats Directive

17. The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (the Habitats Directive) provides a framework for the conservation and management of certain habitats and species in Europe. Its aim is to maintain or restore those habitats and species at a favourable conservation status and protect them from the potential adverse effects of plans and projects. The relevant provision of the Directive is the procedure for the protection of Special

Areas of Conservation (SACs) (Article 6). SACs are identified and designated based on the presence of the natural habitat types listed in Annex I and populations of the species listed in Annex II.

18. The European Union (EU) Directive on the Conservation of Wild Birds (2009/147/EC) (the Birds Directive) provides a framework for the conservation and management of certain wild birds in Europe and the identification and designation of SPAs.

19. The Habitats Directive and the Birds Directive provided the foundations for the UK Habitats Regulations, although they no longer form part of UK legislation. In the UK, the Habitats Regulations have been amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, to reflect the UK's departure from the European Union. This has, among other changes, replaced the provisions which gave a role to the European Commission (EC) in relation to derogations in certain scenarios.

20. Article 6(3) of the Habitats Directive (see **Table 2-2**) sets out the approval procedure associated with a plan or project for which there is a Likely Significant Effect (LSE) on European sites. Such plans or projects are subject to an AA (see **Section 2.2**). Article 6(4) of the Habitats Directive (see **Table 2-2**) provides the 'HRA derogation' procedure, where an adverse effect on the integrity of a habitats site cannot be ruled out as a result of a plan or project.

Table 2-2: Relevant Articles

Article	Requirement
Habitats Directive Article 6(3)	"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."
Habitats Directive Article 6(4)	"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."

2.2 Policy

21. The draft Overarching National Policy Statement for Energy (NPS EN-1) (BEIS, 2021a) and draft National Policy Statement for Renewable Energy (NPS EN-3) (BEIS, 2021b) outline the requirements for Applicants to provide evidence to support an HRA derogation case at the application stage, where the Statutory Nature

Conservation Body (SNCB) has advised that it may not be possible to rule out an adverse effect on site integrity (**Table 2-3**).

22. The need for information to be provided at the application stage was also stated by the Secretary of State in the Hornsea Project Three (BEIS, 2020a) and Norfolk Boreas (BEIS, 2021c) decision letters: *"in order to maintain the efficient functioning of the development consenting regime, he may not always request post-examination representations on such matters [HRA], indeed it should be assumed that he will not do so, and he may therefore make decisions on such evidence as is in front of him following his receipt of the ExA's Report".*

Table 2-3: Relevant Policies of the NPS EN-1 and Draft NPS EN-1

Paragraph	Policy
NPS EN-1 Paragraph 4.3.1	"*Prior to granting a development consent order, the [SoS] must, under the Habitats and Species Regulations, (which implement the relevant parts of the Habitats Directive and the Birds Directive in England and Wales) consider whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects. Further information on the requirements of the Habitats and Species Regulations can be found in a Government Circular. Applicants should also refer to Section 5.3 of this NPS on biodiversity and geological conservation. The applicant should seek the advice of Natural England and/or the Countryside Council for Wales, and provide the [SoS] with such information as it may reasonably require to determine whether an Appropriate Assessment is required. In the event that an Appropriate Assessment is required, the applicant must provide the [SoS] with such information as may reasonably be required to enable it to conduct the Appropriate Assessment. This should include information on any mitigation measures that are proposed to minimise or avoid likely effects*".
NPS EN-1 Paragraph 4.4.3	*"Where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements. Given the level and urgency of need for new energy infrastructure, the [SoS] should, subject to any relevant legal requirements (e.g. under the Habitats Directive) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives:* ● *the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner;* ● *the [SoS] should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development;* ● *where (as in the case of renewables) legislation imposes a specific quantitative target for particular technologies or (as in the case of nuclear) there is reason to suppose that the number of sites suitable for deployment of a technology on the scale and within the period of time envisaged by the relevant NPSs is constrained, the [SoS] should not reject an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals;* ● *alternatives not among the main alternatives studied by the applicant (as reflected in the ES) should only be considered to the extent that the [SoS] thinks they are both important and relevant to its decision;* ● *as the [SoS] must decide an application in accordance with the relevant NPS (subject to the exceptions set out in the Planning Act 2008), if the [SoS] concludes that a decision to grant consent to a hypothetical alternative proposal would not be in accordance with the policies set out in the relevant NPS, the existence of that alternative is unlikely to be important and relevant to the [SoS]'s decision;*

Paragraph	Policy
	● *alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the [SoS]'s decision;* ● *alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the [SoS]'s decision; and* ● *it is intended that potential alternatives to a proposed development should, wherever possible, be identified before an application is made to the [SoS] in respect of it (so as to allow appropriate consultation and the development of a suitable evidence base in relation to any alternatives which are particularly relevant). Therefore where an alternative is first put forward by a third party after an application has been made, the [SoS] may place the onus on the person proposing the alternative to provide the evidence for its suitability as such and the [SoS] should not necessarily expect the applicant to have assessed it."*
draft NPS EN-1, paragraph 4.2.10	"*If, during the pre-application stage, the SNCB indicate that the proposed development is likely to adversely impact the integrity of HRA sites, the applicant must include with their application such information as may reasonably be required to assess a potential derogation under the Habitats Regulations…. Applicants must have discussed with SNCB whether any proposed compensation is appropriate, and the compensation must be secured, or an indication given as to how it can be secured. Provision of such information will not be taken as an acceptance of adverse impacts and if an applicant disputes the likelihood of adverse impacts, it can provide this information without prejudice to the Secretary of State's final decision on the impacts of the potential development. If, in these circumstances, an applicant does not supply information required for the assessment of a potential derogation, there will be no expectation that the Secretary of State will allow the applicant the opportunity to provide such information following the examination*."
draft NPS EN-1 paragraph 4.2.13	*"Where there is a policy or legal requirement to consider alternatives, the applicant should describe the alternatives considered in compliance with these requirements. Given the level and urgency of need for new energy infrastructure, the Secretary of State should, subject to any relevant legal requirements (e.g. under the Habitats Regulations) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives:* *• the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner* *• only alternatives that can meet the objectives of the proposed development need be considered* *• the Secretary of State should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security, climate change, and other environmental benefits) in the same timescale as the proposed development* *• the Secretary of State should not refuse an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals* *• alternatives not among the main alternatives studied by the applicant (as reflected in the ES) should only be considered to the extent that the Secretary of State thinks they are both important and relevant to the decision* *• as the Secretary of State must assess an application in accordance with the relevant NPS (subject to the exceptions set out in the Planning Act 2008), if the Secretary of State concludes that a decision to grant consent to a hypothetical alternative proposal would not be in accordance with the policies set out in the relevant NPS, the existence of that alternative is unlikely to be important and relevant to the Secretary of State's decision* *• alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or*

Paragraph	Policy
	alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the Secretary of State's decision *• alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the Secretary of State's decision Overarching National Policy Statement for Energy (EN-1) 52* *• it is intended that potential alternatives to a proposed development should, wherever possible, be identified before an application is made to the Secretary of State (so as to allow appropriate consultation and the development of a suitable evidence base in relation to any alternatives which are particularly relevant). Therefore, where an alternative is first put forward by a third party after an application has been made, the Secretary of State may place the onus on the person proposing the alternative to provide the evidence for its suitability as such and the Secretary of State should not necessarily expect the applicant to have assessed it"*
draft NPS EN-3, paragraph 2.24.12	"*With increasing deployment of offshore wind farms, cumulative environmental impacts upon HRA sites and MCZs may not be able to be addressed by mitigation alone, therefore compensation measures may be required where adverse effects on site integrity and/or on conservation objectives cannot be ruled out. In such cases, derogation for Imperative Reasons of Overriding Public Interest (IROPI) and associated compensatory measures under the Habitats Regulations, or derogation where the benefit to the public clearly outweighs the risk of damage to the environment and associated measures of equivalent environmental benefit (MEEB) under Marine and Coastal Access Act, may be necessary to allow deployment to continue*."
draft NPS EN-3, paragraph 2.24.13	"*As set out in [draft] EN-1 (paragraphs 4.2.9 - 4.2.13) as a general principle, development should at the very least aim to avoid significant impacts to protected sites, including through mitigation and consideration of reasonable alternatives. Where such a significant impact cannot be avoided then appropriate compensation measures should be sought. In instances where the HRA determines that an energy infrastructure development proposal will result in significant adverse effects to a protected site, then the applicant should propose compensatory measures that compensate for those adverse effects identified*."
draft NPS EN-3, paragraph 2.24.14	"*If, during the pre-application stage, statutory nature advisors indicate that the proposed development is likely to adversely impact a protected site, the applicant should include with their application such information as may reasonably be required to assess potential derogations under the Habitats Regulations or the Marine and Coastal Access Act*."
draft NPS EN-3, paragraph 2.24.15	"*It is vital that applicants consider the need for compensation as early as possible in the design process as 'retrofitting' compensatory measures will introduce delays and uncertainty to the consenting process. Applicants should work with statutory nature conservation advisors and Defra to develop a compensation plan for all protected sites adversely affected by the development and include this plan with their application to the Secretary of State*".
draft NPS EN-3, paragraph 2.24.16	"*Where several developers are likely to have cumulative impacts on the same species or feature it may be appropriate to collaborate with each other on compensation measures. Applicants may also want to coordinate with other marine industry sectors also needing to find compensatory measures. Defra will be publishing guidance imminently to help applicants consider how compensation should be developed."*
draft NPS EN-3, paragraph 2.24.17	*"the scale of offshore wind developments and potential in-combination effects means compensation could be required and applicants should refer to the latest Defra compensation guidance when making their assessments*."

3 HABITATS REGULATIONS ASSESSMENT PROCESS

23. Under the Habitats Regulations and the Marine Habitats Regulations, the relevant competent authority must consider whether a plan or project has the potential to have an adverse effect on site integrity of a habitats site. HRA derogation under Article 6(4) and the associated Regulations (see **Table 2-1**) can only apply after the AA has concluded that an adverse effect on site integrity cannot be ruled out.

24. The following UK and ECEC Guidance addresses Article 6(4):

- Department for Environment, Food & Rural Affairs (Defra) *et al*. (2021) Habitats Regulations Assessments: protecting a European site, published February 2021
- Defra (2021a) Best practice guidance for developing compensatory measures in relation to Marine Protected Areas. Draft for consultation.

25. **Plate 3-1** provides an outline of the sequential HRA process. This HRA derogation document provides information only relating to Stage 3. A **RIAA** (document reference 5.4) is provided with the DCO application, which supports Stages 1 and 2 of the HRA process.

26. The **RIAA** concludes that an in-combination adverse effect on integrity of the Sandwich tern feature of the North Norfolk Coast SPA and Greater Wash SPA and the kittiwake feature of the Flamborough and Filey Coast SPA cannot not be ruled out and therefore a derogation case has been provided.

27. The **RIAA** concludes no adverse effect on integrity for the gannet, guillemot and razorbill features of the Flamborough and Filey Coast SPA however a ‘without prejudice’ derogation case has been provided for these species following review of the comments received on the draft RIAA consulted on as part of the section 42 consultation and the further consultation undertaken with the ornithology compensation ETG. It should be noted that the approach to the development of compensatory measures is the same regardless of whether they are being provided on a 'without prejudice' basis or not.

