Hornsea Project Four

B2.2: Report to Inform Appropriate Assessment Part 2: Appendix A: Habitat Regulations Assessment Screening Report (Tracked)

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Revision Summary

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Revision Change Log

Rev	Page	Section	Description
01	-	-	*Submitted as part of DCO Application*
02	N/A	N/A	Order Limits were updated for all GIS Figures (i.e. 1, A-1, A-2, A-3 and A-4).
02	N/A	N/A	GIS Figure A-4 was also updated to include labels for the designated sites identified under criterion 4.

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Glossary

Term	Definition
Appropriate Assessment	An assessment to determine the implications of a plan or project on a European site in view of the site's Conservation Objectives. An AA forms part of the Habitats Regulations Assessment and is required when a plan or project likely to have a significant effect on a European site.
Annex I Habitat	Natural Habitat types of community interest whose conservation requires the designation of Special Area of Conservation.
Annex II Species	Animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation.
Barrier Effect	The potential for birds to fly around an array of turbines causing an increase in the overall distance flown than would otherwise have been the case if the wind turbines had not been present.
Birds Directive	Directive 2009/147/EC of the European Parliament and of the Council of 30th November 2009 on the Conservation of Wild Birds.
Collision Risk	A potential risk that birds collide with wind turbine or its blades.
Commitment	A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Cumulative Effect	Impacts that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Four.
Development Consent Order	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIPs).
Displacement	The potential for birds and other animals to avoid an area due to the presence of the wind turbines or from vessel activity.
Environmental Impact Assessment	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and the EIA Regulations, including the publication of an Environmental Statement (ES).
European Site	A Special Area of Conservation (SAC) or candidate SAC (cSAC), a Special Protection Area (SPA) or potential SPA (pSPA), a site listed as a Site of Community Importance (SCI) or a Ramsar site.
Habitats Regulations Assessment	A process which helps determine Likely Significant Effects and (where appropriate) assesses adverse effects on the integrity of European Conservation Sites and Ramsar sites. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI).
High Voltage Alternating Current	High voltage alternating current is the bulk of electricity by alternating current, whereby the flow of electric charge periodically reverses direction.

Term	Definition
High Voltage Direct Current	The bulk transmission of electricity by direct current, whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
In-Combination Effect	The combined effect of Hornsea Four in-combination with the effects from a number of different projects on the same feature/receptor.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
Marine Mammal Mitigation Protocol	A document detailing the protocol to be implemented in the event that driven or part-driven pile foundations are proposed to be used. The protocol identifies the methods for detection, potential mitigation and monitoring/reporting protocols for marine mammals.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Mitigation	A term used interchangeably with Commitment(s) by Hornsea Four. Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping or PEIR).
Orsted Hornsea Project Four Ltd	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate	The executive agency of the Department of Communities and Local Government responsible for operating the planning process for NSIPs.
Preliminary Environmental Information Report	Defined in the EIA regulations as information referred to in part 1, Schedule 4 information for inclusion in environmental statements which has been compiled by the applicant and is reasonably required to assess the environmental effects of the development.
Project Description	A summary of the engineering design elements of Hornsea Four.
Ramsar Site	Wetlands of international importance, designated under the Ramsar Convention.
Sites of Community Importance	Sites that have been adopted by the European Commission in accordance with the Habitats Directives but not yet formally designated by the government of each country.
Special Area of Conservation	Strictly protected sites designated under Article 3 of the Habitats Directive for habitats listed on Annex I and animals listed on Annex II of the directive.
Special Protection Area	Strictly protected sites designated under Article 4 of the Birds Directive for species listed on Annex I of the Directive and for regularly occurring migratory species.
Transboundary	Crossing into other European Economic Area (EEA) states.

Acronyms

Acronym	Definition
AA	Appropriate Assessment
ADD	Acoustic Deterrent Device
AEoI	Adverse Effect on Integrity
AfL	Agreement for Lease
BEIS	Department of Business, Energy and Industrial Strategy
Cefas	Centre for Fisheries and Aquaculture Science
CfD	Contract for Difference
CIEEM	Chartered Institute for Ecology and Environmental Management
CoCP	Code of Construction Practice
CRM	Collision Risk Modelling
cSAC	Candidate SAC
DCO	Development Consent Order
DIN	Dissolved Inorganic Nitrogen
DO	Dissolved Oxygen
DECC (now (BEIS))	Department of Energy and Climate Change (now Business, Energy and Industrial Strategy)
EA	Environment Agency
EC	European Commission
ECJ	European Court of Justice
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
HDD	Horizontal Direction Drill
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IFCA	Inshore Fisheries Conservation Authority
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effect
MCZ	Marine Conservation Zone
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
NE	Natural England
O&M	Operation and Maintenance
OSS	Offshore Substation
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Information Report
PEMMP	Project Environmental Management and Monitoring Plan
PINS	The Planning Inspectorate

Acronym	Definition
pSPA	Possible Special Protection Area
PTS	Permanent Threshold Shift
RIAA	Report to Inform Appropriate Assessment
rMCZ	Recommended MCZ
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCI	Site of Community Importance
SIP	Site Integrity Plan
SNCB	Statutory Nature Conservation Body
SNH	Scottish Natural Heritage
SNS	Southern North Sea
SoS	Secretary of State
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
WTG	Wind Turbine Generator

Units

Unit	Definition
km	kilometre
nm	nautical miles

1 Introduction

1.1 Purpose of this Report

1.1.1.1 Orsted Hornsea Project Four Ltd., (the 'Applicant') is proposing to develop the Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). This document has been produced to inform the Habitats Regulations Assessment (HRA) process for Hornsea Four. It provides information to enable the screening of the project with respect to its potential to have a likely significant effect (LSE) on European and Ramsar sites of nature conservation importance. This step in the process and associated reporting requirements are further described in the following sections.

1.1.1.2 The assessment provided in this document is based on the understanding of the baseline environment (**Section 4**) and the scope and nature of the proposed project activities as reported at Development Consent Order (DCO) Application (**Sections 1.2-1.7**). **Section 3** takes account of all consultation responses on HRA Screening received to date and therefore includes consideration of the consultation responses on the first draft of the Screening Report (issued October 2018), together with and subsequent screening updates issued to Natural England (May 2019), together with comments made on screening presented in the draft Report to Inform Appropriate Assessment (RIAA) (issued August 2019). That consultation process has been managed through the Evidence Plan (EP) Process, as agreed with statutory bodies through the EP Terms of Reference (**Appendix A of B1.1.1: Evidence Plan**)).

1.1.1.3 HRA Screening was initially undertaken during Scoping and published for consultation in October 2018. Following that point, a number of updates to that original screening have been undertaken and presented here, with these updates driven by consultation responses, project updates following the Section 42 and Section 47 consultation process, and new scientific literature (specifically the recent update to Thaxter et al. (2012), in the form of Woodward et al. (2019)). As a result of these updates, it has been determined that a re-visit of HRA Screening is required to support RIAA which forms part of the Hornsea Four DCO Application.

1.1.1.4 The current report is effectively an updated version of the original October 2018 Screening Report and includes all updates to screening since that point within a single source, for Hornsea Four alone and in-combination (in-combination previously provided within the draft RIAA for PEIR), thus providing a final Screening record to inform the subsequent final RIAA at the point of the DCO Application (**B2.2: Report to Inform Appropriate Assessment**). For clarity and completeness, a summary of the key changes to the Screening Report issued at PEIR (issued to support the draft RIAA) and that presented here is provided below:

- Minor updates to the project description presented in **Section 1** in line with the Hornsea Four Project Description (**ES Volume A1 Chapter 4: Project Description**);
- A brief update to the Habitats Regulations Assessment process to acknowledge the change following Brexit in **Section 2**;
- Inclusion of all consultation received to date (May 2020) in relation to Screening in **Section 3**;
- Minor updates to the environmental baseline description to reflect project specific survey work in **Section 4**;
- Re-positioning the site selection process now summarised only in **Section 5** (the application of criteria to identify relevant sites and features for consideration through screening) to **Appendix A**;

- Update to Screening to reflect the above changes in Section 6; and
- Inclusion of full screening in-combination, updated to reflect the above changes, in Section 7.

1.2 Project Overview

1.2.1 Former Hornsea Zone

1.2.1.1 The former Hornsea Zone is located in the North Sea off the east coast of Yorkshire. The Hornsea Zone was one of several offshore wind generation zones around the UK coast identified by The Crown Estate (TCE) during the third round of wind licensing.

1.2.1.2 DONG Energy Wind Power A/S (now Orsted) acquired the rights to develop Hornsea Project One Offshore Wind Farm, (hereafter Hornsea Project One) in early 2015 and later that year, DONG Energy Power (UK) Ltd. acquired the Hornsea Zone. This was accompanied by the acquisition of development rights for Hornsea Project Two Offshore Wind Farm (hereafter Hornsea Project Two), Hornsea Project Three Offshore Wind Farm (hereafter Hornsea Three) and Hornsea Four. As of March 2016, the previous Hornsea Zone Development Agreement (initiated between Smart Wind Ltd. and TCE) was dissolved and new project specific agreements (known as Agreement for Leases (AfLs)) were created in agreement with TCE for all four projects. The Hornsea Zone has therefore been dissolved and is referred to as the former Hornsea Zone in this document.

1.2.1.3 Hornsea Project One was the first project to be granted development consent in the former Hornsea Zone on the 10 December 2014, with the final of 174 wind turbine generators (WTGs) installed in October 2019. Hornsea Project Two was the second project to be granted consent (16 August 2016) and is expected to be fully operational by 2022. Hornsea Three was submitted by Orsted on 14 May 2018 for Examination by the Planning Inspectorate (PINS), with the Examination closing on 2nd April 2019. A decision on the project has been postponed until 1st June 2020. Hornsea Four is the fourth proposed project being brought forward in the former Hornsea Zone by the Applicant and is explained in further detail below.

1.2.2 Hornsea Four

1.2.2.1 Hornsea Four will be situated approximately 65 km from the Yorkshire coastline (at its closest point) and will consist of a maximum of 180 WTG. Electricity generated will be transported to the coastline via offshore export cables which will be installed within the offshore Export Cable Corridor (ECC) to a landfall site south of Bridlington and to the east of Fraisthorpe, within the cable corridor, to be located as close as practical to the National Grid substation at Creyke Beck, shown below in Figure 1.

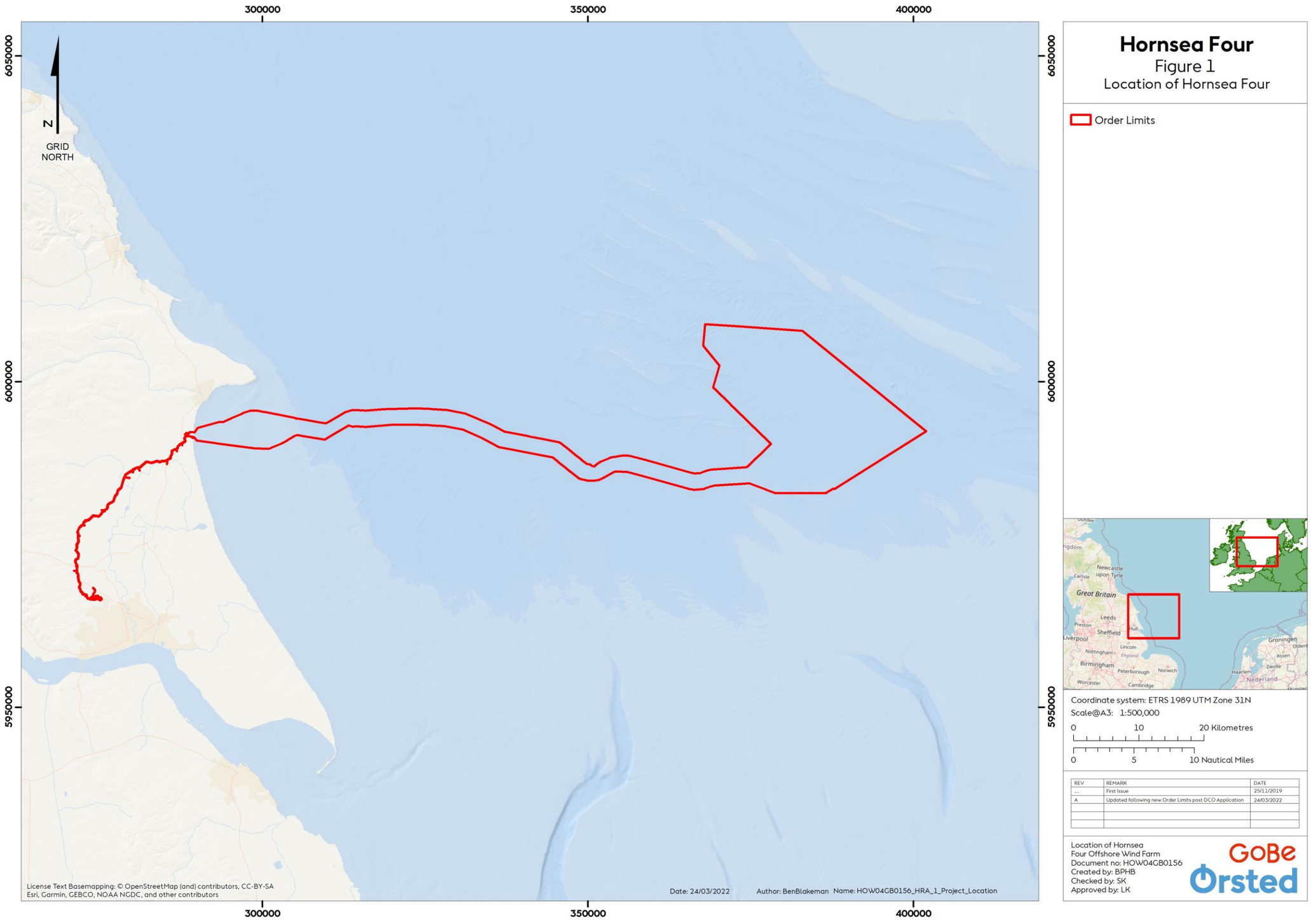

Figure 1: Location of Hornsea Four.