28. A summary of the conclusions of the **RIAA** is provided in **Section 4.4**.

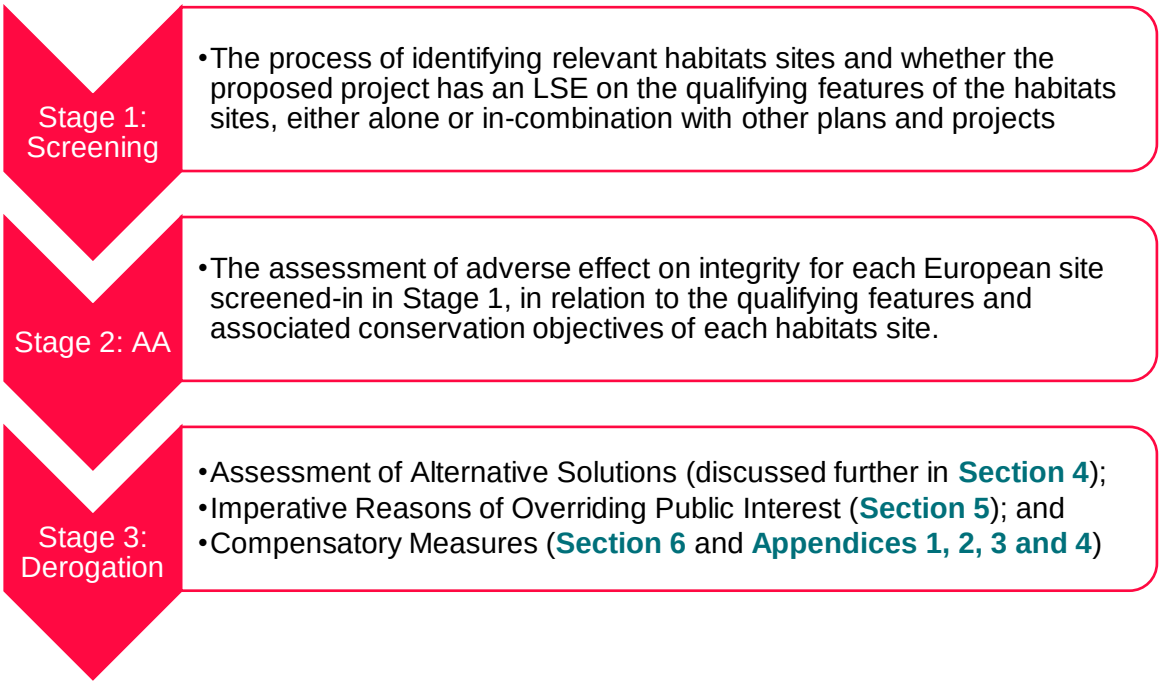

Plate 3-1 HRA Process

4 ASSESSMENT OF ALTERNATIVE SOLUTIONS

4.1 Introduction

29. As outlined in **Section 1.1**, SEP and DEP are extensions to the existing Sheringham Shoal offshore wind farm (SOW) and Dudgeon offshore wind farm (DOW) which were identified during the 2017 extension leasing round. The selection process undertaken by The Crown Estate (TCE) was informed by a plan level HRA of all the offshore wind farm extension applications received, which was completed in August 2019 (TCE, 2019). Key criteria that influenced the TCE process included that wind farm extensions must share a boundary with the existing (parent) wind farm; and that other than the existing wind farm, the proposed extensions must not encroach within a radius of 5km of any other wind farm (unless the tenant of any such wind farm had confirmed its agreement otherwise). The latter consideration limited the proposed boundary of the SEP wind farm site to the west due to an application to extend the Race Bank offshore wind farm from its eastern boundary. In addition, the TCE application criteria required that the proposed wind farm to be extended must be constructed and fully operational at the date of the application. The Applicant also took into account the requirement for the size of the proposed extension to be of an appropriate scale to the existing site, and to only apply for an area that was necessary and proportional to the installed capacity, taking account of necessary flexibility.

4.2 Approach

30. Defra *et al.* (2021) provides guidance on the approach to the consideration of alternative solutions under the HRA derogation tests. Of relevance to an offshore

wind farm array, the guidance states that the assessment of alternative solutions must consider:

- Alternative locations;
- Alternative scale/size;
- Alternative design;
- Alternative method; and
- Alternative timing.

31. In order to assess the alternative solutions, Defra *et al.* (2021) states:

"An alternative solution is acceptable if it:

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

32. Defra *et al.* (2021) establishes that the consideration of alternative solutions need not go beyond the form of energy generation proposed, in order to deliver the objectives of renewable energy production:

"Examples of alternatives that may not meet the original objective include a proposal that:

- *offers nuclear instead of offshore wind energy"*

33. Established government policy in NPS EN-1 designated by the Secretary of State also sets limits on alternatives that may be considered in decisions on development consent applications. Whilst this policy applies to development consent decisions rather than specifically to the HRA, it lends emphasis to principles established in the Defra Guidance, in particular where it states in paragraph 4.4.3 that the Secretary of State:

"should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development;

…

alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant

…

alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the IPC's decision".

34. Paragraph 4.2.13 of draft NPS EN-1 (2021) contains similar draft policy:

"the Secretary of State should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same

infrastructure capacity (including energy security, climate change, and other environmental benefits) in the same timescale as the proposed development

…

alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the Secretary of State's decision

…

alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the Secretary of State's decision".

35. In accordance with the Defra guidance (Defra *et al*., 2021), only offshore wind farms (and not other forms of energy provision) are considered in this assessment of alternative solutions.

36. Defra (2021a) compensatory measures guidance advises that a "do nothing" option should be considered.

37. The methodology adopted to assess alternative solutions has been developed based on former and current guidance from a range of sources, including:

- Defra (2012). Habitats and Wild Birds Directives: guidance on the application of Article 6(4) Alternative solutions, IROPI and compensatory measures.
- Defra (2021a) Best practice guidance for developing compensatory measures in relation to Marine Protected Areas. Draft for consultation.
- Defra, *et al.* (2021). Habitats regulations assessments: protecting a European site; How a competent authority must decide if a plan or project proposal that affects a European site can go ahead.
- Defra (2021b) Policy paper Changes to the Habitats Regulations 2017.
- EC (2001). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
- EC (2011). Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones; with particular attention to port development and dredging.
- EC (2012). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.
- EC (2019). Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.
- The Planning Inspectorate (2017). Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects.

38. The approach to this derogation case has also been developed through consideration of UK precedents, namely:

- The Hornsea Project Three HRA produced by the Secretary of State (BEIS, 2020a);
- The Norfolk Boreas HRA produced by the Secretary of State (BEIS, 2021c);
- The East Anglia ONE North and East Anglia TWO HRA produced by the Secretary of State (BEIS, 2022a; 2022b); and
- The Norfolk Vanguard HRA produced by the Secretary of State (BEIS 2022c).

39. The methodology adopted herein follows the following steps each of which is detailed and evidenced within the following subsections of this document:

- Step 1 – summarise the Project need and objectives in order to allow the assessment (Step 3) to determine whether the alternative solution(s) achieve the same overall objective(s);
- Step 2 – identify the risk of harm to the integrity of the relevant European site in order to allow the assessment (Step 5) to determine whether the alternative solution(s) is less damaging to the European site and does not have an adverse effect on the integrity of this or any other European site;
- Step 3 – produce a long list of potential alternative solutions and screen these in terms of whether they meet the objectives of the Project, to produce a short list of alternative solutions that meet the Project objectives;
- Step 4 – consider whether any short-listed potential alternative solutions identified in Step 3 are feasible (financially, legally and technically); and
- Step 5 – consider whether any feasible alternative solutions identified in Step 4 would have a lesser effect on the integrity of the national site network.

4.3 Step 1: Project Need and Objectives

4.3.1 The Need for the Project

40. The key drivers underpinning the need for offshore wind power projects are:

- The need to reduce greenhouse gas emissions;
- The need for energy security; and
- The urgency of the need for low carbon electricity capacity.

4.3.1.1 The Need to Reduce Greenhouse Gas Emissions

41. The commitments made by the UK and international governments at the United Nations Conference of the Parties 21 (COP21) to the Framework Convention on Climate Change, in Paris in 2015 in (the Paris Agreement) were to limit global temperature increase to below 2°C (preferably 1.5°C) were ratified by the UK foreign secretary in November 2016 and implemented through the fifth UK Carbon Budget. This commits the UK to a 57% reduction in carbon emissions by 2032, compared to emission levels in 1990 (Committee on Climate Change (CCC), 2015). Most

recently, in line with the recommendation of the CCC and the sixth Carbon Budget, the UK government has announced that it will set the world's most ambitious climate change target into law to reduce emissions by 78% by 2035 compared to 1990 levels (BEIS, 2021d).

42. In 2019, the Sector Deal reported total UK greenhouse gas emissions were provisionally 45.2% lower than in 1990 and 3.6% lower than 2018 (BEIS, 2020b). This is mainly as a result of changes in the fuel mix used for electricity generation, away from coal and towards renewables. However, as outlined above, the world is not currently on track to meet the long-term temperature goal set out in the Paris Agreement, with a 2.7ºC increase predicted following COP26 (CCC, 2021a).

43. The Queen's Speech on 19 December 2019 (HM Government, 2019) confirmed that Government will take steps to meet the world-leading target of net zero greenhouse gas emissions by 2050. The CCC report on recommendations for achieving net zero states that 75GW of offshore wind could be required to reach net zero by 2050 (CCC, 2019). The British Energy Security Strategy (BEIS, 2022d) provides a target of 50GW of operational offshore wind farms by 2030.

44. NPS EN-1 (DECC, 2011) reflects the UK commitment to the legally binding targets to cut greenhouse gas emissions and recognises that future large-scale renewable energy generation is likely to come from offshore wind projects. NPS EN-1 (Paragraph 3.3.15) reinforces the need for new electricity NSIPs and their urgency:

"In order to secure energy supplies that enable us to meet our obligations for 2050, there is an urgent need for new (and particularly low carbon) energy NSIPs to be brought forward as soon as possible, and certainly in the next 10 to 15 years [at the time of writing in 2011]*, given the crucial role of electricity as the UK decarbonises its energy sector."*

45. This is reiterated in the draft NPS EN-1 (BEIS, 2021a) which states *"There is an urgent need for new electricity generating capacity to meet our energy objectives."*

46. The UK Government is required to publish a Climate Change Risk Assessment (CCRA) every five years under the 2008 Climate Change Act. The CCRA3 was published in 2022 (Defra, 2022c).

47. The global average surface temperature over the decade between 2006-2015 was 0.87°C (+/-0.12°C) warmer than the pre-industrial period (considered to be 1850-1900) with an average annual temperature increase for England of 1°C (CCC, 2019).

48. The 2021 Progress Report (CCC, 2021b) predicts that by 2050, summer temperatures in the UK are expected to increase by around 1.5°C above the 1981 - 2000 baseline (with a 0ºC – 3ºC uncertainty range). However, based on policies as of the end of the United Nations Conference of Parties (COP) 26, the CCC (2021a) states a global temperature increase of around 2.7°C by 2050 is expected.

49. Independent assessment by a consortium of experts led by the University of Exeter has been completed in 2021 to inform the CCRA process (Sustainability West Midlands (2021)). Sustainability West Midlands (2021) provides the summary of climate risks in England and lists the following high magnitude risks which require action now:

- Impacts of climate change on the natural environment, including terrestrial, freshwater, coastal and marine species, forests and agriculture;
- An increase in the range, quantities and consequences of pests, pathogens and invasive species, negatively affecting terrestrial, freshwater and marine priority habitats species, forestry and agriculture;
- More frequent flooding and coastal erosion, causing damage to our infrastructure services, including energy, transport, water and information and communication technologies;
- A reduction in public water supplies due to increasing periods of water scarcity;
- The impact of extreme temperatures, high winds and lightning on the transport network;
- The impact of increasing high temperatures on people's health and wellbeing and changes in household energy demand due to seasonal temperature changes;
- Increased severity and frequency of flooding of homes, communities and businesses;
- The viability of coastal communities and the impact on coastal businesses due to sea level rise, coastal flooding and erosion;
- Disruption to the delivery of health and social care services due to a greater frequency of extreme weather;
- Damage to our cultural heritage assets as a result of temperature, precipitation, groundwater and landscape changes; and
- Impacts internationally that may affect the UK, such as risks to food availability, safety and security, risks to international law and governance from climate change that will affect the UK, international trade routes, public health and the multiplication of risks across systems and geographies.

50. The international and UK legislation that has been put in place to secure a reduction in emissions is further outlined in **ES Chapter 2 Policy and Legislative Context** (document reference 6.1.2).

51. SEP and DEP will each have an export capacity greater than 100 megawatts (MW) and in the context of reductions in the capacity of the UK to generate electricity (total UK generating capacity has fallen from 85GW in 2009 to 75.8GW in 2021 – BEIS 2022e), will therefore contribute to meeting the UK Government's ambitious target of 50GW of generating offshore wind energy by 2030. This will help to alleviate the risks associated with climate change such as flooding, water supply shortages and risks to health, food security and productivity and trade. SEP and DEP will provide an important element for the UK to achieve the target of net zero greenhouse gas emissions by 2050.

4.3.1.2 The Need for Energy Security

52. Energy security is about ensuring secure, reliable, uninterrupted supplies to consumers, and having a system that can effectively and efficiently respond and adapt to changes and shocks. It is made up of three characteristics: flexibility, adequacy and resilience (BEIS, 2017).