1.3 Project Description

1.3.1.1 This section of the HRA Screening Report provides an outline description of the design of Hornsea Four, based on design information as described in the **Volume A1, Chapter 4: Project Description**. It sets out the key Hornsea Four design and components for both the onshore and offshore infrastructure, as well as the main activities associated with the construction, operation and maintenance, and decommissioning of the project.

1.3.1.2 In common with all offshore wind farms, the final design may not be confirmed until after consent has been granted. Consequently, Hornsea Four has developed 'Maximum Design Scenarios' (MDS) to provide sufficient flexibility within the project whilst ensuring that the project eventually constructed has been properly assessed[1]. It should be noted that the relevant MDS will therefore vary depending on the receptor being assessed, with a different MDS provided for each receptor topic. These are explained and presented in full within the relevant Environmental Statement (ES) chapters and, where applicable to the sites and features under assessment, within the RIAA (**B2.2: Report to Inform Appropriate Assessment**) and are therefore not repeated here.

1.4 Hornsea Four Order Limits

1.4.1.1 The Hornsea Four array area at Scoping (and therefore within the original October 2018 Screening Report, Orsted 2018) covered approximately 846 km^2. That original array boundary was amended during PEIR to 600 km^2 and has been maintained for the DCO Application (**Figure 1**). Similarly, a number of amendments have been made following PEIR to the onshore and offshore ECC, logistics compound and accesses, with these detailed in **Volume A1, Chapter 4: Project Description** and **Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**. Hornsea Four consists of:

- Hornsea Four array area – The location of the offshore wind farm and will include the turbines, array cables, offshore accommodation platform and offshore substations along with offshore interconnector cables;
- Hornsea Four offshore ECC – The location of the offshore electrical transmission infrastructure which will include offshore export cables and the offshore High Voltage Alternating Current (HVAC) booster substation; and
- Hornsea Four onshore ECC - The location of the permanent onshore electrical infrastructure which will include onshore export cables; and
- Hornsea Four onshore substation, Electrical Balancing infrastructure (EBI) and connection to the National Grid substation at Creyke Beck.

1.5 Offshore infrastructure

1.5.1.1 The type and design of WTGs, offshore substations and offshore accommodation platform will depend on the final site investigations and procurement negotiations which will be undertaken post-consent. This revised and final Screening report is based on final ES chapters, and draws on the MDSs contained therein. The key offshore components of Hornsea Four will include the following:

[1] National Policy Statement for Renewable Energy Infrastructure (EN-3) refers, see EN-3 section 2.6.43 Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps- renewable-energy-en3.pdf

- A maximum of 180 WTGs and associated foundations (foundation designs potentially including monopile, mono-suction bucket, suction bucket jacket, piled jacket and gravity base);
- A maximum number of 10 platforms within the array area (comprising up to six offshore transformer substations, up to three offshore High Voltage Direct Current (HVDC) converter substations (if required for the HVDC system) and one offshore accommodation platform);
- A maximum of three High Voltage Alternating Current (HVAC) booster stations (if required for the HVAC system) located in the HVAC booster station search area;
- Up to six offshore export cables;
- Array cables and interconnector cables between the WTGs and transformer/converter substations within the array;
- Scour and cable protection, including cable crossings.

1.5.1.2 Consideration of substation and accommodation platform foundation types will follow those presented for WTGs (with the addition of options for box-type gravity bases and two types of pontoon gravity bases), however, they could be proportionately scaled up in size to accommodate larger offshore infrastructure.

1.5.1.3 The Hornsea Four electrical transmission system will consist of up to six offshore cables which will collect and transport the power produced at the WTGs, to the landfall site and the associated onshore cables, ultimately connecting to the UK National Grid. Two main transmission technologies are currently being considered based upon a range of factors including project economics and technology risk; HVAC and HVDC. The decision on which transmission type will be utilised will be made post- consent. Offshore HVAC booster substations will be required to extend the distance over which HVAC electrical export infrastructure can operate, based on the large distance from the wind farm to the landfall site.

1.5.1.4 In addition to the array cables which will connect the WTGs to each other, and to one of the offshore substations, interconnector cables will be used to improve the reliability of the transmission system by interconnecting offshore substations. Additionally, a cable may be used to provide the offshore accommodation platform with power. Offshore export cables will connect the offshore substation to the landfall.

1.6 Onshore infrastructure

1.6.1.1 The key onshore infrastructure elements of Hornsea Four will include export cables and the onshore substation and EBI. Onshore export cables will connect the landfall to the Hornsea Four onshore substation which subsequently connects to the National Grid substation at Creyke Beck. The routing of onshore export cables from the landfall site will be further developed to minimise potential impact and where possible and practical, will employ less intrusive construction methods (for example Horizontal Directional Drilling (HDD)).

1.6.1.2 There will be a maximum number of six onshore export cables which will be installed in direct-lay in trenches or pulled through pre-installed ducting. The cables will be installed within the Hornsea Four onshore ECC, with an expected width of 80 m (this includes both the 60m permanent easement and temporary working area). The width of the permanent and/or temporary areas may change where obstacles are encountered, such as the crossing of the National Rail Network at Beswick where the ECC has been extended to 120 m to facilitate HDD of the railway line. The reason for the increased width at these locations is to

facilitate the future delineation of the landfall compound and National Grid connection locations, at which point the temporary areas will dissolve to leave the permanent easement of the respective cables.

1.6.1.3 The onshore substation area of 164,000 m² will be accompanied by a temporary area of construction of 130,000 m². The 1-5 main buildings will not exceed a height of 30 m.

1.7 Construction programme

1.7.1.1 Works at landfall are anticipated to commence in March 2024, lasting 32 months. Piling works offshore are scheduled to start December 2024, running until November 2025, with unexploded ordnance (UXO) clearance and geophysical survey predating that. The anticipated programme of construction is illustrated in Figure 2.

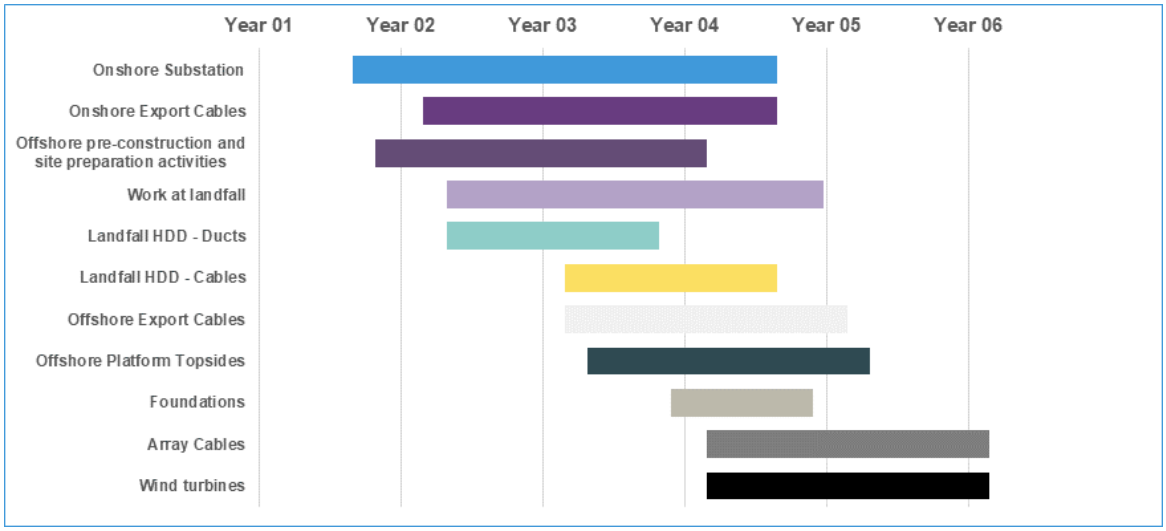

Figure 2: Indicative construction programme for Hornsea Four.

1.8 Outline of the Structure and Contents of this Report

1.8.1.1 This HRA Screening Report is set out in a number of stages as follows (including a note as regard the degree to which sections have been updated since the initial October 2018 Screening Report was issued (Orsted 2018)):

- A brief summary of the main components of Hornsea Four (Section 1);
- A brief summary of the Habitats Regulations Assessment Process (Section 2);
- Summary of consultee comments received on screening (Section 3) ;
- A summary description of the environmental baseline relevant to the screening process (Section 4);
- Site Selection (Section 5) together with identification of potential effects;
- Screening - an assessment of the potential for LSE to arise for the project alone with regard to the designated features of the European sites under consideration (Section 6);
- Screening in-combination assessment (Section 7);
- A summary of the European sites and features for which the screening process has identified potential for LSE (Section 8); and
- References (Section 9).

2 The Habitats Regulations Assessment Process

2.1 Legislative Context

2.1.1.1 European designated sites referred to here are defined as Special Areas of Conservation (SACs), Sites of Community Importance (SCIs) and Candidate SACs (cSACs), which are designated under the Habitats Directive (92/43/EEC), and Special Protection Areas (SPAs), which are designated under Council Directive (2009/147/EC) on the Conservation of Wild Birds (the 'Birds Directive'). In addition to sites designated under European nature conservation legislation, UK Government policy (ODPM Circular 06/2005) states that proposed and potential SPAs and SACs and internationally important wetlands designated under the Ramsar Convention (Ramsar sites) are afforded the same protection as SPAs and SACs, for the purpose of considering development proposals that may affect them (and so are considered in this report as "European sites").

2.1.1.2 The Habitats Directive, with respect to terrestrial areas of the UK and territorial waters out to 12 nautical miles (nm), is transposed into UK law through The Conservation of Habitats and Species Regulations 2017 (herein referred to as the Habitats Regulations). The Habitats Regulations incorporate all SPAs into the definition of 'European sites' and, consequently, the protections afforded to European sites under the Habitats Directive apply to SPAs designated under the Birds Directive.

2.1.1.3 The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) transpose the Habitats and Birds Directives into national law, covering waters beyond 12 nm, to the extent of the British Fishery Limits and UK Continental Shelf Designated Area.

2.1.1.4 Immediately following Brexit (i.e. on 31 January 2020), it is understood that the existing Regulations noted above will continue to apply, with the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 expected to come into force following Completion day (31 December 2020).

2.2 The Habitats Regulations Process

2.2.1.1 The Habitats Regulations require that wherever a project that is not directly connected to, or necessary for, the management of a Natura 2000 site is likely to have a significant effect on the conservation objectives of the site (directly, indirectly, alone or in- combination with other plans or projects) then an 'Appropriate Assessment' (AA) must be undertaken by the Competent Authority (Regulation 61 of the Habitats Regulations). The Appropriate Assessment must be carried out before consent or authorisation can be given for the project.

2.2.1.2 The Planning Inspectorate (PINS) Advice Note Ten 'Habitats Regulations Assessment relevant to nationally significant infrastructure projects' (Version 8, November 2017), defines HRA as a step by step process which determines potential for LSE and (where appropriate) assesses potential for adverse impact on the integrity of a European site, examines alternative solutions, and provides justification of Imperative Reason for Overriding Public Interest (IROPI). This constitutes a four-stage process as summarised below in Figure 3.

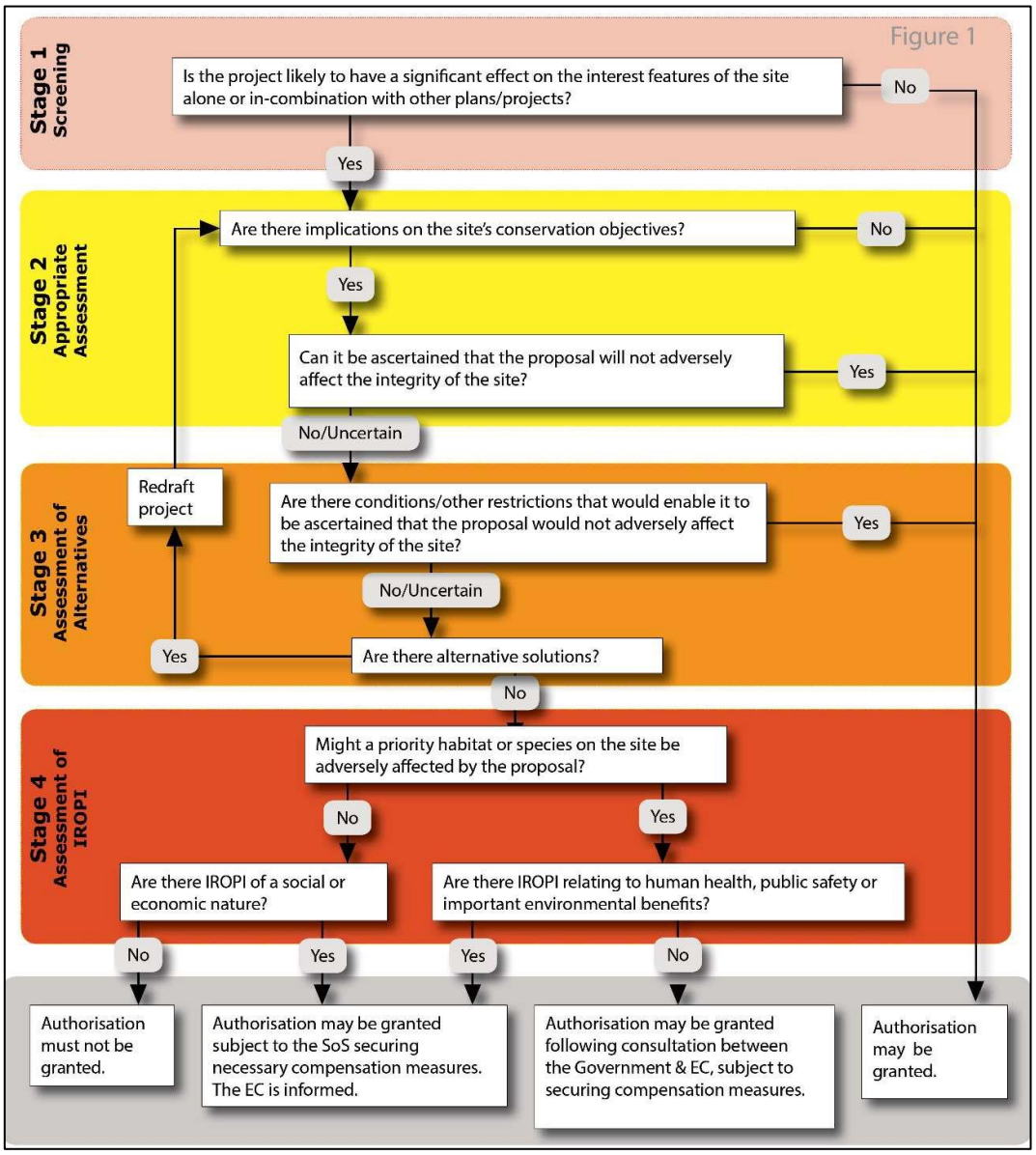

Figure 3: Four stage HRA process (The Planning Inspectorate 2016).

2.2.1.3 The integrity of a site (referred to in Figure 3 above in Stage 2) is defined by guidance as the coherence of the site's ecological structure and function, across the whole of its area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated (EC 2001). An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status as it did at the time of designation.

2.2.1.4 All four stages of the process are referred to as the HRA to clearly distinguish the whole process from the one step within it referred to as the "AA". Under the Habitats Regulations and the Offshore Habitats Regulations, before granting approval (i.e. planning permissions, licenses and consents) for a development with the potential to have a likely significant effect on an SAC or SPA/Ramsar site, an appropriate assessment must be made by a Competent Authority of its implications for the site in view of that site's conservation objectives.

2.2.1.5 This report comprises the first stage of the HRA process, the Screening Stage, where the

identification of potential LSE is reported. Potential LSE is, in this context, any effect that may be reasonably predicted as a consequence of a project that may affect the conservation objectives of the feature(s) for which the European Site was designated, but excluding trivial or inconsequential effects.

2.3 Roles and Responsibilities

2.3.1.1 The Examining Authority will not make the final decision on Hornsea Four; this decision will fall to the Secretary of State for the Department for Business, Energy and Industrial Strategy (BEIS) (hereafter referred to as "the Secretary of State"). The Secretary of State is therefore the Competent Authority in this instance.

2.3.1.2 This Screening Report and the RIAA (**B2.2: Report to Inform Appropriate Assessment**) (together with its Screening and Integrity matrices annexes) produced for Hornsea Four provide the information required by the Competent Authority to enable it to undertake an AA, if required, in accordance with Article 6(3) of the Habitats Directive.

2.4 Approach to Screening

2.4.1.1 Screening is a relatively coarse filter to identify those sites and features for which, in the context of the proposed project, a potential LSE cannot be discounted. For the purposes of this report, a series of criteria have been applied to identify those sites and features for further consideration (**Section 5**). Once sites and features have been identified, the consideration of potential for LSE is made for the project alone and in-combination (in **Section 6** and **Section 7**), based on a source-pathway-receptor approach for all stages of the project (as informed by the relevant chapters of the ES).

2.4.1.2 A precautionary approach is followed; whereby if it is not possible to exclude potential for LSE, then the site/feature is progressed to the AA Stage (Stage 2 of the HRA) and is included within the RIAA.

2.4.1.3 In relation to each European site considered in the screening exercise, at Stage 1 of the HRA (Screening), it will be concluded that either:

- There are no LSEs on the feature(s) of the European site(s) and therefore no further assessment is required; or
- Potential LSEs on the European site(s) cannot be discounted (in relation to one or more designated feature, but not necessarily all) and will require an AA by the Competent Authority.

2.4.1.4 With respect to in-combination effects, the original Screening Report published in October 2018 identified the categories of plans and projects for consideration, together with the broad approach to follow for in-combination screening. Full screening in-combination was presented within the draft RIAA issued in support of the statutory pre-application consultation, alongside the PEIR, in August 2019, as relevant plans and projects had been identified by that stage. That in-combination screening is provided here (with relevant updates such as the addition of new projects, an acknowledgement that some projects have progressed, and that some projects no longer have potential tor overlap with Hornsea Four (for example as a result of changes to the timing of construction)) in place of the screening methodology provided within the October 2018 Screening Report. Broadly, the approach to screening in-combination considers those plans and projects identified through the overall project review (and included within individual ES chapters), augmented by any additional

plans or projects referenced during consultation, and considers potential for an in-combination effect to the sites and features considered for screening alone. In common with other offshore wind farm in-combination assessments, a tiered approach to screening has been followed.

2.4.1.5 Of note are recent rulings by the European Court of Justice (ECJ), referred to as Sweetman rulings[2][3]. The rulings relate to how screening for potential LSE is carried out, specifically in relation to the way in which mitigation is considered in the screening process, but also wider issues around site integrity. Consideration has been given to these rulings throughout the Screening process.

3 Screening Consultation

3.1 Consultation

3.1.1.1 The Consultation Report (**B1.1: Consultation Report**) provides information on all Hornsea Four consultation prior to DCO Application submission. Discussions regarding Hornsea Four, including the approach to screening undertaken within the HRA Screening Report, have been held through the EP process, with meetings held in 2018, 2019 and 2020. Comments have also been received on draft reports (including the draft RIAA, issued for consultation in August 2019) and the PEIR within the same timeframe. A summary of comments received on HRA Screening are summarised within **Table 1** below. Consultees involved in the EP meetings and/or consulted in writing include the following (in alphabetical order):

- The Centre for Fisheries and Aquaculture Science (Cefas);
- Eastern Inshore Fisheries and Conservation Authority (IFCA);
- East Riding of Yorkshire Council (ERYC);
- Environment Agency (EA);
- Joint Nature Conservation Committee (JNCC);
- Marine Management Organisation (MMO);
- Marine Scotland;
- Natural England;
- Natural Resources Wales;
- Northern Ireland Environment Agency;
- Northumberland IFCA;
- North Eastern IFCA;
- Planning Inspectorate;
- Royal Society for the Protection of Birds (RSPB);
- Scottish Natural Heritage (SNH);
- The Wildlife Trusts (TWT);
- York Consort; and
- Yorkshire Wildlife Trust.

[2] http://curia.europa.eu/juris/document/document.jsf?docid=200970&doclang=EN
[3] http://curia.europa.eu/juris/document/document.jsf?text=&docid=204392&pageIndex=0&doclang=en&m%20o%20de=req&dir=&occ=first&part=1&cid=388838

Table 1: Summary of consultation undertaken and received on the HRA Screening Report.

Consultee	Reference	Comment	Addressed
Natural England	EP Onshore Ecology Technical Panel Meeting: 12 September 2018	Natural England requested that impact risk zones (IRZs) for European and Ramsar sites were used in the screening assessment.	The IRZs have been used and referenced where relevant.
Natural England	EP Offshore & Intertidal Ornithology Technical Panel Meeting: 13 September 2018	Natural England agreed that a 16 km buffer would be appropriate for benthic and intertidal ecology features. Natural England agreed that the terrestrial elements of Flamborough Head SAC could be screened out. Confirmed that the People over Wind ruling means mitigation cannot be taken into account for screening. Lamprey should be considered. Natural England confirmed that the approach to HRA screening seemed appropriate.	The 16 km screening distance applied for benthic features in the October 2018 Screening Report. That range is revisited here following subsequent comments by Natural England (benthic screening confirmed in **Section 4**). Terrestrial feature of Flamborough Head SAC screened out (vegetated sea cliffs of the Atlantic and Baltic Coasts) in **Table 5.1**. Mitigation not applied during screening process (**paragraph 2.4.1.5**). Lamprey is considered for screening as a feature of the Humber Estuary SAC. It is noted that the approach to HRA screening seems appropriate.
Natural England	EP Offshore & Intertidal Ornithology Technical Panel Meeting: 13 September 2018	Natural England raised concern that the ECC was in close proximity to / overlapping the Flamborough and Filey Coast (FFC) SPA and the Greater Wash SPA.	The ECC has been refined and is no longer overlapping any SPAs.
Natural England	EP Marine Processes & Ecology Technical Panel Meeting: 12 September 2018	Confirmed that altering longshore sediment transport would have implications for HRA if there was extensive nearshore rock armouring required that could interfere with this process. Confirmed that a 16 km buffer would be appropriate for benthic and intertidal ecology and agreed that the terrestrial elements of Flamborough Head SAC could be screened out. Clarified Natural England's interpretation of the Sweetman ruling, ensuring all potential impacts are initially screened in for assessment, and only when mitigation is subsequently applied is no likely significant effected reached.	Noted. Confirmation that the potential for a change in longshore sediment transport will be minimal will be considered within the final DCO Application. If a change in screening is required, that will be applied. No change required following the updating of the Marine Processes Technical Report (**Volume A5, Annex 1.1 Marine Processes Technical Report**).

Consultee	Reference	Comment	Addressed
Natural England	EP Marine Processes & Ecology Technical Panel Meeting: 12 September 2018	Suggested lamprey should be considered alongside other activities like abstraction and fishing licences – the EA would hold these records. Concluded that the approach to HRA Screening seems appropriate.	Will be applied in the in- combination assessment (see Section 6).
Eastern IFCA	Response to HRA Screening Report – November 2018	Do not intend to make a formal response.	Noted.
ERYC	Response to HRA Screening Report – November 2018	No comment on offshore matters. Agree with the proposed screening criteria and the approach to the in-combination assessment. Noted the need to consider IRZs onshore, especially for pink footed goose.	Onshore screening criteria in Appendix A.
MMO	Response to HRA Screening Report – November 2018	The MMO defer to any comments made by Natural England as the Statutory Nature Conservation Body.	Noted.
Marine Scotland Licensing Operations Team (MS-LOT)	Response to HRA Screening Report – November 2018	No response to the consultation but recommended contacting SNH.	SNH contacted 19 November 2018 on the draft Screening Report and on 23rd August 2019 (SNH and Marine Scotland) with the draft RIAA. No response received to April 2020.
TWT	Response to HRA Screening Report – November 2018	We note that the cable site boundary touches Flamborough Head SAC. TWT does not support cable routing within this site. We are pleased that Orsted has committed to avoiding cabling within all marine designated sites (Co86 of the Commitments Register within the Scoping Report). TWT requests to work with Orsted to ensure that this commitment is withheld and any cable routing through marine designated sites are avoided.	The cable corridor has been amended and the Hornsea Four Order Limits avoids all Natura 2000 sites, with the exception of the Southern North Sea (SNS) SAC (within which the Hornsea Four array area is located).
RSPB	Response to HRA Screening Report – October 2018	We consider that the data sources listed in paragraph 3.4.1.2 are appropriate to inform the screening process for the offshore and intertidal ornithological sites and interest features for the Hornsea Four HRA Screening Report. It is important to note that the RSPB was given no opportunity to comment on the proposed survey methodology for the Hornsea Four array area and has instead been presented with the final data. Given the proximity of the array area to the Flamborough Head and Bempton Cliffs SPA and FFC potential SPA (pSPA), it is not possible for us to state at this point that the	Noted.

Consultee	Reference	Comment	Addressed
		methods used and in particular the manner in which the resultant data are presented will not create difficulties in understanding the distribution of the seabirds or the implications for the potential to construct an offshore wind farm at this location.	
Natural England	EP Onshore Ecology Technical Panel Meeting: January 2019	Natural England raised that Impact Risk Zones (IRZ) should be used to determine any potential impacts on European Sites from Hornsea Four, rather than a standard 2 km / 5 km buffer	The use of IRZs is detailed in **Volume A3, Chapter 3: Ecology and Nature Conservation**. Use of IRZs has been applied to confirm the screening undertaken, with no change to the original screening onshore.
Natural England	EP Onshore Ecology Technical Panel Meeting: April 2019	Natural England were presented with the information that the IRZ data had been used in combination with a search regarding impacts on European Sites and that there were no such sites onshore, and no impact zones from offshore sites on the onshore Hornsea Four boundaries	The use of IRZs is outlined in **Volume A3, Chapter 3 Ecology and Nature Conservation**.
Natural England	Response to October 2018 Screening Report, dated 1 May 2019	Natural England confirmed that March/September are the windows for updating designated site advice, with March 2019 updates including FFC SPA. Natural England confirmed that it is appropriate to provide cross referencing to baseline information in topic specific chapters, with that information not repeated in the RIAA.	Noted.
		FFC SPA – please note that the site is fully classified and no longer a pSPA. The site includes the Flamborough Head and Bempton Cliffs SPA, with assessment for the latter no longer required.	Noted and amended throughout.
		Approach to screening – the proportionate EIA approach is not suitable for HRA.	Discussed at EP Steering group meeting on 28 May 2019 and confirmed that HRA Screening differs to EIA Scoping. HRA Screening revisited following that meeting.
		The significance test is a coarse filter and Natural England did not agree with progressing beyond Table 4.9 of the Screening Report.	Discussed at EP Steering group meeting on 16 May 2019. The importance of a pathway to link a receptor and effect stressed, with screening revisited and issued for comment from Natural England (28 May 2019 for receptors other than offshore ornithology, offshore ornithology on 10 June). Screening updated.