53. The Overarching National Policy Statement for Energy (NPS EN-1) (Department of Energy and Climate Change (DECC, 2011) sets out national policy for energy infrastructure. DECC (2011) stated that within the next forty years (at the time of writing in 2011) the need to electrify large parts of the industrial and domestic heat and transport sectors could double demand for electricity. To meet emissions targets, the electricity being consumed will need to be almost exclusively from low carbon sources. This shows that energy security has been a key concern in the UK for a number of years, however the issue has recently been exacerbated by recent sanctions on Russian gas. As a result, European gas prices have increased by more than 200% from 2021 to 2022. This has led to extreme increases in the cost of living, with gas providing a key source of energy to the UK. (BEIS, 2022e).

54. The draft EN-1 (BEIS, 2021a) states that electrification to reduce emissions in transport, heating and industry could lead to more than 50% of final energy demand being met by electricity in 2050, up from 17% in 2019, representing a doubling in demand for electricity.

55. NPS EN-1 (DECC, 2011) recognises that it is critical that the UK continues to have secure and reliable supplies of electricity as the transition to a low carbon economy is made. EN-1 also states that the Secretary of State should "*give substantial weight to the contribution which projects would make towards satisfying this need*" (paragraph 3.2.3). The draft NPS EN-1 (BEIS, 2021a) states "*we need a diverse mix of electricity infrastructure to come forward, so that we can deliver a secure, reliable, affordable, and net zero consistent system in 2050 for a wide range of demand, decarbonisation, and technology scenarios*".

56. The UK Government recognises the importance to businesses and households of access to an affordable, secure and sustainable supply of energy:

    "Where applicable, national objectives with regard to reducing energy import dependency from third countries, for the purpose of increasing the resilience of regional and national energy systems" (The UK's Draft Integrated National Energy and Climate Plan - BEIS, 2019a).

57. BEIS (2022e) provides the UK Energy Statistics for 2021. Similarly to 2020, energy consumption remained low in comparison to pre-pandemic levels, increasing from April as restrictions eased. Overall net energy imports increased by 8% in 2021, which, combined with a drop in exports increased the UK's net import dependency to 38%. Total energy production was down 14% from 2020 with oil and gas output reduced by 17%. Electricity demand in the UK is likely to rise during the 2020s as a greater proportion of the heat and transportation systems electrify.

58. Draft NPS EN-1 (BEIS, 2021a) states that to ensure the UK's supply of energy remains secure, reliable, affordable, and consistent with meeting the target of net zero by 2050, decarbonisation of the energy system is required. Meeting these

objectives necessitates a significant amount of energy infrastructure, both large and small-scale.

59. Reliance on global markets for imported energy leaves the UK vulnerable to spikes in world energy market prices, political pressure, and potentially physical supply disruptions and the knock-on effects of supply challenges in other countries. For example, a significant proportion of France's nuclear plants have been closed during 2022 due to planned maintenance, damage to facilities and very hot weather, and so the UK has been using more gas in power stations to supply France via 3GW of electricity interconnectors, so while interconnectors can help improve the UK's energy security, they can also place additional demand burden when other countries need them for their own security.

60. The UK Government recognised in "The UK's Draft Integrated National Energy and Climate Plan" the importance to businesses and households of access to an affordable, secure and sustainable supply of energy:

"Where applicable, national objectives with regard to reducing energy import dependency from third countries, for the purpose of increasing the resilience of regional and national energy systems" (BEIS, 2019a).

61. The British Energy Security Strategy (BEIS, 2022d) therefore provides a target of 50GW of operational offshore wind farms by 2030 and recognises the need to fast track the consenting process in order to achieve this target and improve the UK's energy security. In addition, the Strategy involves an *"approach to reduce global reliance on Russian fossil fuels whilst pivoting towards clean, affordable energy"* in the light of the invasion of Ukraine and concerns around reliance in Europe on Russian fuel imports, the constraining of which has led to significant global price rises for consumers. The strategy has been rapidly deployed with House of Commons Library research finding in August 2022 (House of Commons, 2022) that:

"In 2021 imports from Russia made up 4% of gas used in the UK, 9% of oil and 27% of coal. In 2021, imports of gas, oil and coal from Russian to the UK were worth a combined £4.5 billion. According to Eurostat, in 2020, imports from Russia made up 39% of the gas used in the EU, 23% of oil imports and 46% of coal imports.

In June 2022, the fourth full month since the invasion, according to UK trade statistics, the UK Imported no oil, gas or coal from Russia. This was the third month in a row with no Russian gas imports, but the first month (since 2000 when this data is available back to) with no gas, oil or coal imports from Russia"

62. In a global market, this further reduction in supply from Russia continues the upward pressure on prices for energy in the UK and Europe even when the UK's supplies are more diversified.

63. In the context of the falling capacity of the UK to generate energy (as above) SEP and DEP will make a key contribution to security of supply providing, as part of a generation mix, clean and sustainable UK based generation, as energy demand increases within the UK.

4.3.1.3 The Urgency of the Need for Low Carbon Electricity Capacity

64. Established Government policy in NPS EN-1 emphasises the urgency of the need for new (and particularly low carbon) electricity generating capacity in paragraph

3.3.15: "*In order to secure energy supplies that enable us to meet our obligations for 2050, there is an urgent need for new (and particularly low carbon) energy NSIPs to be brought forward as soon as possible, and certainly in the next 10 to 15 years, given the crucial role of electricity as the UK decarbonises its energy sector*".

65. Assessments in NPS EN-1 noted that the Updated Energy and Emissions Projections (DECC 2010) of the time assumed that electricity demand in 2025 would be approximately the same as it was at the time of publication in 2011. Electricity demand in 2011 was 374TWh as compared to 330TWh in 2021, due to a pandemic related depressing effect, as above. The NPS assumes however that demand will be higher by 2025 allowing for economic recovery from 2022 and the accelerating take up of electric vehicles and as evidenced in the sixth carbon budget (ibid), this assumption remains valid and as above BEIS (2022e) shows demand resumed its increasing trend from April 2021 when pandemic restrictions began to be lifted.

66. Resulting NPS policy, taking account of the need for excess or headroom capacity to account for the intermittency of renewable sources of generation, is that 113GW of total generation will be needed by 2025 of which 59GW would be new build, a breakdown of which is given (EN-1 paragraph 3.3.22) as being made up of: "*around 33 GW of the new capacity by 2025 would need to come from renewable sources to meet renewable energy commitments as set out in Section 3.4; it would be for industry to determine the exact mix of the remaining 26 GW of required new electricity capacity, acting within the strategic framework set by the Government; of these figures of 33 GW and 26 GW respectively, around 2 GW of renewables and 8 GW of non-renewable technologies are already under construction36. This leaves a balance of 18 GW to come from new non-renewable capacity; and the Government would like a significant proportion of this balance to be filled by new low carbon generation and believes that, in principle, new nuclear power should be free to contribute as much as possible towards meeting the need for around 18 GW of new non-renewable capacity by 2025*".

67. Draft NPS EN-1 (2021a) similarly sets out the range of generation options and concludes "*All the generating technologies mentioned above are urgently needed to meet the Government's energy objectives*".

68. Current generation capacity in the UK stands at only 76.6GW in 2021 (BEIS 2022e) with recent increases being due to additional wind energy installations coming on stream. However, this remains significantly behind the 113GW supply capacity target established in NPS EN-1 and is an overall reduction in UK generating capacity from 2011 when NPS EN-1 was designated.

69. In relation to the subsidiary target of 33GW of new capacity in 2025 to come from renewables, with total UK renewable generation capacity standing at only 23.2GW, this target remains to be met, meaning that the contribution of SEP and DEP will be of significant value.

70. Draft NPS EN-1 (BEIS, 2021a) states: "*Wind and solar are the lowest cost ways of generating electricity, helping reduce costs and providing a clean and secure source of electricity supply (as they are not reliant on fuel for generation)*." Analysis provided in BEIS (2020c) shows that a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.

71. The UK has a world leading offshore wind sector and is well placed to benefit from further investment in renewables innovation to accelerate cost reduction. Large cost reductions have been realised, as the offshore wind industry has matured in recent years, as evidenced by the Contracts for Difference (CfD) process whereby the cost of offshore wind in the 2019 (third CfD) round dropped to approximately 30% lower than the second auction held in 2017, which in turn was approximately 50% lower than the original CfD auction round in 2015.

72. Developers are continuing to drive these cost reductions through technology development and new work processes. The development of SEP and DEP will contribute to this process. In addition, there are specific cost efficiencies from the combined development of SEP and DEP (for example the commitment for a shared onshore substation and shared export cable route, which optimises overall design and cost), as well as synergies with the existing SOW and DOW, particularly once all projects are operational.

4.3.1.4 Summary of the Need for the Project

73. There is a clear and urgent need for the development of SEP and DEP to help meet the UK Government target of 50GW of offshore wind installed capacity by 2030. SEP and DEP will each provide greater than 100MW of renewable energy capacity, contributing approximately 4% of installed capacity to the current shortfall based on the 40GW target, and 2.5% of the current shortfall of the 50GW target. SEP and DEP will therefore make a substantial contribution to the achievement of national renewable energy targets towards net zero and to the UK's contribution to global efforts to reduce the effects of climate change.

74. The offshore wind farms will provide secure, reliable, affordable renewable energy supply in the UK for over 0.74 million homes. SEP and DEP would help the UK meet its Net Zero targets and significantly contribute to the economy by providing substantial investment locally and nationally, as well as employment and new infrastructure during all phases of the Projects. This will enhance the sustainable development of the local community.

75. The Need for the Project is set out in full in the **Planning Statement** (document reference 9.1).

4.3.2 Project Objectives

Table 4-1: Project Objectives

ID	Objective	Basis for the Objective
1	**Decarbonisation**: To generate low carbon electricity from an offshore wind farm by 2030 in support of the UK target to generate 50GW of offshore wind power by 2030 and associated	The UK Government has committed to reducing its greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050. This commitment is made through the Climate Change Act 2008 (2050 Target Amendment) Order 2019 which was brought into force in June 2019 in response to recommendations by the CCC (CCC, 2019). The UK independent Climate Change Committee states that 75GW of offshore wind could be required to reach net zero by 2050 (CCC, 2019). Legislation has committed the UK to achieving Net Zero emissions by 2050. Part 3 of NPS EN-1 (DECC 2011) states (3.3.15) *"In order to secure energy supplies that enable us to meet our obligations for 2050, there is*

ID	Objective	Basis for the Objective
	carbon reduction targets	*an urgent need for new (and particularly low carbon) energy NSIPs to be brought forward as soon as possible, and certainly in the next 10 to 15 years, given the crucial role of electricity as the UK decarbonises its energy sector".* The British Energy Security Strategy (BEIS 2022d) commits the UK to an ambition to deliver "50GW by 2030". Paragraph 3.3.21 of draft NPS EN-1 (BEIS, 2021a) already committed the UK to "*an ambitious target to have 40GW of offshore wind capacity (including 1GW floating wind) by 2030*" as a key component in delivering energy security and net zero by 2050. This is likely to be amended in the final NPS to align with the British Energy Security Strategy (BEIS, 2022d). SEP and DEP will contribute to meeting UK Government objectives of delivering sustainable development to enable decarbonisation.
2	**Security of supply:** To export electricity to the UK National Grid to support UK commitments for offshore wind generation and security of supply	Part 2 of NPS EN–1 notes that *"it is critical that the UK continues to have secure and reliable supplies of electricity as we make the transition to a low carbon economy"* and acknowledges the need for a diverse mix of technologies to ensure security of supply. This is reiterated in Part 2 of the draft NPS EN-1 which states *"Given the vital role of energy to economic prosperity and social well-being, it is important that our supply of energy remains secure, reliable and affordable."* This is reinforced by the British Energy Security Strategy (BEIS, 2022d), one of whose key purposes is to improve security from diverse sources of energy, with offshore wind playing a leading role. Paragraph 3.4.3 of NPS EN-1 states "*offshore wind is expected to provide the largest single contribution towards the 2020 renewable energy generation targets*".
3	**Optimisation:** To coordinate and optimise generation and export capacity within the constraints of available sites and onshore transmission infrastructure whilst delivering project skills, employment and investment benefits in the Norfolk area.	The 2017 Extension projects, which include SEP and DEP, were identified by TCE to provide an intermediate process between Rounds 3 and 4 to help achieve the urgent need for renewable energy and recognising that extensions to existing offshore wind farms are a proven way of efficiently developing more offshore generating capacity (The Crown Estate, undated). The Government's Offshore Transmission Network Review begun in August 2020, under which SEP and DEP are a Pathfinder Project, had the objective "*To ensure that the transmission connections for offshore wind generation are delivered in the most appropriate way, considering the increased ambition for offshore wind to achieve net zero. This will be done with a view to finding the appropriate balance between environmental, social and economic costs".* *Workstreams include the need to: "identify and implement changes to the existing regime to facilitate coordination in the short-medium term* *assess the feasibility and costs/benefits of centrally delivered, enabling infrastructure to facilitate the connection of increased levels of offshore wind by 2030* *explore early opportunities for coordination through pathfinder projects, considering regulatory flexibility to allow developers to test innovative approaches*