Consultee	Reference	Comment	Addressed
		Overlap with FFC SPA.	Hornsea Four Order Limits amended and no overlap remains.
		Natural England agrees with the receptor ranges for cetaceans, the management units considered for bottlenose dolphin and harbour porpoise. For harbour seal sites within the South East management unit should be considered and for grey seals sites within North East and South East management units should be considered.	Noted that Natural England agrees with receptor ranges for cetaceans. Screening for seals was re-visited prior to issue of the draft RIAA and in line with **Volume A5, Annex 4.1 Marine Mammals Technical Report**.
		Natural England considers that both the Maximum and Mean maximum foraging ranges from Thaxter et al. (2012) are used to determine species connectivity for Hornsea Four, as well as any relevant species-specific tracking / tagging study data.	Noted. The maximum and mean foraging ranges have been used form Thaxter et al. (2012) as well as tracking / tagging study data, where available and relevant.
		For terrestrial sites, Natural England advises the use of the IRZs for screening.	Applied and confirms all terrestrial sites/features screened out.
		Criteria 2 (Table 4.4) The header suggests that migratory and over wintering species are being considered in here, but they do not appear to have been. Natural England requested this to be revisited, where applicable.	Species and designated sites from which those species may be connected to were considered appropriately within all of the criteria laid out. In response to Natural England's request these criteria and the outcomes from them were clearly presented within the HRA Screening revisited.
		Natural England do not agree with screening out seabird species (and associated designated sites) solely in response to being recorded on less than ten occasions within the Scoping boundary area from site-specific surveys.	Further consideration of species was provided for within the HRA Screening revisited and any new species and designated sites identified through that process are included within **B2.2: Report to Inform Appropriate Assessment**.
		Table 4.7: Fulmar, kittiwake, herring gull and lesser black-backed gull form part of the seabird assemblage feature of the Farne Islands SPA and Coquet Island SPA; additionally razorbill and great black-backed gulls are part of the seabird assemblage feature of the Farne Islands SPA.	Consideration is provided within the assessments in **B2.2: Report to Inform Appropriate Assessment** for all species connected to designated sites, with highest priority provided to qualifying features and named features within general seabird assemblages for all sites.

Consultee	Reference	Comment	Addressed
		Mitigation and potential LSE Screening.	It can be confirmed that mitigation has not been a consideration when determining potential LSE.
		Table 4.9: • Greater Wash SPA – common scoter is classified for a non-breeding rather than migratory population in this SPA. • Farne Islands SPA/Coquet Island SPA – please see our comments on Table 4.7 regarding these SPAs and revise these rows accordingly.	Noted. These two issues were addressed in the HRA Screening revisited report and the appropriate site-specific assessments in **B2.2: Report to Inform Appropriate Assessment**.
		Consider beyond Section 4.2 to fall outside HRA Screening.	Text beyond Section 4.2 takes account of a pathway for the effect and is therefore a valid and necessary part of screening. Discussed at the 16 May 2019 meeting, with screening reissued on 28 May and 10 June to Natural England for comment.
Natural England	HRA Screening Report teleconference with Natural England – 16 May 2019	Natural England raised a query with regard to the potential for over-wintering pink footed geese in agricultural landscapes within the onshore Hornsea Four boundaries.	Hornsea Four conducted an over-wintering and migratory bird survey between November 2018 and March 2019 (inclusive). No pink footed geese were recorded during the survey. Full survey details are reported in **Volume A6, Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report.**
		Discussion on the screening criteria and the application of a pathway.	Text clarified to explain the need for screening criteria for initial site selection prior to consideration for potential LSE.
		Discussed that it was not expected to re-issue the Screening Report – but to summarise any updates to screening within the RIAA.	Screening Report was not re-issued alongside draft RIAA.
		Offshore ornithology – Natural England agreed with the list of designated sites screened in, but requested that further consideration be provided to consider breeding / non-breeding birds at the Farne Islands SPA and Coquet Island SPA.	This comment was noted and breeding / non-breeding bird species have been screened in from these sites, where applicable through the criteria explained in **Appendix A** of this report.
		Offshore ornithology – Natural England requested that further consideration be provided to migratory waterbirds and migratory seabirds.	This comment was noted and breeding / non-breeding bird species have been screened in from sites, where

Consultee	Reference	Comment	Addressed
			applicable through the criteria explained in **Appendix A** of this report.
		Offshore ornithology – Natural England requested that consideration be provided to features and assemblages of those designated sites in the screening process. They proposed a three tier process, reviewing; firstly, to consider the cited interest features; secondly, the named features within a seabird assemblage; and thirdly, to consider any other species that may contribute to the seabird assemblage, if applicable.	This comment was noted and bird species have been screened in from sites, where applicable through the criteria explained in **Appendix A** of this report, accounting, where practical, to this three tier approach.
		IRZ should be applied for onshore ecology, with screening to be confirmed by checking IRZ. Note that pink footed goose in the Humber needs to be checked.	IRZ applied and confirms no LSE for onshore ecology (including for pink footed goose)
		Screening for seals	Updated based on **Volume A5, Annex 4.1 Marine Mammals Technical Report** to ensure site connectivity taken into account.
		Bottlenose dolphin – Natural England questioned if sites should be included. Natural England suggested to include initially, then rule out on relevant criteria.	Bottlenose dolphin sites revisited within the update to screening issued May 2019 and included here. It is noted that no site connectivity is evident and screening out all bottlenose dolphin sites is supported by **Volume A5, Annex 4.1 Marine Mammals Technical Report**.
		Screening approach for harbour porpoise includes underwater noise and accidental pollution. Natural England confirmed the approach is appropriate.	Noted, with the caveat that accidental pollution now screened out in all cases (as per the draft RIAA).
		Updated screening results to be issued to Natural England for comment.	Update to screening (matters excluding ornithology) issued June 2019, ornithology followed June 2019.
Natural England	Response to update to Screening (update to screening issued June 2019, response on non-ornithological matters received 4th July 2019)	Questioned the consideration of coastal processes with respect to benthic ecology. Including sediment flow into the Humber Estuary SAC and Ramsar alone or in-combination.	Further consideration provided in **Section 5** and drawing on **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes**, concluding no LSE with respect to a change in physical processes within the Humber Estuary.
		Highlighted the need to consider potential LSE alone or in-combination.	Screening initially carried out alone pending project level review of plans and projects, with the approach to

Consultee	Reference	Comment	Addressed
			in-combination screening presented. The draft RIAA issued in August 2019 included screening in-combination. That screening in-combination has been transferred here in the updated and revised screening report for completeness (see Section 7).
		Would expect the information provided for collision risk in harbour porpoise at the SNS SAC to be 'NA' given the conclusion of no LSE.	Collision risk screened in for harbour porpoise.
		Potential LSE in-combination for vessel disturbance and the SNS SAC (construction, operation and maintenance and decommissioning).	Vessel disturbance included here in Section 6 (screening alone) and Section 7 (screening in-combination).
		Consideration of prey for the SNS SAC and Humber Estuary grey seals should remain in consideration until PEIR has reported. Potential case for prey for Berwickshire and North Northumberland Coast grey seal to be screened out.	Considered in Section 6 for each relevant site. All confirmed as screened out from potential LSE, in line with ES reporting.
		Question on potential for sandwave levelling in the SNS SAC and where disposal sites will be located.	Sandwave levelling is assumed to be potentially required at any point along the cable length (array and ECC), as assessed in Volume A2, Chapter 2: Benthic and Intertidal Ecology. Disposal of any sediment removed would take place within the Order Limits, depending on where the activity occurred.
		Natural England will only comment on English sites (not Scottish or transboundary).	Noted.
		Not much connectivity expected between the Wash harbour seal population, with potential for the site to be screened out subject to PEIR.	Noted and agreed. However, site remains screened in on a precautionary basis, with consideration of potential LSE reflecting the low potential for site connectivity for harbour seal.
		Humber Estuary and Berwickshire and North Northumberland Coast grey seal collision risk – needs to consider potential for LSE in-combination. Natural England also commented that for the Humber Estuary Ramsar, grey seal collision risk should also be considered for the project alone.	Noted. Potential for LSE as a result of collision risk re-visited here and conclusions updated.

Consultee	Reference	Comment	Addressed
		Questioned sea lamprey migration risk.	The concern regarding sea lamprey is whether the effects identified could affect ,migration up and/or down the estuary. Sea lamprey now screened out in all cases following the removal of accidental pollution from potential LSE (see Section 7) and noting that the closest distance between the offshore ECC and the mouth of the Humber (the access point for lamprey migration) is now 47 km.
		Long term physical habitat loss within the SNS SAC during O&M needs to be quantified.	A very small percentage of the total available habitat will be temporarily affected by the project (approximately 0.001% of the benthic habitat and 0.0001% of the water column). No LSE applies. However based on consultee concerns, long term habitat loss is screened in in-combination.
		Referenced the phrase 'long term physical loss of habitat' with respect to the Flamborough Head SAC and stated a preference for referring to 'direct habitat loss'.	Noted. The amendment to the ECC has resulted in no potential for direct habitat loss and therefore a conclusion of no LSE.
		Operational underwater noise impacts alone or in-combination need to be based on the potential for impact from Hornsea Four.	Noted. Screened in for potential LSE for harbour porpoise and the SNS SAC.
		The comments on the potential for coastal process changes to affect intertidal habitats within the Humber Estuary apply equally to the Humber Estuary SPA	Please see the comments made above with respect to coastal processes and the Humber Estuary intertidal habitats (noting that for the SPA, intertidal habitats are a potential supporting habitat of designated feature and not a designated feature).
		Offshore Ornithology – Natural England highlighted that the Crown Estate commissioned piece of work revisiting the Thaxter et al. (2012) foraging ranges. They suggested that this would allow for an update to the receptor foraging ranges for consideration in the breeding season later in 2019.	In December 2019, a revised paper updating foraging ranges of seabirds breeding in UK waters for use in HRA Screening was issued (Woodward et al. 2019). These updated data have now been applied through the criteria explained in Appendix A of this report.
		Offshore ornithology – Natural England provided advice on the application of the three tier process that requires consideration to the cited interest	This comment was noted and a complete revision of bird species considered for the purpose of screening was undertaken through the criteria explained in Appendix A

Consultee	Reference	Comment	Addressed
		features, the named features within a seabird assemblage and any other breeding species that may contribute to the seabird assemblage.	of this report, accounting, where practical, to this three tier approach.
		Offshore ornithology – Natural England queried why consideration was not provided to potential LSEs in-combination.	This comment was noted and consideration of the potential for LSE both alone and in-combination are provided in Section 6 and 7 of this report, respectively.
		Offshore ornithology – Natural England suggested that the narrative within the consideration for LSE reflect that a species may be sensitive to construction activities (e.g. if close to a breeding colony), but in this case as construction activities were very distant to breeding colonies they would not be sensitive to such activities.	This comment was noted and revised text provided in Table 6 to provide a more reflective account of this.
		Offshore ornithology – Natural England stated that the Northumberland Marine SPA protects the foraging ranges of terns from 4 colony SPAs in Northumberland as well as waters important to guillemot and puffin from 2 SPAs for maintenance behaviours. Given the HRA screening assesses the relevant SPAs (Farne Islands and Coquet Island) separately, we consider that it is not necessary to also assess Northumberland Marine SPA for this case. They welcomed feedback on this proposed approach.	This comment was noted and Natural England's proposed approach is welcomed. Following this agreed position, the assessment of LSE within B2.2: Report to Inform Appropriate Assessment may consider any such features screened in with respect to the individual sites as suggested by Natural England rather than for this wider marine SPA.
		Offshore ornithology – Natural England suggested that indirect impacts be left in for potential LSE until the implications of the proposed habitats and prey are understood.	This was noted and consideration was given to the outcomes of potential LSE from indirect impacts prior to this updated HRA Screening.
		Offshore ornithology – Natural England requested that herring gull from FFC SPA be considered for LSE with respect to collision risk.	This was noted and herring gull from FFC SPA have been screened in for collision risk.
		Offshore ornithology – Natural England requested further consideration be provided to account for migratory seabirds and non-seabirds from UK SPAs.	This was noted and additional consideration provided, which is presented in Appendix A of this report and within a separate report on migratory species (Volume A5, Annex 5.5: Offshore Ornithology Migratory Birds Report).
		Offshore ornithology – Natural England suggested that advice should be sought from SNH with respect to Scottish sites.	This was noted and SNH were consulted as referenced above. No response received to date.

Consultee	Reference	Comment	Addressed
Natural England	Response to draft RIAA issued 23rd August 2019, dated 11th October 2019 (note – comments logged here relate to screening only, all other RIAA comments included within the **B2.2: Report to Inform Appropriate Assessment**).	SNS SAC prey availability and behaviour – in relation to habitat loss only. Screening needed to be re-visited in relation to piling and cable protection habitat loss.	Habitat loss during operation and maintenance has been revisited here, screened in for potential LSE for the project in-combination, to include cable protection.
		Disagree with the conclusion on LSE for the Humber Estuary saltmarsh (in relation to air quality).	Noted. Humber Estuary saltmarsh has been screened in for the Humber Estuary SAC and Ramsar with respect to nitrogen deposition, where saltmarsh is either a designated feature or named as part of a Ramsar criterion, and for the Humber SPA as a supporting habitat.
		Where the LSE screening for benthic features draws on the PEIR, Natural England does not agree. The issue relates to the potential for significant impacts to coastal processes and nearshore sediment transport and the potential for effect on Humber Estuary SAC, SPA and Ramsar. The previously agreed 16 km range for benthic habitats need to be revisited and confirmed or amended.	Noted. Use of sediment plume extent for benthic screening is applied on a precautionary basis, as experience shows this to be the largest physical process footprint associated with an offshore wind Farm (OWF). Further work undertaken in **Volume A5, Annex 1.1: Marine Processes Technical Report** and **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes** demonstrate that all other potential changes to physical processes (namely waves, tidal flow, sediment transport) are within that range, with site specifics indicating the range should actually be reduced to 14 km (not the 16 km applied during initial screening and prior to site specific modelling being conducted). On a precautionary and consistency basis, for benthic HRA screening, the 16 km range remains applied here (although no change to sites/features screened in/out would result from a 14 km screening range).
		Offshore ornithology – Natural England requested evidence in support of only screening in two SPAs (Humber Estuary and Hornsea Mere) within respect to migratory waterbirds.	Consideration has been provided to migratory seabirds and non-seabirds within **Volume A5, Annex 5.5: Offshore Ornithology Migratory Birds Report**. Following this process the species and sites were screened in, where applicable, following the criteria explained in **Appendix A** of this report.