ID	Objective	Basis for the Objective
		focus primarily on projects expected to connect to the onshore network after 2025 *The long-term workstream will seek to:* *conduct a holistic review of the current offshore transmission regime and design and implement a new enduring regime that enables and incentivises coordination while seeking to minimise environmental, social, and economic costs* *consider the role of multi-purpose hybrid interconnectors in meeting net zero through combining offshore wind connections with links to neighbouring markets and how the enduring offshore transmission regime can support the delivery of such projects* *focus on projects expected to connect to the onshore network after 2030*" *These Review workstreams find support in the Energy White Paper "Powering our Net Zero Future" of December 2020, one policy of which is "To minimise the impact on local communities, we will implement a more efficient approach to connecting offshore generation to the mainland grid*". Under East Inshore and East Offshore Marine Plans (EIEOMP – Defra, 2014) Objective 2 is: "*To support activities that create employment at all skill levels, taking account of the spatial and other requirements of activities in the East marine plan areas*", whilst EIEOMP Policy EC2 is that "*Proposals that provide additional employment benefits should be supported, particularly where these benefits have the potential to meet employment needs in localities close to the marine plan areas*". NPS EN-1 policy is that the SoS should take into account (4.1.3) "*potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits*" which may be (4.1.4) "*at national, regional and local levels*" and that (5.12.8) "*The [SoS] should consider any relevant positive provisions the developer has made or is proposing to make to mitigate impacts (for example through planning obligations) and any legacy benefits that may arise as well as any options for phasing development in relation to the socio-economic impacts*".

4.4 Step 2: Define the Potential for Harm

4.4.1 Overview

76. **Table 4-2** lists the sites and features relevant to this derogation case and considered within this assessment of alternatives. Further information on the quantification of these effects is provided in the following sections. As discussed in **Section 1.2**, the **RIAA** (document reference 5.4) concludes that an in-combination adverse effect on integrity cannot be ruled out for the breeding Sandwich tern feature of the North Norfolk Coast SPA and the Greater Wash SPA and for the breeding kittiwake feature of the Flamborough and Filey Coast SPA. The Applicant maintains that there will be no adverse effect on integrity of the gannet, guillemot and razorbill features of the

Flamborough and Filey Coast SPA as a result of the Projects, alone or in-combination.

Table 4-2: Relevant Effects

Site	Feature	Effect
North Norfolk Coast SPA	Sandwich tern	In-combination collision risk In-combination combined displacement and collision risk
Greater Wash SPA	Sandwich tern	In-combination collision risk In-combination combined displacement and collision risk
Flamborough and Filey Coast SPA	Kittiwake	In-combination collision risk
	Guillemot and razorbill	In-combination displacement risk
	Gannet	In-combination combined displacement and collision risk

4.4.2 North Norfolk Coast Special Protection Area - Sandwich Tern

4.4.2.1 Overview of the North Norfolk Coast Special Protection Area

77. The North Norfolk Coast SPA and Ramsar site is located east of The Wash on the northern coastline of Norfolk, and covers an area of nearly 8,000 hectares extending approximately 40km from Holme to Weybourne. The SPA was originally designated in January 1989 (English Nature, 1996). A variety of coastal habitats occur within the site, including intertidal mudflats and sandflats, coastal waters, saltmarshes, shingle, sand dunes, freshwater grazing marshes and reedbeds. The site is important within Europe as one of the largest areas of undeveloped coastal habitat of its type, and at designation was the fourth most important wetland site for waterfowl in Britain.

78. The coastal waters along the North Norfolk Coast are shallow and follow the complex series of harbours and inlets along the coast. These support large populations of small fish including sandeel and sprat which provide vital food for breeding tern populations that occur within the site.

79. The qualifying features of the SPA are Sandwich tern, common tern, pink-footed goose, dark-bellied brent goose, pintail, wigeon, knot, and a waterbird assemblage. Of these, only Sandwich tern is considered within this derogation case because the **RIAA** (document reference 5.4) concludes that adverse effect on integrity cannot not be ruled out for this feature. The assessments for all other features conclude that adverse effect on integrity can be ruled out. None of the qualifying features of the SPA are priority species.

4.4.2.2 Conservation Objectives

80. The SPA's conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features.
- The structure and function of the habitats of the qualifying features.
- The supporting processes on which the habitats of the qualifying features rely.
- The populations of each of the qualifying features.
- The distribution of qualifying features within the site.

4.4.2.3 Summary of the Assessment of Effects on Sandwich Tern

4.4.2.3.1 Project-Alone (SEP and DEP)

81. The combined SEP and DEP project-alone annual breeding adult Sandwich tern collision risk and combined displacement and collision risk apportioned to the North Norfolk Coast SPA varies based on assumptions around Sandwich tern macro-avoidance (see the **RIAA** (document reference 5.4)). The predicted mean annual mortality is therefore between **5.94** and **9.23** (95% CI of 1.00-27.77). Note that these mortality predictions are based on design-based density estimates which result in lower mean annual and higher 95% CI mortalities when compared to model based density estimates. Natural England recommend that the required levels of compensation are set against upper 95% CIs and therefore this ensures a worst case approach.

4.4.2.3.2 In- Combination with Other Offshore Wind Farm Projects

82. The in-combination annual breeding adult Sandwich tern collision risk and combined displacement and collision risk apportioned to the North Norfolk Coast SPA from all wind farms predicted to have connectivity are presented in the **RIAA** (document reference 5.4). There are various total figures presented dependent upon the macro-avoidance assumption, the assumed designs of some of the offshore wind farms included and whether design-based or model-based density estimates are used for SEP and DEP. The estimated annual mortality ranges from **50.4** to **175.6**.

4.4.3 Greater Wash Special Protection Area – Sandwich Tern

4.4.3.1 Overview of the Greater Wash Special Protection Area

83. The Greater Wash SPA is a marine SPA located in the southern North Sea. The SPA boundary encompasses offshore areas identified as containing high densities, or encompassing breeding season foraging ranges of the qualifying bird species (Natural England and JNCC, 2016).

84. To the north, off the Holderness coast in Yorkshire, seabed habitats primarily comprise coarse sediments, with occasional areas of sand, mud and mixed sediments. Subtidal sandbanks occur at the mouth of the Humber Estuary, primarily comprising sand and coarse sediments. Offshore, soft sediments dominate, with extensive areas of subtidal sandbanks off The Wash as well as north and east Norfolk coasts. Closer inshore at The Wash and north Norfolk coast, sediments comprise a mosaic of sand, muddy sand, mixed sediments and coarse sediments,

as well as occasional Annex I reefs. The area off the Suffolk coast continues the mosaic habitats mostly dominated by soft sediment.

85. The landward boundary of the SPA covers the coastline from Bridlington Bay in the north (at the village of Barmston), to the existing boundary of the Outer Thames Estuary SPA in the south. Across the mouth of the Humber Estuary, the boundary abuts the boundary of the Humber Estuary SPA, except where neither the little tern foraging zone or the red-throated diver Maximum Curvature Analysis (MCA) density threshold reaches the SPA. The landward boundary abuts the seaward boundary of The Wash SPA except where the former overlaps the latter to encompass habitats used by breeding Sandwich tern.

4.4.3.2 Conservation Objectives

86. The SPA's conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features.
- The structure and function of the habitats of the qualifying features.
- The supporting processes on which the habitats of the qualifying features rely.
- The populations of each of the qualifying features.
- The distribution of qualifying features within the site.

4.4.3.3 Summary of the Assessment of Effects on Sandwich Tern

4.4.3.3.1 Project-Alone (SEP and DEP)

87. The combined SEP and DEP project-alone annual breeding adult Sandwich tern collision risk and combined displacement and collision risk apportioned to the Greater Wash SPA varies based on assumptions around Sandwich tern macro-avoidance (see the **RIAA** (document reference 5.4)). The predicted mean annual mortality is therefore between **5.86** and **9.17** (95% CI of 1.00-27.46). Note that these mortality predictions are based on design based density estimates which result in lower mean annual and higher 95% CI mortalities when compared to model based density estimates. Natural England recommend that the required levels of compensation are set against upper 95% CIs and therefore this ensures a worst case approach.

4.4.3.3.2 In-Combination with Other Offshore Wind Farm Projects

88. The in-combination annual breeding adult Sandwich tern collision risk and combined displacement and collision risk apportioned to the Greater Wash SPA from all wind farms (including SEP and DEP) predicted to have connectivity are presented in the **RIAA** (document reference 5.4). There are various total figures presented dependent upon the macro-avoidance assumption and assumed designs of some of the offshore wind farms included. The estimated annual mortality ranges from **51.1** to **175.16**.

4.4.4 Flamborough and Filey Coast Special Protection Area – Kittiwake, Gannet, Guillemot and Razorbill

4.4.4.1 Overview of the Flamborough and Filey Coast Special Protection Area

89. The Flamborough and Filey Coast SPA was designated in 2018, as a geographical extension to the former Flamborough Head and Bempton Cliffs SPA, which was designated in 1993 (Natural England, 2018).

90. The SPA is located on the Yorkshire coast between Bridlington and Scarborough, and is composed of two sections. The northern section runs from Cunstone Nab to Filey Brigg, and the southern section from Speeton, around Flamborough Head, to South Landing. The seaward boundary extends 2km offshore and applies to both sections of the SPA.

91. The predominantly chalk cliffs of Flamborough Head rise to 135m and have been eroded into a series of bays, arches, pinnacles and gullies. The cliffs from Filey Brigg to Cunstone Nab are formed from various sedimentary rocks including shales and sandstones. The adjacent sea out to 2km off Flamborough Head as well as Filey Brigg to Cunstone Nab is characterised by reefs supporting kelp forest communities in the shallow subtidal, and faunal turf communities in deeper water. The southern side of Filey Brigg shelves off gently from the rocks to the sandy bottom of Filey Bay. This site does not support any priority habitats or species (Natural England, 2018)

92. The coastal areas of the SPA cover cliffs supporting internationally important breeding populations of seabirds, the marine extension includes areas close to the colony used by seabirds for maintenance behaviours (loafing, preening etc).

93. None of the qualifying features of the SPA are priority species. The qualifying species screened into the AA are breeding gannet, breeding kittiwake, breeding guillemot, and breeding razorbill. All of these species are considered within this derogation case, with gannet, guillemot and razorbill proposals being put forward on a ‘without prejudice’ basis.

4.4.4.2 Conservation Objectives

94. The site’s conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features.
- The structure and function of the habitats of the qualifying features.
- The supporting processes on which the habitats of the qualifying features rely.
- The populations of each of the qualifying features.
- The distribution of qualifying features within the site.

4.4.4.3 Summary of the Assessment of Effects on Kittiwake

4.4.4.3.1 Project-Alone (SEP and DEP)

95. The combined SEP and DEP project-alone annual breeding adult kittiwake collision risk apportioned to the Flamborough and Filey Coast SPA is **8.86** (95% CI of 1.25-23.76) (see the **RIAA** (document reference 5.4)).

4.4.4.3.2 In-Combination with Other Offshore Wind Farm Projects

96. The in-combination annual breeding adult kittiwake collision risk apportioned to the Flamborough and Filey Coast SPA from all wind farms predicted to have connectivity is **487.9** individuals. SEP and DEP therefore contribute 1.8% to the total predicted mortality.

4.4.4.4 Summary of the Assessment of Effects on Guillemot

4.4.4.4.1 Project-Alone (SEP and DEP)

97. The estimated mean number of non-breeding adult guillemot apportioned to the Flamborough and Filey Coast SPA is 703 for SEP and DEP combined. Of these, between 30% and 70% would be predicted to be at risk of displacement (i.e. 210.9-492.1 individuals) and of these a consequent mortality rate of between 1% and 10% would be applied, therefore giving a precautionary upper mortality of **49** individuals. It should be noted that these figures were estimated using Natural England's precautionary rates of displacement (70%) and mortality (10%). Evidence-based estimates assuming a 50% displacement rate (APEM, 2022) and 1% mortality of displaced birds reduces the predicted impact to **4** individuals.

4.4.4.4.2 In-Combination with Other Offshore Wind Farm Projects

98. The in-combination total number of guillemot at risk of displacement apportioned to the Flamborough and Filey Coast SPA is 43,983. The estimated annual in-combination mortality using Natural England's precautionary rates of displacement (70%) and mortality (10%) provides the upper mortality of **3,079** individuals. Evidence-based rates of 50% displacement and 1% mortality result in mortality of **220** individuals.

4.4.4.5 Summary of the Assessment of Effects on Razorbill

4.4.4.5.1 Project-Alone (SEP and DEP)

99. The estimated mean number of non-breeding adult razorbill apportioned to the Flamborough and Filey Coast SPA is 107 for SEP and DEP combined. Of these, between 30% and 70% would be predicted to be at risk of displacement (i.e. 32.1-74.9 individuals) and of these a consequent mortality rate of between 1% and 10% would be applied, therefore giving a precautionary upper mortality of **7.5** individuals. It should be noted that these figures were estimated using Natural England's precautionary rates of displacement (70%) and mortality (10%). Evidence-based

estimates assuming a 50% displacement rate (APEM, 2022) and 1% mortality of displaced birds reduces the predicted impact to **0.5** individuals. It is clear from this that there is very little justification for compensation of this impact due to SEP and DEP.

4.4.4.5.2 In-Combination with Other Offshore Wind Farm Projects

100. The in-combination total number of razorbill at risk of displacement apportioned to the Flamborough and Filey Coast SPA is 7,174. The estimated annual in-combination mortality using Natural England's precautionary rates of displacement (70%) and mortality (10%) provides the upper mortality of **502** individuals. Evidence-based rates of 50% displacement and 1% mortality result in mortality of **36** individuals.

4.4.4.6 Summary of the Assessment of Effects on Gannet

4.4.4.6.1 Project-Alone (SEP and DEP)

101. The combined SEP and DEP project-alone annual breeding adult gannet collision risk estimate is a mean of 1.77 (95% CIs of 0.09-5.90). The displacement mortality is a mean of **3** (95% CIs of 1-4).

4.4.4.6.2 In-Combination with Other Offshore Wind Farm Projects

102. The in-combination annual gannet collision risk and combined displacement and collision risk estimates apportioned to the Flamborough and Filey Coast SPA from all wind farms predicted to have connectivity are presented in the **RIAA** (document reference 5.4). The estimated annual mortality ranges from **400.1** to **420.1**.

4.4.5 Relevant Design Parameters

103. The Projects' design parameters that are of relevance to the effects outlined above, which could therefore be considered in the assessment of alternatives are detailed in **Table 4-3**.

104. Changes (i.e. alternatives) to these parameters are considered in **Sections 4.5** and **4.6**. Any other element of the project design parameters would have no bearing on collision or displacement risk for these features and cannot be alternative solutions.

Table 4-3: Design Parameters Relevant to Displacement and Collision Risk

Parameter	DEP	SEP
Collision risk parameters		
Number of wind turbines	17-30	13-23
Maximum rotor diameter (m)	300	300
Maximum rotor swept area (km^2)	1.30	1.00
Maximum tip height above Highest Astronomical Tide (HAT) (m)	330	330

Parameter	DEP	SEP
Minimum clearance (air gap) above HAT (m)	30	30
Displacement parameters		
Wind farm site area (excluding offshore temporary works area) (km^2)	103.5	92.6
Distance from North Norfolk Coast SPA (km)	33.3	17.7
Distance from Greater Wash SPA (km)	16	7
Distance from Flamborough and Filey Coast SPA	116	112
Anticipated design life (years)	40	40

4.5 Step 3: Long List of Alternative Solutions

4.5.1 Do Nothing Scenario

105. While the Defra (2021a) compensatory measures guidance advised that the "do nothing" option should be considered, it acknowledges this would rarely be a true alternative:

"It is unlikely in most cases that the 'do nothing' option (i.e. no proposed activity) would be an acceptable alternative as it would not deliver the same overall objective as 'the activity'. However, it is useful to provide a comparison for other alternatives and to act as a baseline against which public benefits can be assessed. Where it is most likely to be an option is where no or limited tangible public benefit can be demonstrated."

106. The "do nothing" scenario would not enable SEP and DEP to contribute to the range of government legislation and policy which promote the importance of developing offshore wind farms. Of particular note, the target for 50GW of installed capacity of offshore wind by 2030 requires the vast majority of offshore wind farms currently in planning to be consented. **Table 4-4** shows there is currently c. 12.3GW of operational offshore wind farms in the UK, c. 18.9GW in construction and consented (pre-construction) phase. There is currently approximately 4.2GW in the planning stages (i.e. pre-submission and post-submission). Approximately 40.1GW is in pre-planning which includes 8GW, 25GW and 4GW of Round 4, Scotwind and Celtic Sea offshore wind farms respectively. With respect to Scotwind, the sectoral marine plan only assessed 10GW of capacity in its plan-level HRA whilst the Celtic Sea offshore wind farms have yet to proceed through the plan-level HRA stage. Therefore, there remain significant challenges in achieving the 50GW target by 2030.

107. Given the need for the Projects, as set out in **Section 4.3.1** and expanded in the IROPI case (**Section 5**), the alternative of not developing an offshore wind farm would clearly not satisfy any of the project objectives outlined in **Section 4.3.2** and would not comply with precedents set by other recent offshore wind farm decisions

(Hornsea Project Three, Norfolk Boreas, Norfolk Vanguard, East Anglia ONE North and East Anglia TWO). The “do nothing” scenario is therefore not considered further.

4.5.2 Alternative Offshore Wind Farm locations

108. In accordance with the approach outlined in **Section 4.2**, an assessment of alternative offshore wind farm locations is provided in the following sections. This includes:

- Locations outside of the UK EEZ (**Section 4.5.2.1**);
- Other locations within the UK, including:
  - Outside existing leasing rounds (**Section 4.5.2.2**); and
  - Inside existing leasing rounds (**Section 4.5.2.3**).

109. ES **Chapter 3 Site Selection and Assessment of Alternatives** (document reference 6.1.3) describes the process that led to the identification of the SEP and DEP locations.

4.5.2.1 International Sites

110. Projects in other countries would not meet the UK specific legal obligations, targets and policy in relation to carbon emission reductions or renewable energy generation. As a result, this alternative solution does not meet project objectives and is not considered further.

4.5.2.2 UK Alternatives Outside Existing Leasing Rounds

111. The development of offshore wind farms in the UK is constrained by the requirement to secure an Agreement for Lease (AfL) from The Crown Estate or Crown Estate Scotland. This process is undertaken through prescribed leasing rounds in line with Marine Plans and informed by Strategic Environmental Assessment and plan-level HRA. Offshore wind farms in locations outside existing leasing rounds are therefore not a feasible alternative solution to meet the project objectives (**Section 4.3.2**) and are not considered further.

4.5.2.3 UK Alternatives Within Existing Leasing Rounds

4.5.2.3.1 Offshore Wind Farms in Planning (Round 3, Extensions and Round 4)

112. As discussed in **Section 4.5.1**, the target for 50GW of installed capacity of offshore wind requires the vast majority of offshore wind farms currently in planning to be consented. There is currently c. 12.3GW of operational offshore wind farms in the UK, c. 18.9GW in construction and consented (pre-construction) phase.

113. Approximately 40.1GW is in pre-planning which includes 8GW, 25GW and 4GW of Round 4, Scotwind and Celtic Sea offshore wind farms respectively. With respect to Scotwind, the sectoral marine plan only assessed 10GW of capacity in its plan-level HRA whilst the Celtic Sea offshore wind farms have yet to proceed through the plan-level HRA stage. Pre-planning schemes are inherently high risk due to long lag time for delivery, therefore, the final installed capacity and operation date cannot be

accurately determined. Thus, there remain significant challenges in achieving the 50GW target by 2030 and the project objectives outlined in **Section 4.3.2**.

Table 4-4: Status of UK Offshore Wind Farms

Project Status	No. of Projects	Capacity (GW)
Operational	38	12.3
Under construction	8	9.8
Consented	6	9.1
In Planning	7	4.2
Pre-planning	29	40.1

114. In light of this challenge, the 2017 Extension projects were identified by TCE to provide an intermediate process between Rounds 3 and 4 to help contribute to the 2030 targets, recognising that extensions to existing offshore wind farms are a proven way of efficiently developing more offshore generating capacity (TCE, undated).

115. The 2017 Extensions projects will account for c. 3.4GW of generating capacity (not including those which were cancelled, see **Section 4.5.2.3.3**) and are critical to achieving the urgent need for renewable energy set out in established government policy. Therefore, other 2017 Extension projects are not deemed to be an alternative to SEP and DEP and are therefore not considered further.

4.5.2.3.2 Scotwind

116. It is anticipated that Scotwind could deliver up to 25GW of offshore wind. Site leases were awarded in January 2022 however it is unlikely that Scotwind will be able to contribute sufficiently to 2030 targets due to the timescales for grid availability and the typical development process, following identification of a site, which includes:

- EIA and pre-application consultation, including baseline surveys (c. 3 years);
- Submission to consent decision (c. 1.5 years);
- Detailed design (c. 2 years);
- Consent compliance including pre-constructions surveys (1-2 years); and
- Construction (c. 2 years).

117. For projects which have not yet commenced the required minimum of two years baseline survey data for EIA, it is unlikely that they will be operational by 2030 and therefore this alternative would not satisfy the project objectives (**Section 4.3.2**) and such projects are therefore not considered further.

4.5.2.3.3 Cancelled Projects

118. Several offshore wind farms from the previous licensing rounds were not developed, such as Atlantic Array, Rhiannon and Navitus from Round 3. Reasons ranged from being cancelled by the developer because of feasibility issues, to being refused consent. The Rhiannon project has effectively been revived by the Mona Round 4 project, which has already been considered in **Section 4.5.2.3.1**.

119. In addition, with regard to the 2017 Extension projects, following the plan-level HRA, Race Bank Extension was not progressed to the award leasing rights due to adverse effects associated with being located within an SAC, and Thanet Extension was refused consent due to navigational safety issues.

120. It is likely that the reasons the other projects were not taken forward would still apply and therefore not all capacity in pre-planning and in planning can be expected to be built out. In addition, given that data collected for cancelled projects would become out of date, consenting processes for any replacement projects would need to be restarted meaning, their development timescales would not meet the project objectives. This alternative solution is therefore not considered further.

4.5.2.3.4 Repowering Existing Offshore Wind Farms

121. Existing wind farms (Rounds 1 and 2) typically have a life span of 20 to 25 years before decommissioning or repowering and most existing operational offshore wind farms are not yet at the end of their life.

122. In addition, any repowering would be subject to a feasibility assessment, EIA, consenting, detailed design, procurement, consent compliance, and construction and is therefore significantly behind SEP and DEP in development and would be unlikely to satisfy the project objectives. This alternative solution is therefore not considered further.

4.5.3 Alternative Scale

123. In accordance with the approach outlined in **Section 4.2**, an assessment of alternative scale/size of development is considered in relation to deployment of fewer turbines to reduce collision risk (**Section 4.5.3.1**) and smaller or alternative wind farm site areas to increase distance from the North Norfolk Coast SPA, Greater Wash SPA and Flamborough and Filey Coast SPA. The **Consultation Report** (document reference 5.1) provides further detail on the evolution of the design of SEP and DEP and how that has been shaped by stakeholder comments.

4.5.3.1 Fewer Turbines

124. The project design envelope includes a range of turbines from 15MW to 18+MW capacity in order to accommodate the ongoing rapid development in wind turbine technology and provide a future proof design envelope. The maximum number of turbines is associated with the lower capacity 15MW turbines and has been reduced following Section 42 consultation feedback and further review of the market. Reducing the number of turbines further whilst maintaining the project capacity would require increasing the minimum turbine capacity, however the 15MW turbines represent the largest capacity turbines currently available on the market and therefore it is essential that these are included in the design envelope to provide certainty that the consented project will be buildable.