Consultee	Reference	Comment	Addressed
		Offshore ornithology – Natural England requested further consideration be provided to the three tiers of species within FFC SPA and further account to be provided in support of any species screened out at this stage.	Consideration has been provided for all bird species associated with the FFC SPA and following the criteria within **Appendix A**, only those species within this have been screened in. However, it must be noted that where a seabird's mean-max foraging range (according to Woodward et al, 2019) is very close to the distance between a designated site and Hornsea Four it is further considered for inclusion, where appropriate.
		Offshore ornithology – Natural England requested further consideration to potential in-combination assessment for species associated with designated sites that may have a wide foraging range that may interact with a large number of projects.	Consideration has been provided for all species with respect to the potential for an LSE alone or in-combination. However, where any potential effect alone would be of no material contribution to an in-combination effect this is highlighted and consideration will be provided for additional high-level assessments to be included in such circumstances, where applicable.
RSPB	Response to draft RIAA issued 23rd August 2019 (note – comments logged here relate to screening only, all other RIAA comments included within the RIAA B2.2)	The RSPB reiterated their overall concern with respect to potential LSE with respect to features of the FFC SPA, in particular when considered in-combination.	This is noted and our assessments within **B2.2: Report to Inform Appropriate Assessment** consider such potential for an LSE with respect to the FFC SPA.
Natural England	Offshore & Intertidal Ornithology Technical Panel Meeting 7, 26 November 2019	Natural England confirmed that whatever species are listed as designated features on the updated Natural England website within the citations are the designated species of interest. In relation to assemblages, Natural England clarified that conclusions need to cover the assemblages themselves rather than individual species. This was explained as the number of each species need to be put in context of the total number of birds in the assemblages (e.g. expressing the predicted level of impact for a species not recognised as a feature of the SPA or a 'named component' of the assemblage against the assemblage target abundance for the SPA in question).	This was noted and where applicable will be incorporated into **B2.2: Report to Inform Appropriate Assessment**.

Consultee	Reference	Comment	Addressed
		Natural England provided an update to the meeting that the Woodward et al (2019) paper providing the latest foraging ranges for consideration in HRA Screening assessments would be published in December 2019.	This was noted and the report would be reviewed following publication and the new foraging ranges from this paper have been included in this updated HRA Screening.
		Natural England also confirmed the following; Little tern should be screened out for all sites; Roseate tern should be screened out for Lindisfarne SPA and the Farne Islands SPA, as they do not breed at these two sites; That Black-headed gull should be screened out of all sites; Consideration should be given to assemblage features from the Farne Islands SPA, such as razorbill; Shag and cormorant should be screening out for FFC SPA; and Common scoter should be screened in for the Greater Wash SPA, even though no Adverse Effect on Integrity (AEoI) could be readily concluded.	These points and agreements for species and sites were noted and considered within this updated HRA Screening.

4 Environmental Baseline

4.1 Introduction

4.1.1.1 This section provides an overview of the environmental characteristics relevant to the receptors under consideration as part of the HRA screening process for Hornsea Four, specifically:

- Benthic and intertidal ecology;
- Marine mammals;
- Offshore and intertidal ornithology;
- Onshore ecology; and
- Migratory fish.

4.1.1.2 Baseline information relevant to the determination of potential LSE relates to the Hornsea Four array area and both the offshore EEC and onshore ECC. Where relevant, information is drawn from a wider area (e.g. marine mammal data across the Management Unit). The information presented here draws on the relevant ES chapters (each referenced individually) and wider technical reporting, for Hornsea Four and it is not intended to repeat that information fully. Instead, for each receptor group, the relevant chapter of the ES is noted (including relevant technical reporting), together with a bullet point list of the main sources of information drawn on for potential LSE screening and that will be drawn on further in the subsequent RIAA. The relevant ES chapters present baseline information on a wider selection of topic areas that are not represent within the above receptor groups; where relevant (such as physical processes), these are drawn on here to define the potential effects (see **Table 5**). Where relevant, note is made of designated sites, purely to provide baseline information and not to prejudge screening. All designated sites considered for screening are listed in **Appendix B**, including a link to site level information.

4.2 Benthic and Intertidal Ecology

4.2.1.1 In addition to the wealth of data collected previously across the former Hornsea Zone, additional surveys specific to Hornsea Four have been completed with associated benthic grab sampling. The results from these are reported on within **Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report**.

4.2.1.2 **Volume A2, Chapter 2: Benthic and Intertidal Ecology** summarises the information on benthic subtidal ecology. The key references include the following:

- **Volume A2, Chapter 2: Benthic and Intertidal Ecology**;
- **Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report**;
- Broad scale mapping studies (e.g. regional marine aggregate projects, technical reports as part of the oil and gas Strategic Environmental Assessment (SEA) process, the North Sea Benthos Project and the academic literature);
- Mapping undertaken for specific locations in the region (e.g. other offshore wind farms, designated sites); and
- Survey data collected within the former Hornsea Zone.

4.2.1.3 Detailed benthic subtidal surveys across the former Hornsea Zone were undertaken in 2010, with subsequent project specific surveys undertaken across Hornsea Project One array area in 2010 and 2011, and surveys of Hornsea Project Two array area undertaken in 2012. The survey of the former Hornsea Zone included full coverage of the Hornsea Four array area,

with the Hornsea Project One and Two surveys providing additional regional context together with some samples located directly within Hornsea Four.

4.2.1.4 Benthic ecology data available for the offshore ECC has been sourced from the Dogger Bank Creyke Beck Offshore Wind Farm ES, the inshore area of which coincides with the inshore stretch of the Hornsea Four offshore ECC. Additional data sets contain benthic ecology mapping for the entire Hornsea Four array area and offshore ECC. Specific to Hornsea Four, relevant surveys include the 2018 geophysical survey, the 2018 subtidal benthic survey and the 2019 intertidal survey.

4.2.1.5 Across the Hornsea Four array area, a total of 2,678 individuals representing 163 taxa were recorded from the 21 macrofaunal samples acquired. The macrofaunal community was found to be relatively sparse with 54 taxa appearing at a single station and 34 of those taxa represented by a single individual.

4.2.1.6 Benthic communities across the Hornsea Four array area were generally dominated by Annelida, Mollusca and Echinodermata all of which contributed c.30% of the total individuals identified. The Mollusca group was dominated by the bivalve *Abra* which contributed 60% of total Mollusc individuals whilst the Echinodermata group was dominated by the brittle star *A. filiformis*, which contributed 72% of the total Echinoderm individuals. The Annelid group was not dominated by a single taxon rather the group was represented by a diverse range of taxa.

4.2.1.7 Results of seabed imagery collected across the array correlated with those geophysical and benthic grab findings, with footage revealing sandy sediments from gravelly sand to muddy sand. Visible fauna were generally sparse, although at one station (located at the most southerly station outside the array) the habitat 'sea pen and burrowing megafauna community' was identified.

4.2.1.8 The habitat model produced by GoBe Consultants Ltd for Hornsea Four revealed that the biotopes present had differing, but also overlapping habitat requirements, which is likely to be reflective of the homogeneity of ecological conditions across some of the site, particularly in the offshore section of the benthic subtidal ecology study area.

4.2.1.9 The biotope that characterised the intertidal area during the Phase I walkover survey along the Holderness Coast between Bridlington and Skipsea was coarse littoral sand (LS.LSa.MoSa.Bar.Sa), which is typical of clean sands in areas of high hydrodynamic energy, as seen along this portion of coastline.

4.2.1.10 The closest designated site to the offshore ECC with a benthic intertidal aspect is the Humber Estuary SAC (some 47 km distant[4]), with the Flamborough Head SAC being the closest subtidal benthic ecology site. HRA screening will determine if any European sites, which contain designated intertidal or subtidal habitat, will be screened in for potential LSE.

4.3 Marine Mammals

4.3.1.1 Project specific marine mammal and ornithology surveys were conducted between April 2016 and March 2018, with the results from those surveys presented within the Technical Report (**Volume A5, Annex 4.1: Marine Mammal Technical Report**) published at DCO Application. For the purposes of screening, the site specific data are in the context of existing

[4] Note that this is a reduction on previous ranges provided for the distance between landfall and the Humber, due partly to the reduction in cable corridor width but also clarification in how the range has been calculated - previously made 'as the crow flies' but now represents the closest point of the cable corridor to the Humber while avoiding land.

data from surveys conducted across the former Hornsea Zone, accompanied by broader scale surveys (e.g. Small Cetacean Abundance in the North Sea (SCANS) III[5]) and surveys conducted for other offshore wind farm projects in the region, with these reported on in the ES (**Volume A2, Chapter 4: Marine Mammals**).

4.3.1.2 **Volume A5, Annex 4.1: Marine Mammal Technical Report** focuses on six marine mammal species: harbour porpoise (*Phocoena phocoena*), minke whale (*Balaenoptera acutorostrata*), white-beaked dolphin (*Lagenorhynchus albirostris*), bottlenose dolphin (*Tursiops truncates*), harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*). With the exception of bottlenose dolphin, these are the only marine mammal species expected to be present in the Hornsea Four array area. Consideration of bottlenose dolphin has been included following consultation (see **Table 1**). For the purposes of screening, the focus is on species for which sites have been designated, namely harbour porpoise, bottlenose dolphin, harbour seal and grey seal – other cetacean species are addressed through the EIA process and, where required, European Protected Species (EPS) licensing. The full list of such sites across the management units is extensive and therefore not repeated here, but is included in **Appendix A.** Species density information, where required, is drawn from project specific data within the technical report, but also as relevant to individual species from SCANS, Joint Cetacean Protocol Data (Paxton et al. 2016), Heinänen and Skov 2015, Russell et al. 2017, Special Committee on Seals (SCOS) data sets and telemetry datasets. Overall population size is at management unit level, following the approach originally detailed in the Scoping Report and followed through in the PEIR and the final ES.

4.4 Offshore and Intertidal Ornithology

4.4.1.1 This section briefly describes the offshore and intertidal baseline for ornithology receptors. Full detail is provided within **Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation Report** and **Volume A2, Chapter 5: Offshore and Intertidal Ornithology**). In this section, there is a separation between the offshore and intertidal ornithology baseline with the onshore ornithology baseline being described in the Onshore Ecology Section. For ornithology receptors, the separation is that the intertidal baseline considers birds occurring on land that is exposed between the mean low water spring (MLWS) mark and mean high water spring (MHWS), whilst the offshore baseline considers birds using the water (both on and below) and the air above that water seaward of the MHWS. Since birds are highly mobile and seasonally migratory, this baseline considers the bird populations of a wide geographical area including the North Sea and the east coast of England.

4.4.1.2 Extensive ornithological surveys have shown that the North Sea is an important area for birds, during migratory passage periods and in winter months when British breeding birds are joined by birds that have migrated from continental Europe and Fennoscandia. There is mix of bird populations present at different times including those overwintering in the area, those foraging from nearby breeding coastal colonies and those on post-breeding dispersal, migration and pre-breeding return. As well as true pelagic seabirds (e.g. gannet, fulmars and auks), other species that spend part of their annual life cycle at sea (e.g. divers, gulls and seaducks) are also be present in particular months, with periodic numbers of non- seabird migrants passing through the area (e.g. wildfowl, waders and passerines). The main sources of information on offshore ornithology receptors drawn on for this screening stage, and that will be drawn on further in **B2.2: Report to Inform Appropriate Assessment**, are:

[5] https://synergy.st-andrews.ac.uk/scans3/

- Surveys of bird populations across the North Sea and the resultant atlases of bird distribution;
- OWF development specific surveys across the former Hornsea Zone as well as the specific Hornsea Projects;
- Peer reviewed scientific papers; and
- Literature reviews including the baseline reports of other OWF developments.

4.4.1.3 The offshore bird species that have been identified in this process and that have been considered in most detail in the evaluation and assessment of bird populations in relation to the other Hornsea Projects are red-throated diver (*Gavia stellata*), fulmar (*Fulmarus glacialis*), gannet (*Morus bassanus*), great black-backed gull (*Larus marinus*), herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), puffin (*Fratercula arctica*), razorbill (*Alca torda*) and guillemot (*Uria aalge*).

4.4.1.4 Ornithological surveys have shown that the intertidal land of the Holderness coast of East Yorkshire is a relatively poor habitat for intertidal birds in comparison to the Humber Estuary that lies to the south. This is because it provides relatively limited food resources as it is dominated by mobile, sandy beaches and lacks any significant areas of muddy shore. The result is that the populations of birds using the coast are very low. The main sources of information on intertidal ornithology receptors drawn on for this screening stage, and that will be drawn on further in **B2.2: Report to Inform Appropriate Assessment**, are:

- Periodic surveys of bird populations along the coast as part of national programmes organised by the British Trust for Ornithology (BTO) and the resultant web based databases and atlases of bird distribution;
- Peer reviewed scientific papers;
- County bird reports and County avifaunas; and
- Literature reviews including the baseline reports of other OWF developments.

4.4.1.5 The intertidal bird species that have been identified in this process and that have the highest numbers present on the Holderness coast include oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), turnstone (*Arenaria interpres*) and sanderling (*Calidris alba*).

4.4.1.6 The wider North East coast of England has a number of large areas classified as SPAs for their intertidal non-breeding bird species. Those birds may migrate across the North Sea, potentially to European stop-over points, to more northern or eastern breeding grounds. Those birds undertaking that twice-yearly migration may be placed at risk of collision.

4.5 Onshore Ecology

4.5.1.1 The habitat within the onshore Order Limits[6] is predominantly agricultural, dominated by large open arable fields with hedgerows. There are some areas of scattered woodland, grassland and scrub and a network of rivers, streams, drains and ponds. The common and widespread habitat within the onshore Order Limits is representative of the region's vast agricultural landscape.

4.5.1.2 The extended aerial phase 1 habitat assessment (JNCC 2010) combined with ground-truthing completed in August 2018 identified habitats that could potentially support the following species:

[6] 'Onshore Order Limits' is the boundary landward from MHWS and the intertidal zone plus substation search area as shown on **Figure 1**.

- Breeding birds;
- Wintering birds;
- Bats;
- Great crested newt (*Triturus cristatus*);
- Eurasian otter *(Lutra lutra)*;
- Water vole (*Arvicola amphibious*);
- Reptiles; and
- Badger (*Meles meles*).

4.5.1.3 Further detailed surveys for the species listed above have further informed the EIA, however as confirmed in the June 2019 updates to screening, when the IRZs were considered at the request of Natural England, no additional sites or features were identified and therefore onshore ecology remains screened out from the process.

4.5.1.4 There are no European sites within the Hornsea Four onshore Order Limits. **Table 2** below identifies European and Ramsar sites located within a 15 km buffer of the onshore Order Limits.

Table 2: European and Ramsar sites located within a 15 km buffer of the onshore Order Limits.

Site	Distance from Onshore Order Limits	Description
Greater Wash SPA	Greater than 1.5 km at its nearest point	The Greater Wash SPA is a marine site designated for its important offshore foraging areas for sea birds including red-throated diver, little gull, sandwich tern, common tern, little tern and common scoter.
Flamborough Head SAC	4.9 km	Flamborough Head encompasses a large area of hard and soft chalk cliffs that extend seaward as bedrock, boulder and cobble reefs. The reefs at Flamborough are important due to their substrate type, biogeographic position and the influences of hydrodynamic processes. The caves are important for their specialised cave-algal communities.
Hornsea Mere SPA	6.2 km	Hornsea Mere is a large, shallow, eutrophic lake of 120 hectares, with associated fen, carr woodland and reed swamp habitat. It supports internationally important wintering population of Gadwall (*Anas strepera*)[7].
Humber Estuary SPA/SAC/Ramsar	7.5 km	The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer.
Flamborough and Filey Coast SPA	7.6 km	Flamborough and Filey Coast SPA encompasses cliffs composed of chalk and other sedimentary rocks and supports internationally significant populations of kittiwake, gannet, guillemot and razorbill.

[7] This site is only designated for gadwall according to the official citation. Other documentation in reference to this site includes mute swan. However, for the purposes of this assessment, the official citation will be used.

4.6 Migratory Fish

4.6.1.1 Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report identifies a number of data sources for fish ecology, which draw on the former Hornsea Zone and project specific surveys in the same manner as for benthic ecology above. Effectively, no migratory fish species have been noted during the surveys, with screening for migratory fish species undertaken in subsequent sections drawing on European designated sites for which migratory fish are a primary reason for selection of the site (specifically linked to the access point – i.e. where the estuary discharges to sea). The closest such site to Hornsea Four is the Humber Estuary SAC, the seawards extent of which is some 47 km from the offshore ECC. The Humber Estuary SAC includes both river and sea lamprey in its citation, with the River Derwent SAC (a tributary of the Humber) including the sea lamprey.

5 Site Selection

5.1 Approach to Site Selection

5.1.1.1 Given the large spatial scale and nature of Hornsea Four and the number of European sites that could potentially be affected, HRA Screening undertaken is fronted by an initial site selection process, to identify sites and features for consideration through Screening. This stage essentially provides a long list of designated sites identified on the basis of potential spatial connectivity, to be taken forward for consideration of potential for LSE in Section 6. The long list of sites, including the site selection criteria applied, are presented in Appendix A. The potential effects associated with the construction, operation & maintenance and decommissioning of Hornsea Four are presented in Section 6.

5.1.1.2 Following the initial site selection process, the significance of pathways to the sites on the long list is considered in more depth in Section 6, to ensure that trivial or inconsequential risks are discounted before a conclusion on potential for LSE is drawn.

5.1.1.3 A summary of all designated sites identified through the site selection criteria applied in Appendix A is provided in Table 3 below. Clarification is also provided on associated interest features where a designated site has more than one feature listed, but not all were highlighted by the site selection criteria. For example, the site selection process may identify a designated site based on a ranges associated with a specific mobile species, however these ranges may exceed the relevant range for benthic habitat. In such an example, only the relevant feature(s) identified through the site selection criteria would be highlighted for screening.

Table 3: Designated features associated with European and Ramsar sites identified through the initial site selection process.

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
Southern North Sea SAC	Harbour porpoise	None
Flamborough Head SAC	Annex I Habitats: • Reefs • Submerged or partially submerged sea caves.	• Vegetated sea cliffs of the Atlantic and Baltic Coasts
Moray Firth SAC	Bottlenose dolphin	Sandbanks which are slightly covered by sea water all the time

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
The Wash and North Norfolk Coast SAC	Harbour seal	• Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Coastal lagoons • Large shallow inlets and bays • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) • Mudflats and sandflats not covered by seawater at low tide • Eurasian otter • Reefs • Salicornia and other annuals colonising mud and sand • Sandbanks which are slightly covered by sea water all the time
River Derwent SAC	Annex II Species: • Sea lamprey • River lamprey	Annex I Habitats: • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • Annex II Species: • Bullhead • Eurasian otter
Humber Estuary SAC	• Sea lamprey • River lamprey • Grey seal • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)[8]	• Coastal lagoons • Dunes with *Hippophaë rhamnoides*. • Embryonic shifting dunes • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Fixed coastal dunes with herbaceous vegetation ('grey dunes') • Salicornia and other annuals colonising mud and sand • Sandbanks which are slightly covered by sea water all the time • Shifting dunes along the shoreline with • *Ammophila arenaria* ('white dunes')
Berwickshire and North Northumberland Coast SAC	Grey Seal	• Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Reefs • Submerged or partially submerged seacaves

[8] Note – the feature has been identified through project specific assessment and modelling of air quality (Volume A3, Chapter 9: Air Quality)

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
Transboundary harbour porpoise sites (48 sites)	Harbour porpoise	All other designated features (unless included for seals or bottlenose dolphin below)
Transboundary harbour seal sites (Doggersbank (Dutch) SAC and klaverbank SCI))	Harbour seal	All other designated features (unless included for harbour porpoise above or grey seal or bottlenose dolphin below)
Transboundary grey seal sites (Doggersbank (Dutch), Klaverbank SCI, Bancs des Flandres SCI, Vlaamse Banken SCI, SBZ 1 SCI, SBZ 2 SCI, SBZ 3 SCI, Vlakte van der Raan SCI, Westerschelde & Saeftinghe SCI, Voordelta SCI, Noordzeekustzone SCI, Waddenzee SCI))	Grey seal	All other designated features (unless included for harbour porpoise or harbour seal above or bottlenose dolphin below)
Transboundary bottlenose dolphin sites (6 sites)	Bottlenose dolphin	All other designated features (unless included for harbour porpoise or seal above)
Greater Wash SPA	Non-breeding: • Red-throated diver • Common scoter • Little gull (Migratory)	Breeding: • Sandwich tern • Little tern • Common tern
Hornsea Mere	N/A	Gadwall
Humber Estuary SPA	• Golden plover • Black-tailed godwit • Bar-tailed godwit • Ruff • Shelduck • Dunlin • Knot • Redshank • Saltmarsh - as a potential supporting habitat of designated species	• Bittern • Hen harrier • Marsh harrier • Avocet • Little tern • Waterbird assemblage
Humber Estuary Ramsar	• Ramsar criterion 1 (estuary – specifically the saltmarsh habitat) • Ramsar criterion 3 (grey seal) • Ramsar criteria 5 (assemblage of international importance) • Ramsar criterion 6 (species/populations occurring at levels of international importance	N/A

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
	• Ramsar criterion 8 (migratory fish river lamprey and sea lamprey) Bird species total including: • Golden plover • Dunlin • Black-tailed godwit • Bar-tailed godwit • Redshank • Shelduck • Red knot	
Flamborough & Filey Coast SPA	• Fulmar (component of seabird assemblage) • Gannet • Kittiwake • Herring gull (component of seabird assemblage) • Guillemot • Razorbill • Puffin (component of seabird assemblage)	Seabird assemblage (breeding) (including shag and cormorant)
Northumbria Coast SPA	Arctic tern	• Purple sandpiper • Turnstone • Little tern
Lindisfarne SPA	N/A	• Bar-tailed godwit • Common scoter • Dunlin • Eider • Golden plover • Grey plover • Greylag goose • Light-bellied brent goose • Little tern • Long-tailed duck • Red-breasted merganser • Redshank • Ringed plover • Roseate tern • Sanderling • Shelduck • Whooper swan • Wigeon • Waterbird assemblage
Lindisfarne Ramsar	N/A	• Bar-tailed godwit • Greylag goose • Light-bellied brent goose • Pink-footed goose

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
		• Redshank • Ringed plover • Wigeon • Waterbird assemblage
Teesmouth and Cleveland Coast SPA (as extended in January 2020)	• Sandwich tern • Common tern	• Little tern • Avocet • Ruff • Knot • Redshank • Waterbird assemblage
Coquet Island SPA	• Kittiwake (component of seabird assemblage) • Arctic tern • Common tern • Roseate tern • Sandwich tern • Puffin	Seabird assemblage (including fulmar, herring gull and lesser black-backed gull)
Farne Islands SPA	• Kittiwake (component of seabird assemblage) • Arctic tern • Common tern • Sandwich tern • Guillemot • Puffin (component of seabird assemblage)	Roseate tern Seabird assemblage (including shag and cormorant)
St Abb's Head to Fast Castle SPA	• Kittiwake • Razorbill • Guillemot	• Shag • Herring gull
Forth Islands SPA	• Gannet • Kittiwake • Arctic tern • Common tern • Sandwich tern • Guillemot • Razorbill • Puffin	• Fulmar • Shag • Cormorant • Herring gull • Lesser Black-backed Gull • Roseate tern
Outer Firth of Forth and St Andrews Complex pSPA	• Gannet • Kittiwake • Guillemot • Puffin	• Manx shearwater • Shag • Common scoter • Eider • Goldeneye • Long-tailed duck • Red-breasted merganser • Common gull • Black-headed gull • Little gull • Herring gull

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
		• Arctic tern • Common tern
Fowlsheugh SPA	• Kittiwake • Razorbill • Guillemot	• Fulmar • Herring gull
Buchan Ness to Collieston Coast SPA	• Fulmar • Kittiwake • Guillemot	• Shag • Herring gull
Troup, Pennan and Lion's Heads SPA	• Kittiwake • Razorbill • Guillemot	• Fulmar • Herring gull
Tips of Corsemaul and Tom Mor SPA	N/A	Common gull
East Caithness Cliffs SPA	• Kittiwake • Razorbill • Guillemot • Puffin	• Fulmar • Shag • Cormorant • Peregrine • Herring gull • Great black-backed gull
North Caithness Cliffs SPA	• Kittiwake • Razorbill • Guillemot • Puffin	• Fulmar • Peregrine
Copinsay SPA	• Kittiwake • Guillemot	• Fulmar • Great black-backed gull
Hoy SPA	• Fulmar • Arctic skua • Great skua • Kittiwake • Guillemot • Puffin	• Red-throated diver • Peregrine • Great black-backed gull
Marwick Head SPA	• Kittiwake • Guillemot	N/A
Rousay SPA	• Arctic skua • Kittiwake • Arctic tern • Guillemot	• Fulmar
Calf of Eday SPA	• Kittiwake • Great black-backed gull • Guillemot	• Fulmar • Cormorant
West Westray SPA	• Arctic skua • Kittiwake • Arctic tern • Razorbill	Fulmar

Designated Site	Designated Feature(s) Highlighted Through Site Selection	Additional Designated Feature (s)
	• Guillemot	
Fair Isle SPA	• Gannet • Arctic skua • Great skua • Kittiwake • Arctic tern • Razorbill • Guillemot • Puffin	• Fulmar • Shag • Fair Isle wren
Sumburgh Head SPA	• Kittiwake • Arctic tern • Guillemot	Fulmar
Noss SPA	• Gannet • Great skua • Kittiwake • Razorbill • Guillemot • Puffin	Fulmar
Foula SPA	• Arctic skua • Great skua • Kittiwake • Arctic tern • Razorbill • Guillemot • Puffin	• Fulmar • Leach's petrel • Shag • Red-throated diver
Fetlar SPA	• Arctic skua • Great skua • Arctic tern	• Fulmar • Dunlin • Whimbrel • Red-necked Phalarope
Hermaness, Saxa Vord and Valla Field SPA	• Gannet • Great skua • Kittiwake • Guillemot • Puffin	• Fulmar • Shag • Red-throated diver

5.2 Identification of Potential Effects

5.2.1.1 Considerable experience and knowledge exists from previous offshore wind farm projects, including specifically from within the former Hornsea Zone (namely the operational Hornsea Project One, the consented Hornsea Project Two, and the in-planning Hornsea Three), with regard to the potential effects that may result from the construction, operation and maintenance, and decommissioning of an offshore wind farm. This therefore provides a wealth of knowledge which can be drawn upon by Hornsea Four when identifying the potential effects that need to be considered through the screening process. In addition, for

a number of the designated sites identified through the site selection criteria, Natural England has prepared site advice packages and supporting documents, which are intended to help with site assessments and the impact of marine activity in sensitive areas. Specifically, the 'advice on operations' documents are relevant here, as these identify the type of effect that specific features are sensitive to. All these sources of information have been drawn together to produce a concise list of effects that may result from Hornsea Four and that need to be taken into account when determining the potential for LSE for the designated sites and features identified in **Table 3** above. The information is summarised below in **Table 5**. For the purposes of HRA Screening, and given the limited information available, the potential for effect during decommissioning is assumed, as a worst case scenario, to be the same as for construction (but is realistically likely to be less).

5.2.1.2 It should be noted that the effects identified in **Table 5** do not correlate to potential LSE. The potential for LSE is explored subsequently, in relation to relevant sites and feature(s) in **Section 6**.