125. Fewer turbines, resulting in a lower capacity would limit the ability of the Projects to contribute to the 2030 targets and as discussed in **Section 4.5.2.3.1,** it is likely that the majority of capacity currently in planning will be required to achieve the 50GW target. This alternative scale is therefore not considered further.

4.5.3.2 Smaller/Alternative Wind Farm Sites

126. A more condensed or altered SEP and/or DEP wind farm site to increase the distance from the North Norfolk Coast, Greater Wash and Flamborough and Filey Coasts SPAs could potentially achieve the project objectives whilst having a lesser effect on displacement. The feasibility of this alternative solution is therefore discussed in **Section 4.6**.

4.5.4 Alternative Design

127. In accordance with the approach outlined in **Section 4.2**, an assessment of alternative design options, in relation to the relevant parameters outlined in **Section 4.4.5** is provided in the following sections. Alternative design options include:

- Smaller rotors/swept area to reduce collision risk (**Section 4.5.4.1**); and
- Increased air gap to reduce collision risk (**Section 4.5.4.2**).

128. For further details on the design evolution of the offshore works to date and how SEP and DEP fulfil the requirements for good design as set out within the Overarching National Policy Statement for Energy (BEIS, 2011), refer to the **Offshore Design Statement** (document reference 9.26). This details the considerations that will inform the detailed design of the final offshore works, including how this has been shaped by stakeholder consultation.

4.5.4.1 Smaller Rotors/Swept Area

129. Smaller rotors for the same number of turbines would result in a lower capacity project which would limit the ability of the Projects to contribute to the 2030 targets and as discussed in **Section 4.5.2.3.1,** it is likely that the majority of capacity currently in planning will be required to achieve the 50GW target.

130. Smaller rotors to achieve the same offshore wind farm capacity would require a greater number of turbines which would increase the magnitude of potential effects on ornithology receptors and would potentially require an increased wind farm site area. This alternative scale is therefore not considered further.

4.5.4.2 Increased Air Gap

131. An increased air gap could potentially achieve the project objectives whilst having a lesser effect on kittiwake, Sandwich tern and gannet collision risk. The feasibility of this alternative solution is therefore discussed in **Section 4.6**.

4.5.5 Alternative Method

132. As the effects of relevance to this derogation case relate to the operation of the offshore wind farm, no alternative methods are available beyond the scale, design and timing options considered in the preceding and following sections.

4.5.6 Alternative Timing

133. In accordance with the approach outlined in **Section 4.2**, alternative timing options are considered.

134. Since displacement effects on guillemot and razorbill may be caused by the physical presence of the wind farm infrastructure, any operational timing restrictions are unlikely to have a lesser effect on distribution and are therefore not considered further.

135. In addition, whilst not all kittiwake, Sandwich tern and gannet at risk of potential collision are on migration, it is noted that the draft NPS EN-3 (BEIS, 2021b) states:

"The exact timing of peak migration events is inherently uncertain. Therefore, shutting down turbines within migration routes during estimated peak migration periods is unlikely to offer suitable mitigation."

136. Reducing the timing of the operation of the turbines e.g. through seasonal restrictions and/or reducing the operational life would limit the ability of SEP and DEP to generate low carbon electricity and export electricity to the National Grid. This alternative solution would therefore not satisfy the project objectives (**Section 4.3.2**) and is not considered further.

4.6 Step 4: Feasibility of Alternative Solutions

137. The following sections outline the feasibility of the alternative solutions identified in Step 3.

4.6.1 Smaller/Alternative Wind Farm Sites

138. ES **Chapter 3 Site Selection and Assessment of Alternatives** (document reference 6.1.3) describes the robust approach taken to define the wind farm site areas. This approach took account of the original TCE application criteria as well as environmental, technical and other sea user constraints to determine the optimum size and configuration for the wind farm sites.

139. The overall size of the wind farm site areas has primarily been driven by the minimum generating capacity required to develop an economically viable project as well as capacity density (i.e. MW installed per km^2) requirements stipulated by TCE as part of the Agreement for Lease application process. The latter requirement allowed for some flexibility whilst also ensuring that the development would not occupy more sea bed than was necessary to develop an economically viable project.

140. Any reduction in the size of the wind farm sites leading to a decrease in turbine numbers would reduce overall generating capacity. Given that the Projects' target generating capacity is already considered to be at the limit of economic viability, this is not considered to be a financially feasible alternative solution. Furthermore, it would reduce the Projects' ability to contribute to the 2030 targets and therefore satisfy the project objectives.

141. The only way to reduce the wind farm site area but maintain generating capacity and therefore economic viability of the Projects would be to increase capacity density. However, condensing the SEP and DEP wind farm sites is not considered technically feasible owing to:

- the wake effects of the turbines and the minimum spacing required to avoid interference and maximise efficiency of SEP and DEP;
- the wake effect of the existing SOW and DOW; and

- the requirement to avoid other constraints within the SEP and DEP wind farm sites and to comply with the Maritime and Coastguard Agency's Marine Guidance Note (MGN) 654 (Maritime and Coastguard Agency, 2021).

142. Thus, reducing the size of the wind farm site areas is not considered to be an acceptable alternative solution as it would not be financially or technically feasible, nor would it satisfy the project objectives.

143. As demonstrated within ES **Chapter 3 Site Selection and Assessment of Alternatives** (document reference 6.1.3), the wind farm sites are considerably constrained and so there is limited opportunity for further refinements that could achieve the project objectives whilst having a lesser effect on European sites.

144. Key constraints that restrict extension to the northeast, east and/or southeast and that would prevent an increase in the distance from the North Norfolk Coast, Greater Wash and Flamborough and Filey Coast SPAs from being achieved include:

- existing pipelines to the north and east of the DEP North array area;
- shipping lanes to the south of the DEP South array area and to the east of SEP;
- existing DOW export cables to the east of SEP; and
- Potential for wake effects on the existing DOW.

145. Given that the overarching site selection criteria included a requirement to minimise cable and pipeline crossings, avoid existing shipping lanes and areas of high shipping, and minimise wake effects on operational wind farms, any alteration to the wind farm sites to increase the distance from European sites is not considered to be financially or technically feasible, nor is it likely to be significantly less damaging. Thus, alterations to the SEP and/or DEP wind farm sites are not considered to be an acceptable alternative solution.

4.6.2 Increased Air Gap

146. The minimum clearance between the rotor blades and sea surface (i.e. air gap) included in the design envelope is 30m above Highest Astronomical Tide (HAT). This has been increased from 26m above HAT following Section 42 consultation feedback regarding potential collision risk impacts with offshore ornithology receptors and is higher than the standard minimum air gap of 22m required for safe navigation in accordance with the Maritime and Coastguard Agency's MGN 654 (Maritime and Coastguard Agency, 2021). Increasing the minimum air gap avoids peak bird densities at lower heights and thus reduces potential collision risk impacts. For key ornithological species (i.e. those screened into Collision Risk Modelling), the decrease in collision risk as a result of increasing the air gap from 26m to 30m above HAT is at least 20% for all species, but over twice that for some species (including Sandwich tern).

147. A review of the minimum blade tip clearance above water level has been undertaken to determine whether this could feasibly be increased beyond 30m above HAT. Feasibility has been assessed based on the resulting hub heights, foundation and wind turbine dimensions as well as an appraisal of the positive and negative impacts that would arise from increasing air gap further and how these might be considered in the overall planning balance.

148. Whilst an air gap of 30m above HAT is found to be technically achievable, it is reliant on a small number of vessels that would be capable of installing at the resulting hub heights, most of which are not yet available on the market. Furthermore, for an air gap of this size, it is foreseeable that an extended foundation would be necessary to retain the tower lift weight below crane limits. In turn, this is predicted to result in foundation weights that could preclude the use of Transition Piece-less monopile foundations, particularly in deeper water areas of the SEP and DEP wind farm sites, due to handling and installation limits.

149. Whilst further developments in installation vessels available on the market could be expected, there is no guarantee of the timeline for their availability or suitability for operating at the specific site conditions found within the SEP and DEP wind farm sites. **Therefore, any further increase to the minimum air gap beyond 30m above HAT is considered to present a significant risk to the overall project feasibility**.

150. The minimum air gap of 30m above HAT restricts the turbine rotor diameter to 300m within the associated 330m maximum tip height. Therefore, to further increase the air gap, the rotor size would have to be decreased (which is discussed and ruled out in **Section 4.5.4.1**) or the maximum tip height would have to be increased which would result in an increase in potential seascape and aviation impacts. Thus, any further increase would require a trade-off between a further reduction in potential collision risk impacts to offshore ornithology receptors but an increase in potential seascape and aviation impacts as well as benthic impacts (from potential increases in turbine footprint and the level of scour protection required).

151. Consideration of the feasible extent of air gap that would constitute a reasonable alternative requires all potential impacts to be to be taken into account and the balance of probabilities as to their relative weight and significance. As above extending the air gap above 30m would involve commensurate raising of the tip height of the wind turbine blades. With regard to the current design, of 25 identified seascape, landscape and visual receptors, four are predicted to experience 'major-moderate' residual seascape and visual impacts in the operational phase of the Projects. All other receptors are predicted to experience lesser seascape and visual impacts (**ES Chapter 25 Seascape and Visual Impact Assessment** (document reference 6.1.25)). Increasing the tip height by two to five metres would potentially increase adverse impacts to seascape and visual as well as exacerbate impacts to aviation due to the requirement to further increase approach altitudes to Norwich airport (**ES Chapter 15 Aviation and Radar** (document reference: 6.1.15)). In addition, further raising the tip height of the proposed turbines would significantly affect the availability of vessels militating against the generation of wind power by 2030 and the urgency of need established by NPS policy. Furthermore, extending the tip height of turbines to create an air gap greater than 30m would place at risk the technical feasibility and therefore deliverability of the project and impose more significant benthic impacts on the sea bed.

152. For all the above reasons therefore increasing the air gap beyond 30m would, because of the associated increase in turbine tip height, potentially increase seascape and visual, aviation and benthic impacts and significantly impact on timescale and deliverability of SEP and DEP. Taken together these impacts are considered to outweigh any ornithological benefit which would be realised by the

only limited and theoretical increase in air gap that could technically be achieved. It is not therefore a feasible alternative solution to increase the air gap beyond 30m above HAT.

4.7 Step 5: Assessment of Effects of Feasible Alternative Solutions

153. Step 5 is not applicable, as there are no feasible alternative solutions.

4.8 Assessment of Alternative Solutions Conclusion

154. The information presented in this document demonstrates the robust assessment of alternative solutions that has been undertaken by the Applicant. The assessment followed available guidance and included a 'do nothing scenario', and alternative locations, scale, design, methodology and timing. No feasible alternative solutions which could host comparable scale offshore wind farms and meet the Project Need and Objectives were identified.

5 Imperative Reasons of Overriding Public Interest

5.1 Introduction

155. In order to define the IROPI case for a plan or project, Defra *et al.* (2021) provides the following definitions:

- *"imperative - it's essential that it proceeds for public interest reasons*
- *in the public interest - it has benefits for the public, not just benefits for private interests*
- *overriding - the public interest outweighs the harm, or risk of harm, to the integrity of the European site that's predicted by the appropriate assessment"*

156. Furthermore, BEIS (2020a) summarises the key principles (as set out in guidance) in defining the IROPI case for Hornsea Project Three:

- Imperative: Urgency and importance: 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 objective falls within a framework for one or more of the following:
    - Actions or policies aiming to protect fundamental values for citizens' life (health, safety, environment);
    - Fundamental policies for the State and the Society; or
    - 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 the Habitats and Birds Directives are long term interests.

- Overriding: The public interest of development must be greater than the public interest of conservation of the relevant habitats site(s).

157. It should be noted that there are no priority habitats or species listed under Article 1(d) and Article 1(h) of the Habitats Directive present within the North Norfolk Coast SPA, Greater Wash SPA or Flamborough and Filey Coast SPA. As stipulated by the Habitats Directive (Article 6(4)), Habitats Regulations (Regulation 64) and Marine Habitats Regulations (Regulation 29), where no priority habitats and species are present, the IROPI case need only consider reasons of socio-economic nature.