5.2.1.3 It is noted that the terminology applied to the potential effects identified in **Table 5** for subtidal and intertidal benthic ecology as well as that for offshore ornithology may differ to the activities identified in the relevant advice on operations. For clarity, the equivalent terms, as sourced from the Natural England Advice Packages for the northern North Sea[9], specifically for Flamborough Head[10], as available for the relevant benthic ecology sites identified by the application of the site selection criteria, and as relevant for cables and offshore wind, are defined in **Table 4** below (noting that these may be considered temporary or ongoing according to the stage of development). For offshore ornithology, all comparative definitions are drawn from the Natural England Designated Sites View FFC SPA 'Advice on Operations' pages for 'Electricity from renewables energy sources' and 'Power cables' and relate to those 'Medium-High Risk' pressures that Natural England advise *"Pressure is commonly induced by activity at a level that needs to be considered further as part of an assessment"*[11], which are defined in **Table 4** below.

[9] https://www.gov.uk/government/publications/northern-north-sea-marine-area-index-map-and-site-packages
[10] https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0013036&SiteName=flambor&S
[11] https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK9006101&SiteName=filey&SiteNameDisplay=Flamborough+and+Filey+Coast+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=4

Table 4: Comparison of relevant terms used to define potential effect for Benthic and Intertidal Ecology and Offshore and Intertidal Ornithology.

Term used in this assessment	Term used by Natural England in its marine sites Advice on Operations
Benthic and Intertidal Ecology	
Temporary habitat loss/ disturbance	Abrasion/ disturbance of the substrate on the surface of the seabed Habitat structure changes - removal of substratum (extraction); and Penetration and/ or disturbance of the substratum below the surface of the seabed, including abrasion.
Temporary increases in suspended sediments/ smothering	Changes in suspended solids (water clarity) Smothering and siltation rate changes (Light-heavy).
Accidental pollution	Deoxygenation, temperature decrease (Cables – in operation), temperature increase (Cables – in operation), introduction of light, nutrient enrichment.
Changes to physical processes	Water flow (tidal current) changes, including sediment transport considerations Wave exposure changes.
Long-term physical loss of habitat	Habitat structure changes - removal of substratum (extraction); Penetration and/ or disturbance of the substratum below the surface of the seabed, including abrasion; and Physical loss (to land or freshwater habitat).
Introduction of hard substrate (invasive non-native species)	Introduction or spread of invasive non-native species (INIS); Physical change (to another seabed type); and Barrier to species movements.
Electromagnetic Fields (EMF)	Electromagnetic changes.
Offshore and Intertidal Ornithology	
Direct disturbance and displacement	Direct disturbance and displacement.
Indirect impacts through effects on habitats and prey species	Indirect impacts through effects on habitats and prey species.
Risk of collision	Risk of collision.
Barrier effect	Barrier effect.

Table 5: Potential effects from Hornsea Four on relevant receptors.

Receptor Type	Potential Effect	Potential Range of Effect	Justification
Construction			
Benthic and Intertidal Ecology	Temporary habitat loss/ disturbance	Within the Order Limits	Construction phase works may present potential temporary, direct habitat loss and disturbance from cable laying operations, jack-up leg impacts and seabed preparation works for foundations and associated scour or cable protection installation.
	Temporary increases in suspended sediments/ smothering	16 km[12]	A temporary increase in suspended sediment concentrations and associated sediment deposition may arise from construction activities (e.g. cable and foundation installation) and may affect benthic or intertidal communities.
	Accidental pollution	Within the Order Limits	Construction activities may result in accidental pollution which can affect the sediment and water quality, with potential implications for benthic or intertidal ecology.
	Invasive non-native species	Within the Order Limits	The potential spread of non-native, invasive species via associated construction activities.
Marine Mammals	Increase in underwater noise	26 km (JNCC, 2016)	Construction activities, in particular pile-driving activities, will result in increased levels of underwater noise. Additionally, activities such as vessel traffic during construction will also lead to underwater noise. Potential for effect can range from lethal, permanent or temporary physiological injury through to disturbance.
	Vessel disturbance	Within the Order Limits	Potential for the presence of vessels to result in disturbance.
	Collision risk	Along the transit route from port and within the Order Limits	The increased vessel traffic during construction may result in an increased collision risk to marine mammals.
	Changes in prey availability and behaviour	100 km	Changes to prey availability can have an indirect effect on marine mammals. The screening range applied is the maximum applied for migratory fish (to reflect the largest range for fish as a prey species).
	Accidental pollution	Within the Order Limits	There is a risk of pollution being accidentally released from vessels and machinery used by the project, including construction and installation vessels and from the construction process itself.

[12] Note -16 km is the original HRA Screening range for benthic habitats and for suspended sediment throughout. Subsequent project specific reporting has reduced this range (e.g. see Volume A2 Chapter 2: Benthic and Intertidal Ecology), however for consistency in the HRA, the 16 km range screening remains for potential change to physical processes and for suspended sediment. It should be noted that in any case – the small reduction in the range apparent within the ES would not change the conclusions of HRA screening if applied here.

Receptor Type	Potential Effect	Potential Range of Effect	Justification
	Temporary increases in suspended sediments/ smothering	16 km	A temporary increase in suspended sediment concentrations and associated sediment deposition may arise from construction activities (e.g. cable and foundation installation). This may impair the ability to forage.
Offshore and Intertidal Ornithology	Direct disturbance and displacement	Intertidal: 0.5 km Offshore 4 km	Advice from SNCBs (SNCBs, 2017).
	Changes in prey availability and behaviour	Up to 100 km	Construction activities, in particular pile-driving activities, will result in increased levels of underwater noise. Potential impacts, which are dependent on the level of noise, may include permanent or temporary effects and behavioural disturbance in sensitive species. Range applies reflects the maximum range applied to migratory fish (to reflect fish as a prey species).
Migratory Fish	Temporary increases in suspended sediments/ smothering	16 km	A temporary increase in suspended sediment concentrations and associated sediment deposition may arise from construction activities (e.g. cable and foundation installation). Potential for direct effects (e.g. navigation) or indirect (via food sources).
	Increase in underwater noise	100 km[13]	Construction activities, in particular pile-driving activities, will result in increased levels of underwater noise. Potential impacts, which are dependent on the level of noise, may include permanent or temporary effects and behavioural disturbance in sensitive species.
	Temporary habitat loss/ disturbance	Within the Order Limits	Construction phase works may present potential for temporary, direct habitat loss and disturbance.
	Accidental pollution	Within the Order Limits	Construction activities may result in accidental pollution which can affect the sediment and water quality, with potential implications for migratory fish.
Onshore Ecology	Temporary habitat loss	Within the Order Limits	Construction activities will lead to temporary habitat loss, damage, disturbance, fragmentation and / or severance that qualifying mobile species, such as Annex I birds may utilise outside of Europeans sites.
	Temporary disturbance / damage to habitats	Within the Order Limits	
	Habitat fragmentation or severance	Within the Order Limits	
	Visual disturbance to species	300 m	

[13] This is a precautionary value used during the Hornsea Three HRA Screening report. To remain precautionary and continue consistency across projects within the Hornsea Zone, this range has been used for Hornsea Four. 100km is also considerably greater than all modelled impact ranges of underwater noise with respect to fish in **Volume A4, Annex 4.5: Subsea Noise Technical Report** and it therefore remains a precautionary screening range

Receptor Type	Potential Effect	Potential Range of Effect	Justification
	Noise disturbance to species	300 m where maximum noise levels exceed 55dBA	Qualifying mobile species, such as Annex I birds e.g. wintering wader species feeding on inland fields at high tide, could potentially enter or cross the Hornsea Four Zone of Influence (ZOI) and be disturbed by construction works.
	Invasive non-native species	Within the Order Limits	Construction vehicle and staff movement could introduce invasive non-native species that could impact qualifying mobile species, such as Annex I birds species if they utilise areas within Hornsea Four outside of Europeans sites.
	Accidental release of contaminants	Within the Order Limits	Qualifying mobile species, such as Annex I bird could potentially be affected by an accidental release of contaminants if they utilise areas within Hornsea Four ZOI outside of Europeans sites.
Operation & Maintenance			
Benthic and Intertidal Ecology	Temporary habitat disturbance	Within the Order Limits	Impacts are likely to be similar to those resulting from construction, but the magnitude will be less. For example, the presence of jack-up vessels during maintenance may disturb the substrate.
	Release of sediment into suspension/ smothering	16 km	A temporary increase in suspended sediment concentrations and associated sediment deposition may arise during maintenance activities (e.g. cable works) or scour and may affect benthic or intertidal communities.
	Accidental pollution	Within the Order Limits	There is a risk of pollution being accidentally released from vessels and machinery used by the project, as well as from project infrastructure. There is also potential risk of temperature change in close proximity to the operational cables. Pollution can affect sediment and water quality with potential subsequent implications for benthic or intertidal ecology.
	Changes to physical processes	Within the Order Limits for waves and hydrodynamics. Up to 16 km for sediment pathways	Manmade structures such as scour protection and foundations may result in localised changes in hydrodynamics and wave regimes, with a potential effect on sediment transport pathways and associated effects on benthic and intertidal ecology. This may affect some benthic organisms as water flows may be reduced and therefore reducing the amount of suspended food particles which may inhibit feeding and growth. Alternatively, increased flows and scour may make the habitat less suitable for some species. ES reporting has confirmed that all such changes are wholly contained within the 16km screening range (and are considerably less for purposes of assessment).
	Long-term physical loss of habitat	Within the Order Limits	There is the potential for long-term habitat loss at and around manmade structures, and at any subsea cables where secondary cable protection is installed.
	Introduction of hard substrate (invasive non-native species)	Within the Order Limits	Man-made structures placed on the seabed such as foundations and scour/cable protection are expected to be colonised by a range of marine organisms leading to localised changes in

Receptor Type	Potential Effect	Potential Range of Effect	Justification
			biodiversity. Structures may also act as a refuge for fish and may facilitate the spread of non-native species.
Marine Mammals	Underwater noise	Localised to individual WTGs and vessels	Increased underwater noise resulting from operational WTGs and increased vessel activity required for operation and maintenance operations may result in disturbance of marine mammal receptors. EMF emitted by export and array cables has the potential to lead to a behavioural response in marine mammals. It should be noted that the noise and associated impacts within the operational phase will be substantially lower than construction in terms of magnitude.
	Vessel disturbance	Within the Order Limits	Potential for the presence of vessels to result in disturbance
	Long-term physical loss of habitat	Within the Order Limits	The footprint/ presence of structures (i.e. WTGs, substations, possible scour protection and cable protection) will reduce the area of the habitat for benthic species.
	Collision risk	Along the transit route from port and within the Order Limits	On-going vessel traffic during operation and maintenance may result in an increased collision risk to marine mammals.
	Accidental pollution	Within the Order Limits	There is a risk of pollution being accidentally released from vessels and machinery used by the project, as well as from project infrastructure. Pollution can affect sediment and water quality with potential subsequent implications for marine mammals and their prey.
	Changes in prey availability	Within the Order Limits	Potential for a loss of prey resources for marine mammals as a result of changes in fish communities from operation and maintenance activities.
Offshore and Intertidal Ornithology	Direct disturbance and displacement	Intertidal: 0.5 km Offshore: 4 km	Advice from SNCBs (SNCBs, 2017).
	Indirect impacts through effects on habitats and prey species	Up to 10 km	Response of fish prey (see below).
	Risk of collision	Requires bird to fly across the rotor swept area	Only occurs in rotor swept area.
	Barrier effect	Requires the bird to seek to fly across the array area	Only occurs on array area.

Receptor Type	Potential Effect	Potential Range of Effect	Justification
Migratory Fish	Temporary habitat disturbance	Within the Order Limits	Maintenance activities may present potential temporary disturbance to benthos and therefore have an indirect impact on migratory fish through their prey species.
	Release of sediment into suspension/ smothering	16 km *	A temporary increase in suspended sediment concentrations and associated sediment deposition may arise during maintenance activities (e.g. cable works) or scour. Potential for direct effects (e.g. navigation) or indirect (via food sources). However, the potential for sediment disturbance will be much reduced when compared to the construction phase.
	Underwater noise	Localised to individual WTGs and vessels	Increased underwater noise resulting from operational WTGs and increased vessel activity required for operation and maintenance operations may result in disturbance of fish receptors. EMF emitted by export and array cables has the potential to lead to a behavioural response in fish. It should be noted that the noise and associated impacts within the operational phase will be substantially lower than construction in terms of magnitude.
	Accidental pollution	Within the Order Limits	There is a risk of pollution being accidentally released from vessels and machinery used by the project, as well as from project infrastructure. Pollution can affect sediment and water quality with potential subsequent implications for migratory fish.
Onshore Ecology	Long-term habitat loss	Within the onshore substation footprint	The onshore substation will reduce the area of habitat available for qualifying mobile species, such as Annex I birds, that may utilise the habitat outside of European sites.
	Intermittent temporary habitat loss	Within the Order Limits	Operation and maintenance activities could lead to temporary habitat loss, damage, disturbance, fragmentation and / or severance that qualifying mobile species, such as Annex I birds or Annex II species could utilise outside of Europeans sites.
	Intermittent temporary disturbance to habitats and or species	Within the Order Limits	Qualifying mobile species, such as Annex I birds e.g. wintering wader species feeding on inland fields at high tide, could potentially enter or cross the Order Limits and be disturbed by the operation and maintenance activities.
	Accidental release of contaminants	Within the Order Limits	Qualifying mobile species, such as Annex I birds could potentially be affected by an accidental release of contaminants if they utilise areas within Hornsea Four outside of Europeans sites.
Decommissioning			
Benthic and Intertidal Ecology	The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined in the construction phase.		
Marine Mammals	The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined in the construction phase.		
Offshore and Intertidal Ornithology	The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined in the construction phase.		