5.2 Imperative

158. As discussed in **Section 4.3.1**, there is an urgent need to establish a secure, diverse, affordable and resilient energy supply and meet decarbonisation targets. This provides a clear and urgent need for the development of SEP and DEP to help meet the UK Government target of 50GW of offshore wind installed capacity by 2030. SEP and DEP will each provide greater than 100MW of renewable energy capacity. SEP and DEP will make a substantial contribution to the achievement of national renewable energy targets towards net zero and to the UK's contribution to global efforts to reduce the effects of climate change, which are fundamental policies for the state and the society of the UK.

5.3 Public Interest

159. The following sections outline the essential public benefits of SEP and DEP.

5.3.1 Climate Change Benefits

160. UNEP-CCC (2021) states a global temperature increase of around 2.7°C by 2050 is expected. DECC (2011) predicted that a continuation of global emission trends could lead average global temperatures to rise by up to 6°C by the end of this century. The potential impacts associated with such a global temperature rise include impacts on human health and safety.

161. BEIS (2019b) outlines the following potential health risks resulting from climate change:

- Existing health problems become worse as temperatures increase.
- Malnutrition could become more widespread as crop yields are affected by increased drought conditions in some regions, leading to reduced food production.
- Warmer temperatures could increase the range over which disease-carrying insects are able to survive and thrive.
- Vulnerable people will be at risk of increased heat exposure and the number of deaths due to temperature extremes is expected to increase in the future (although in the long term there will likely be fewer health problems related to cold temperatures).

- Decreasing food production, an increase in health issues associated with climate change, and more extreme weather, will slow economic growth, making it increasingly difficult to reduce poverty.

162. The World Meteorological Organization (WMO) reported that between 2001 and 2010 extreme weather events caused more than 370,000 deaths worldwide (including a large increase in heatwave deaths from 6,000 to 136,000) – 20% higher than the previous decade (BEIS, 2019b).

163. In the UK, floods and droughts have had significant health impacts, including fatalities in recent years. In addition, health impacts as a result of climate change are likely to be more far-reaching than the immediate dangers of flooding. Climate change effects such as flooding have potential to impact on mental health and provide other indirect impacts as a result of disruption to critical supplies of utilities such as electricity and water (Health Protection Agency, 2012).

164. The UK CCC (2017) reported that 2016 was the hottest year on record, which represents the fifth time in the 21st century that a new record high annual temperature has been set (along with 2005, 2010, 2014, and 2015) (National Oceanographic and Atmospheric Administration (NOAA), 2016). At the time, 2019 was the second hottest year globally since records began in 1880 (Copernicus Climate Change service, 2020) and now 2020 is tied with 2016 as the hottest year on record, globally (National Aeronautics and Space Administration (NASA), 2021).

165. Increasing global temperatures is predicted to increase frequency of extreme weather events such as floods and drought and reduced food supplies.

166. The frequency and extent of extreme weather events are increasing around the world and have been seen in the UK, with heat waves becoming more frequent and longer lasting, as well as an increase in intense, heavy rainfall causing flood events.

167. Should global temperatures rise by 2°C above the pre-industrial average, the UK could see a 30% decrease in river flows during ‘dry’ periods and a 5-20% increase in river flows during ‘wet’ periods. In addition, between 700 and 1,000 more heat-related deaths are predicted per year in South-East England (BEIS, 2019b).

168. Climate change has been greatly affecting coastal areas in the UK in recent years. This includes the Norfolk coast, where coastal erosion in certain locations has become a greater problem now compared to previous years, due to a combination of increasing storm frequency and the already sensitive nature of the Norfolk coast to such erosion.

169. Increased temperatures, changes to rainfall patterns, increased prevalence of agricultural pests and an increased risk of extreme weather events is also predicted to reduce the production of major food crops. This would result in an increasing gap between food demand and supply. Since trade networks are increasingly global, the effects of extreme weather events in one part of the world will affect food supply in another. For example, floods or droughts that damage crops in Eastern Europe or the US can directly affect the cost and availability of food in the UK (DECC, 2019).

170. Generating and harnessing energy from low carbon, renewable sources, such as offshore wind, is one of the solutions available to substantially reduce carbon emissions and thereby mitigate all the above climate impacts. SEP and DEP would

make a significant contribution both to the achievement of UK decarbonisation targets and to global commitments to mitigating climate change.

171. The switch to renewable sources of energy has both air quality and associated human health and safety benefits. A recent study has demonstrated the huge beneficial impacts on human health from decarbonisation, stating that "*Our estimates suggest that overall around 3.5 million or so premature deaths from air pollution worldwide could be prevented annually from phasing out fossil fuels at today's population. If all sources of air pollution from human activities could be eliminated, our estimates show that more than five million premature deaths from air pollution would be prevented annually*." (LSHTM, 2019).

172. SEP and DEP will make a significant contribution to the achievement of both the national renewable energy targets and to the UK's contribution to global efforts to reduce the effects of climate change. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 sets a UK target for at least a 100% reduction of greenhouse gas emissions (compared to 1990 levels) by 2050. This ambitious 'net zero' target will only be met by the crucial contribution from the offshore wind industry.

173. SEP and DEP have a design life of approximately 40 years, after which both offshore wind farms may be repowered (subject to the necessary approvals). SEP and DEP would contribute to reaching national targets on CO_2 reduction to net zero greenhouse gas emissions by 2050 and renewable energy production growth, with the potential to each deliver greater than 100MW of clean, renewable energy.

5.3.2 Public Electricity Supply Benefits

174. In addition to their contribution to offsetting carbon emissions, SEP and DEP have the potential to power over 0.74 million UK homes per annum with clean, renewable and low cost electricity.

175. As discussed in **Section 4.3.1.2,** decarbonisation of the UK energy supply chain and increasing electricity demand results in a significant deficit in UK electricity supply compared with demand and therefore there is a clear public benefit inherent in the creation of new electricity supply capacity, such as will be provided by SEP and DEP.

176. In order to help meet the targets described in the sections above, renewable energy needs to be affordable. The UK has a world leading offshore wind sector and is well placed to benefit from further investment in renewables innovation to accelerate cost reduction. The Government, in partnership with the Research Councils and Innovate UK, expects to invest around £177 million to further reduce the cost of renewables, including innovation in offshore wind turbine blade technology and foundations.

177. Through offshore wind developer-led innovation there has been a significant reduction in the levelized cost of energy in recent years. The Clean Growth Strategy (BEIS, 2017) indicates that the costs of offshore wind have decreased significantly (50% fall since 2015) which will help to fight fuel poverty (ORE Catapult, 2017b). The UK offshore wind industry achieved a 'strike price' (the minimum price developers will be paid for electricity) as low as £37.35/MWh in the Government's latest CfD auction in 2022. That price is 6% lower than the third CfD auction in 2019 and 30% lower than the lowest strike price seen in the second CfD auction in 2017.

178. In the Clean Growth Strategy (BEIS, 2017), the UK Government set out a plan to decarbonise all sectors of the UK economy through the 2020s including innovation in the power sector and renewables. Additionally, in March 2019 the UK offshore wind sector committed to an Offshore Wind Sector Deal (BEIS, 2020b) which reinforces the aims of the UK for clean growth. The UK has a world leading offshore wind sector and is well placed to benefit from further investment in renewables innovation to accelerate cost reduction. The Clean Growth Strategy (BEIS, 2017) indicates that costs of offshore wind projects have decreased significantly (50% fall since 2015) which will help to fight fuel poverty.

179. Developers are continuing to drive these cost reductions through technology development and new work processes. The development of SEP and DEP will contribute to this process. In addition, there are specific potential cost efficiencies from the combined development of SEP and DEP (for example the commitment for a shared onshore substation and shared export cable route, which optimises overall design and cost), as well as synergies with the existing SOW and DOW, particularly once all projects are operational. SEP and DEP will continue to drive technology and development costs down.

180. Unless renewable capacity is enhanced through the build out of projects including SEP and DEP it will not be possible for regulators or government to pass on the public benefit of generation cost reductions to consumers in the form of price cuts which are ultimately necessary in the face of the cost of living crisis

5.3.3 Socio-Economic Benefit

181. The UK Clean Growth Strategy (BEIS, 2017) recognises that actions and investments will be needed to meet the Paris Agreement commitments and that the shift to clean growth will be at the forefront of policy and economic decisions made by governments and businesses in the coming decades. This creates enormous potential economic opportunity – an estimated $13.5 trillion of public and private investment in the global energy sector alone will be required between 2015 and 2030, if the signatories to the Paris Agreement are to meet their national targets (BEIS, 2017).

182. In 2017, ORE Catapult undertook analysis of the UK offshore wind supply chain and estimated the current and future potential UK content of offshore wind projects as: 32% in 2017; 50% by 2020; and 65% by 2030. In the UK, the Gross Value Added (GVA) to the UK per GW installed, assuming 32% UK content, has been estimated as £1.8bn and is projected to increase to £2.9bn by 2030 – if 65% UK content can be achieved (assuming that 19GW installed capacity is reached) (ORE Catapult, 2017a). It is estimated that the total (domestic and export) market for UK-provided offshore wind could exceed £10.5bn by 2050 and reach £4.9bn annually by 2030 and £8.9bn by 2050 (under a high scenario) (ORE Catapult, 2018).

183. According to RenewableUK's Offshore Wind Industry Investment in the UK report (RenewableUK, 2017), 48% of the total expenditure associated with UK offshore wind farms was spent in the UK in 2015. The UK content of expenditure during the development stage and operation of offshore wind projects was 73% and 75% respectively in 2015, whereas during manufacturing and construction the UK content was 29% (RenewableUK, 2017).

184. The UK is positioned to continue growth in the offshore wind sector by maximising domestic energy resources and utilising the vast offshore wind resource which the UK holds. The UK also has a strong supply chain that continues to expand to support the growth in offshore wind.

185. The Green Paper: Building our Industrial Strategy (HM Government, 2017) focusses on delivering affordable energy and green growth in the UK. A key commitment within the Green Paper is for the UK to become a leader in delivering clean energy technology and to support innovation in renewable energy. The aim is for:

"the UK to be a global leader in innovation, science and research and our Industrial Strategy will help us to deliver our ambitious CO2 reduction targets while, creating jobs and opportunities for people across the country".

186. The energy sector in the UK plays a central role in the economy. Renewable energy can play a major part in boosting the economy and providing new jobs and skills.

187. The offshore wind industry in the UK provides important employment opportunities. The importance of maximising opportunities for the involvement of local businesses and communities in offshore wind has been highlighted as a key success factor for the wind energy sector in the UK (TCE, 2014). Low carbon businesses and their supply chain have created over 430,000 skilled jobs in the UK with 7,200 jobs directly in offshore wind (BEIS, 2020b).

188. RenewableUK (2017) states: *"Offshore wind has become a key part of the UK economy, creating much needed jobs not only in coastal communities like Hull, Grimsby and Great Yarmouth, but also across the country in the ever-expanding supply chain. A huge number of British companies are heavily involved in building the UK's world-leading offshore wind sector."*

189. The UK Government's Industrial Strategy (HM Government, 2017) sets out a plan to transform offshore wind generation, making it an integral part of a low-cost, low-carbon, flexible grid system and boost the productivity and competitiveness of the UK supply chain. These are to be realised through an industry investment into the Offshore Wind Growth Partnership of up to £250m to support better, high-paying jobs right across the UK (BEIS, 2020b).

190. The Offshore Wind Sector Deal builds on the UK's global leadership in offshore wind, maximising the advantages for UK industry from the global shift to clean growth (BEIS, 2020b). The Government's higher target for 40GW by 2030 as announced in the 2019 Queen's Speech (HM Government, 2019) demonstrates the Government's recognition of the need to accelerate progress towards net zero emissions. The UK Government Ten Point Plan supports the industry's target to achieve 60% UK content by 2030. The offshore wind commitments will enable the offshore wind sector to support up to 30,000 direct jobs and 30,000 indirect jobs in ports, factories and the supply chains by 2030.

191. In a letter to Prime Minister Boris Johnson, the CCC stressed that after the COVID-19 crisis actions towards net-zero emissions and to limit the damages from climate change will help rebuild the UK with a stronger economy and increased resilience (CCC, 2020). The CCC has advised the UK Government that reducing greenhouse gas emissions and adapting to climate change should be integral to any recovery package.

192. SEP and DEP will provide a valuable contribution to employment. During the construction of SEP and DEP it is estimated up to 1,730 full-time equivalent (FTE) jobs could be created. During the operation phase it is expected that SEP and DEP could employ 230 full-time equivalent (FTE) jobs, assuming that all direct operation and maintenance employment would be directly employed by SEP and DEP and based in the UK for the lifetime of SEP and DEP. SEP and DEP will also contribute to development of the supply chain and skilled workforce and the associated economic benefits. The indirect effects from employment and expenditure such as from the workforce will contribute to the local economy.

193. There will also be significant expenditure in manufacturing, services, materials and equipment. SEP and DEP have an estimated overall construction cost of £2.14 billion (2019-pricing). Operation and Maintenance amounts to around £18.5 million per annum for DEP and £13.5 million per annum for SEP, totalling around £32.1 million per annum across both offshore windfarms. In total, the GVA of SEP and DEP over the project lifetime (40 years) is estimated to be up to around £800 million making a significant contribution at the national level and £450 million GVA locally at the East Anglia level.

194. Details of the anticipated expenditure and employment from the construction and operation of SEP and DEP (direct and indirect) are discussed further in ES **Chapter 27 Socio-Economics and Tourism** (document reference 6.1.27).

5.4 Long Term

195. Offshore wind has a critical role in delivering long term, cost effective, UK based low carbon electricity, as well as contributing to minimising the long term impacts of climate change. SEP and DEP will be capable of producing low cost, clean electricity generation for the National Grid throughout their 40-year operational life therefore providing long term benefits.

5.5 Overriding

196. The relevant public interests relating to SEP and DEP must be set against the weight of the conservation interest protected by the Habitats Regulations and the Marine Habitats Regulations, having regard to the nature and extent of the harm identified to the relevant European sites features. The effects upon the European sites features of concern are as follows:

- Kittiwake collision risk (**Section 4.4.4.3**)
- Sandwich tern combined displacement and collision risk (**Section 4.4.2.3** and **4.4.3.3**)
- Guillemot and razorbill displacement (**Section 4.4.4.4** and **4.4.4.5** respectively)
- Gannet combined displacement and collision risk (**Section 4.4.4.6**)

197. In weighing up the public interests delivered by SEP and DEP with these conservation interests account needs to be taken of the fact that the benefits of SEP and DEP include conservation benefits for the species concerned. The SEP and DEP contribution to reducing the effects of climate change will have ecological benefits which outweigh/override the effects outlined above by contributing to a reduction in carbon emissions, a slowing of climate change and the securing of

habitable environments for the longer term for a range of species including kittiwake, Sandwich tern, razorbill and guillemot.

198. Global warming places many species at risk of loss of suitable habitat and/or prey due to changing conditions. Species may shift their geographical ranges to areas where conditions remain suitable (e.g. marine species moving further north in the UK to cooler climates), however, depending on the extent of suitable habitats / prey there may be increased competition.

199. The overriding nature of the public interests engaged in this case should be evident from the suite of legislation and policy documentation which has been outlined in this document. The Projects would deliver benefits relating to human health, public safety and beneficial consequences of primary importance for the environment. It is also clear, as set out earlier in this document, that without achieving the overriding objective of reducing carbon emissions there is likely to be very significant species loss, including of wild birds and their prey.

200. It is recognised that IROPI is considered against the risk to a designated feature(s), having regard to the nature and extent of the harm identified to relevant European sites. In their contribution to reaching Net Zero and the associated action against climate change, SEP and DEP will provide considerable long-term environment benefits, including benefits to the individual bird species within the SPAs.

201. Key drivers of seabird population size in western Europe are climate change (Sandvik *et al*., 2012; Frederiksen *et al*., 2004, 2013; Burthe *et al*., 2014; Macdonald *et al*. 2015; Furness 2016; JNCC 2016), and fisheries (Tasker *et al*. 2000; Frederiksen *et al*. 2004; Ratcliffe 2004; Carroll *et al*. 2017; Sydeman *et al*. 2017). Pollutants (including oil, persistent organic pollutants, plastics), alien mammal predators at colonies, disease, and loss of nesting habitat also impact on seabird populations but are generally much less important and often more local factors (Ratcliffe 2004; Votier *et al*., 2005, 2008; JNCC 2016).

202. Trends in seabird numbers in breeding populations are better known, and better understood than trends in numbers at sea within particular areas. Breeding numbers are regularly monitored at many colonies (JNCC 2016), and in the British Isles there have been three comprehensive censuses of breeding seabirds in 1969-70, 1985-88 and 1998-2002 (Mitchell *et al*. 2004), and a fourth census due to be completed in 2022 (JNCC 2022); as well as single-species surveys (such as the decadal counts of breeding gannet numbers, Murray *et al*. 2015). In contrast, the European Seabirds at Sea database is incomplete, and few data have been added since 2000, so that current trends in numbers at sea in areas of the North Sea are not so easy to assess.

203. Breeding numbers of many seabird species in the British Isles are declining, especially in the northern North Sea (Foster and Marrs 2012; Macdonald *et al*. 2015; JNCC 2016). The most striking exception is gannet, which continues to increase, although the rate of increase has been slowing (Murray *et al*. 2015). In the context of these ongoing declines, the emergence of avian influenza in UK breeding seabird populations in 2022 is a key concern, particularly with outbreaks affecting two species for which the UK hosts more than 50% of the global breeding populations: gannet and great skua. It is too early to quantify effects on populations and monitoring activities at some seabird colonies have been suspended to reduce risks

of spreading avian flu. However, there are indications that some species have suffered very high levels of adult mortality as well as declines in fledged chicks (BTO 2022, RSPB, 2022, Natural History Museum 2022).

204. Nevertheless, climate change is likely to still be the strongest influence on seabird populations in coming years and decades, with anticipated deterioration in conditions for breeding and survival for most species of seabirds (Burthe *et al*. 2014; Macdonald *et al*. 2015; Capuzzo *et al*. 2018) and therefore further declines in numbers are anticipated. It is therefore highly likely that, without interventions being made, breeding numbers of most of our seabird species will continue to decline under a scenario with continuing climate change due to increasing levels of greenhouse gases.

205. Future decreases in kittiwake breeding numbers are likely to be particularly pronounced, as kittiwakes are very sensitive to climate change (Frederiksen *et al*. 2013; Carroll *et al*. 2015). Climate change has been linked with an 87% decline in breeding kittiwakes on Orkney and Shetland, and by 96% at St Kilda since 2007 (RSPB, 2017).

206. Kittiwakes are also sensitive to fishery impacts on sandeel stocks near breeding colonies (Frederiksen *et al*. 2004; Carroll *et al*. 2017), and the species will lose the opportunity to feed on fishery discards as the Landings Obligation comes into effect.

207. Gannet numbers may continue to increase for some years, but evidence suggests that this increase is already slowing (Murray *et al*. 2015), and numbers may peak not too far into the future. While the Landings Obligation will reduce discard availability to gannets in European waters, in recent years increasing proportions of adult gannets have wintered in west African waters rather than in UK waters (Kubetzki *et al*. 2009), probably because there are large amounts of fish discarded by west African trawl fisheries and decreasing amounts available in the North Sea (Kubetzki *et al*. 2009; Garthe *et al*. 2012). The flexible behaviour and diet of gannets probably reduces their vulnerability to changes in fishery practices or to climate change impacts on fish communities (Garthe *et al*. 2012).

208. Climate change has been identified as the strongest influence on future seabird population trends. The recent EU funded SEANSE project has assessed the impact of climate change on four key seabird species (Rijkswaterstaat Zee & Delta 2020). **The research concluded that prey availability effects due to climate change is the pressure/pathway that currently has the largest impact on seabird populations** at the wider North Sea level, and is likely to be responsible for a substantially greater effect than impacts resulting from any of the other activities (including collision risk or displacement from offshore wind). The report states *"it is concluded that prey availability effects due to climate change is the pressure/pathway that in the present day appears to have the largest impact on kittiwake…and lesser black-backed gull at the wider North Sea level, and is likely to be responsible for a substantially greater effect than impacts resulting from any of the other activities. For all seabirds it is largely expected that climate change impacts will become more severe in the future as both temperatures, and possibly the rate of increase, become greater, and extreme weather events become more frequent."*

209. In considering the overriding nature of climate change effects compared with the effects of SEP and DEP, the following key points should be borne in mind:

- There is an absence of any priority habitats or species which are particularly rare or endangered in the North Norfolk Coast SPA, Greater Wash SPA or Flamborough and Filey Coast SPA.
- The scale of the impacts predicted from SEP and DEP are minimal and the impact prediction is highly precautionary.

210. These overriding ecological benefits of SEP and DEP's contribution to tackling climate change are compounded by the public benefits described in **Section 5.2** to provide clear overriding benefits of the Projects.

5.6 Imperative Reasons of Overriding Public Interest Summary

211. This section demonstrates the case that SEP and DEP must be carried out for imperative reasons of overriding public interest.

212. The environmental and social benefits to the UK from increasing the generation of low carbon energy are clear, with SEP and DEP providing a critical contribution. SEP and DEP contribute to the UK's legally binding climate change targets by helping to decarbonise the UK's energy supply, whilst contributing to the essential tasks of ensuring security of supply and providing low cost energy for consumers in line with the UK Government's national policies.

213. The Applicant considers that there is a demonstrable overriding public interest in delivering the Projects and the policy objectives they would serve, which outweighs the risk of adverse effects on the Sandwich tern feature of the North Norfolk Coast SPA (**Section 4.4.2.3**) and the Greater Wash SPA (**Section 4.4.3.3**), and the kittiwake feature of the Flamborough and Filey Coast SPA (**Section 4.4.4.3**). Similarly, in the event that the Secretary of State concludes that an adverse effect on integrity of the gannet, guillemot and razorbill features (**Sections 4.4.4.6, 4.4.4.4**, and **4.4.4.5** respectively) of the Flamborough and Filey Coast SPA cannot be ruled out, there is a demonstrable overriding public interest in delivering the Projects and the policy objectives they would serve, that is considered to override the potential conservation interests at risk.

6 COMPENSATORY MEASURES

214. This document contains within its appendices and annexes the following suite of compensatory measures documents:

- **Appendix 1**: Compensatory Measures Overview
  - Annex 1A: Initial Review of Compensatory Measures for Sandwich Tern and Kittiwake
  - Annex 1B: Sandwich Tern and Kittiwake Ecological Evidence
  - Annex 1C: Initial Review of Compensatory Measures for Gannet, Guillemot and Razorbill
- **Appendix 2**: Sandwich Tern Compensation Document
  - Annex 2A: Sandwich Tern Outline Compensation, Implementation and Monitoring Plan

- Annex 2B: Sandwich Tern Nesting Habitat Improvements Site Selection

- **Appendix 3**: Kittiwake Compensation Document
  - Annex 3a: Kittiwake Outline Compensation Implementation and Monitoring Plan
- **Appendix 4**: Gannet, Guillemot and Razorbill Compensation Document
  - Annex 4a: Outline Gannet, Guillemot and Razorbill Compensation Implementation and Monitoring Plan
- **Appendix 5**: Derogation Funding Statement (Habitats Regulations and Marine and Coastal Access Act)

215. In addition, the **Strategic and Collaborative Approaches to Compensation and Measures of Equivalent Environmental Benefit** (document reference 5.8) has been submitted with the DCO Application.

216. Schedule 17, Part 1 of the **Draft DCO** (document reference 3.1) secures the implementation of the proposed compensatory measures for Sandwich tern and kittiwake and **Appendix 4 Gannet, Guillemot and Razorbill Compensation Document** (document reference 5.5.4) for gannet, guillemot and razorbill.

217. Further details on the compensatory measures proposed for each species, including how the Applicant's proposals relate to the different project development scenarios, are provided in the relevant compensation documents outlined above.

7 CONCLUSION

218. The evidence presented in this document clearly demonstrates that there are no alternative solutions (**Section 4**) which could deliver the project objectives (**Section 4.3.2**), in accordance with the need for SEP and DEP (**Section 4.3.1**).

219. In addition, there is a clear case for IROPI underpinned by International and national policy and legislation, as outlined in **Section 5**.

220. **Appendices 1** to **4** which are listed in **Section 6** describe the proposed compensatory measures which are deliverable post consent and can be secured by the proposed DCO conditions provided in Schedule 17, Part 1 of the **Draft DCO** (document reference 3.1) for Sandwich tern and kittiwake and **Appendix 4 Gannet, Guillemot and Razorbill Compensation Document** (document reference 5.5.4) for gannet, guillemot and razorbill (should compensation be required).

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