Receptor Type	Potential Effect	Potential Range of Effect	Justification
Migratory Fish	The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined in the construction phase.		
Onshore Ecology	The impacts during the decommissioning phase are considered to be similar and likely less than those outlined in the construction phase.		

6 Determination of the Potential for Likely Significant Effect (LSE) Alone

6.1 Introduction

6.1.1.1 The initial site selection process documented in Section 5.1 generated a list of designated sites and relevant features for which there is a need to consider the potential for LSE in relation to Hornsea Four. In addition, in Section 5.2, the likely effects that may result during construction, operation and maintenance and decommissioning of Hornsea Four (and are relevant to the receptors being considered here) are identified to enable these to be considered. This section combines that information for the project alone and presents the assessment of potential LSE for the project alone. Section 7 subsequently presents the information for the project in-combination and together, provides the necessary information for Stage 1 of the Habitats Regulations Assessment process. The assessment is provided separately in respect of the offshore and onshore components of Hornsea Four.

6.1.1.2 The assessment of potential LSE is based on Hornsea Four's description of the baseline environment and the scope and nature of the proposed project activities, together with the relevant information available for the designated sites. The conclusions on potential for LSE form the basis of the RIAA as submitted with the DCO Application for Hornsea Four.

6.2 Assessment of the Potential for Likely Significant Effect (LSE)

6.2.1 Offshore and Intertidal

6.2.1.1 The assessment and conclusions with regards to potential LSEs on all offshore and intertidal designated sites and the relevant features identified has been carried out taking account of the ZOI of potential impacts, location of the European site under consideration and (where known) the distribution of qualifying features within the sites. The information is presented below in Table 6, on a site by site basis.

Table 6: Determination of potential LSE for offshore sites.

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
Construction				
Southern North Sea SAC	Harbour porpoise	Increase in underwater noise	Hornsea Four is located within 0 km of the SAC. There is potential for a significant effect.	**Potential for LSE**
		Vessel disturbance	The presence of additional vessels within the SAC may result in disturbance of harbour porpoise. However, the relevant site selection assessment document found a negative relationship only where levels of traffic increased beyond a threshold of approximately 80 ships per day. It is not expected that Hornsea Four will exceed this level. However, in response to consultee concerns (particularly in-combination) and on a precautionary basis, vessel disturbance has been screened in for assessment.	**Potential for LSE**
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background, and the DCO Application is accompanied by an integral Vessel Management Plan (VMP) (required regardless of the potential for impact on marine mammals). Further, the Advice on Activities for the site found that 'few collisions between harbour porpoise and vessels occur and is not a significant pressure for this species'. However, on a precautionary basis potential collision risk is screened in.	**Potential for LSE**
		Changes in prey availability and behaviour	Given the large foraging range of this species and the short-term duration and temporary nature of any impact, and the conclusions of the Scoping report, the PEIR and the final ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is therefore considered to be negligible and remains screened out.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a Project Environmental Management And Monitoring Plan (PEMMP)) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Harbour porpoise frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of harbour porpoise.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
Flamborough Head SAC	Annex I Habitats: • Reefs • Vegetated sea cliffs of the Atlantic and Baltic Coasts • Submerged or partially submerged sea caves	Temporary habitat loss/ disturbance	No physical overlap between work areas and the designated site and therefore no potential for temporary habitat loss or disturbance.	No LSE
		Temporary increases in suspended sediments / smothering	There is potential for sediment released into suspension from the cable corridor to reach the designated site and therefore potential to affect the reef feature. Although it is considered unlikely, there is potential for some suspended sediment released during works along the cable corridor to reach a submerged or partially submerged sea cave. The vegetated sea cliffs lie above the level at which any suspended sediment associated with Hornsea Four could reach and therefore will not be subject to a temporary increase in suspended sediment/smothering resulting from Hornsea Four. The distance between the array area and the SAC is such that effects resulting from the array are screened out.	**Potential for LSE for: reefs and submerged or partially submerged sea caves** No LSE for other designated Annex I Habitats
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Invasive non-native species	A number of measures and best practice approaches will be implemented during the construction phase to reduce the potential for release and spread of non-native, invasive species and to provide a process to deal with any should they occur. These will include measures to follow published guidelines and best working practice for the prevention of the release and spread of non-native, invasive species. Such measures are considered an integral part of the project and would be required regardless of HRA matters. However, potential for LSE remains.	**Potential for LSE for the following feature: reefs, submerged or partially submerged sea caves.** No LSE for other designated Annex I Habitats
Moray Firth SAC	Bottlenose dolphin	Increase in underwater noise	This site is located at a significant distance from Hornsea Four array (471 km) and cable corridor (451 km) with very low sightings of bottlenose dolphin in the wider area around Hornsea Four and a lack of connectivity evident to SACs. Therefore, a conclusion of no LSE is drawn.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Vessel disturbance	The site is located at a significant distance from Hornsea Four and therefore it is considered that vessel traffic at Hornsea Four will not result in disturbance within the site.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals), and the minimum distance between Hornsea Four and the Moray Firth SAC is substantial (417 km to the cable corridor, 451 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the Moray Firth SAC.	No LSE
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be limited. Furthermore, the minimum distance of 451 km from site to the Hornsea Four Order Limits reinforces the very low risk of potential effect.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Bottlenose dolphin frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of bottlenose dolphin. The range between the project and the SAC (at least 451 km) reinforces the conclusion.	No LSE
The Wash and North Norfolk Coast SAC	Harbour seal	Increase in underwater noise	Site within a distance of 120 km from the project. Therefore, there is the potential for some level of interaction between harbour seal and underwater noise associated with Hornsea Four.	**Potential for LSE**
		Vessel disturbance	Hornsea Four is located at least 88 km from the SAC, and following the harbour seal at sea density maps within the ES is not in an area of high usage by seals. However, on a precautionary basis, vessel disturbance is screened in here.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). The Advice on Activities for the SAC identifies collision risk for harbour seal, however the text draws on the risk of corkscrew injuries which is considered to be outdated. The advice concludes that incidents of mortality or injury of harbour seals caused by vessels remain a very rare occurrence in UK waters. Further, as confirmed by Natural England during consultation the project is a low risk area for harbour seal. Overall therefore it is concluded that the potential for effect is negligible.	No LSE
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be limited. Furthermore, the minimum distance of 88 km from site to the Hornsea Four Order Limits reinforces the low risk of potential effect.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Harbour seal frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of harbour seal.	No LSE
River Derwent SAC	Annex II Species: • Sea lamprey • River lamprey	Temporary increases in suspended sediments/ smothering	The mouth of the Humber Estuary, which leads to the River Derwent, is located at least 47 km from the Hornsea Four offshore ECC. Due to the maximum range of effect for this impact (up to 16 km), it is considered that there is no potential for a significant effect to migratory fish moving into or out of the Humber Estuary and therefore no potential for a significant effect on migratory fish found within the River Derwent.	No LSE
		Increase in underwater noise	The distance between the mouth of the Humber Estuary, which leads to the River Derwent, and the array area is approximately 74 km. It is therefore unlikely there will be a significant impact from underwater noise generated at Hornsea Four on migratory fish entering or	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			leaving the mouth of the Humber Estuary and therefore the migratory fish found within the River Derwent.	
		Temporary habitat loss/ disturbance	The SAC is located upstream from the Humber Estuary and therefore is remote from direct temporary habitat loss or disturbance.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
Humber Estuary SAC	Grey seal	Increase in underwater noise	Site within a distance of 145 km from the project. Therefore, there is the potential for some level of interaction between grey seal and underwater noise associated with Hornsea Four.	**Potential for LSE**
		Vessel disturbance	Hornsea Four is located at least 47 km from the SAC, and following the grey seal at sea density maps within the ES is located primarily on the fringes of an area of high usage by seals. However, in response to consultee concerns (particularly in-combination) and on a precautionary basis, vessel disturbance has been screened in for assessment.	**Potential for LSE**
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). Although the grey seal relevant Advice on Activities for the Humber Estuary SAC states that the risk from collision is low, depending on factors such as vessel speed, nature of the activity and proximity to the feature, Natural England have raised concerns regarding grey seal collision risk. On a precautionary basis, the potential for collision risk has been screened in.	**Potential for LSE**
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be negligible.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Temporary increases in suspended sediments/ smothering	Grey seal frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of grey seal.	No LSE
	• River lamprey • Sea lamprey	Temporary increases in suspended sediments/ smothering	The site is located at least 47 km from Hornsea Four Order Limits which is outside the potential range of effect (16 km) for this particular impact. It is therefore considered that the potential for a significant effect to migratory fish is negligible.	No LSE
		Increase in underwater noise	The distance between the mouth of the Humber Estuary and the array is some 74 km. It is therefore unlikely there will be a significant effect from underwater noise generated at Hornsea Four on migratory fish entering or leaving the mouth of the Humber Estuary.	No LSE
		Temporary habitat loss/ disturbance	The SAC is a minimum 47 km from the cable corridor for Hornsea Four and therefore is remote from direct temporary habitat loss or disturbance.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
	Atlantic salt meadows and Salicornia and other annuals colonizing mud and sand	Increased nitrogen deposition	Increased road traffic running along the side of the Humber Estuary has the potential to increase nitrogen deposition on the intertidal saltmarsh.	**Potential for LSE**
Humber Estuary Ramsar[14]	Grey seal	Increase in underwater noise	This site is within a distance of 145 km from the project. Therefore, there is the potential for some level of interaction between grey seal and underwater noise associated with Hornsea Four.	**Potential for LSE**
		Vessel disturbance	Hornsea Four is located at least 47 km from the SAC, and following the grey seal at sea density maps within the ES is located primarily on the fringes of an area of high usage by seals. Potential LSE as a result of vessel disturbance cannot be ruled out.	**Potential for LSE**
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by	**Potential for LSE**

[14] Note that Ramsar criteria 5 (assemblage of international importance) and Ramsar criterion 6 (species/populations occurring at levels of international importance) are addressed separately

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			an integral VMP (required regardless of the potential for effect on marine mammals). Although the grey seal relevant Advice on Activities for the Humber Estuary SAC states that the risk from collision is low, depending on factors such as vessel speed, nature of the activity and proximity to the feature, Natural England have raised concerns regarding grey seal collision risk. On a precautionary basis, the potential for collision risk has been screened in.	
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be negligible.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Grey seal frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of grey seal.	No LSE
	River lamprey Sea lamprey	Temporary increases in suspended sediments/ smothering	The site is located at least 47 km from Hornsea Four Order Limits which is outside the potential range of effect (16 km) for this particular impact. It is therefore considered that the potential for a significant effect to migratory fish is negligible.	No LSE
		Increase in underwater noise	The distance from the mouth of the Humber Estuary to the array is some 74 km. It is therefore unlikely there will be a significant effect from underwater noise generated at Hornsea Four on migratory fish entering or leaving the mouth of the Humber Estuary.	No LSE
		Temporary habitat loss/ disturbance	The SAC is a minimum 47 km from the cable corridor for Hornsea Four and therefore is remote from direct temporary habitat loss or disturbance.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
	Saltmarsh (as part of Ramsar criteria 1 Estuaries)	Increased nitrogen deposition	Increased road traffic running along the side of the Humber Estuary has the potential to increase nitrogen deposition on the intertidal saltmarsh.	**Potential for LSE**
Humber Estuary SPA	Saltmarsh (as a supporting habitat of designated feature(s))	Increased nitrogen deposition	Increased road traffic running along the side of the Humber Estuary has the potential to increase nitrogen deposition on the intertidal saltmarsh.	**Potential for LSE**
Berwickshire and North Northumberland Coast SAC	Grey seal	Increase in underwater noise	Although the site is not within a distance of 145 km from the project, it has been identified through potential site connectivity. Therefore, there is the potential for some level of interaction between grey seal and underwater noise associated with Hornsea Four.	**Potential for LSE**
		Vessel disturbance	Hornsea Four is located beyond 145 km from the SAC but demonstrates potential for site connectivity. Following the grey seal at sea density maps within the ES, the project is located primarily on the fringes of an area of high usage by seals. Potential LSE as a result of vessel disturbance cannot be ruled out.	**Potential for LSE**
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). Although the grey seal relevant Advice on Activities for the Humber Estuary SAC states that the risk from collision is low (with no mention of collision risk in the Regulation 33 document for the Berwickshire and North Northumberland European Marine Site (EMS), depending on factors such as vessel speed, nature of the activity and proximity to the feature, Natural England have raised concerns regarding grey seal collision risk. On a precautionary basis, the potential for collision risk has been screened in.	**Potential for LSE**
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be negligible.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a CoCP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Temporary increases in suspended sediments/ smothering	Grey seal frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of grey seal.	No LSE
Transboundary harbour porpoise sites (48 sites, listed in full in Appendix B)	Harbour porpoise	Increase in underwater noise	The range applied to UK harbour porpoise sites for Screening of effect is 26 km. No transboundary site falls within that range for this species and therefore there is no potential for LSE.	No LSE
		Vessel disturbance	The sites are all located at a significant distance from Hornsea Four and therefore it is considered that vessel traffic at Hornsea Four will not result in disturbance within those sites.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (78 km to the cable corridor, 106 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	No LSE
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be negligible. Furthermore, the minimum distance of 78 km from site to the Hornsea Four Order Limits reinforces the low risk of potential effect.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Harbour porpoise frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of harbour porpoise.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
Transboundary bottlenose dolphin sites (Anse de Vauville (France) SAC, Baie de Seine orientale (France)SAC, Banc et récifs de Surtainville (France) SAC, Estuaires et littoral picards (baies de Somme et d'Authie) (France) SAC, Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant (France) SAC, Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire (France) SAC)	Bottlenose dolphin	Increase in underwater noise	These sites are located at a significant distance from Hornsea Four array (the closest being 326 km), with very low sightings of bottlenose dolphin in the wider area around Hornsea Four and a lack of connectivity evident to SACs. Therefore a conclusion of no LSE is drawn.	No LSE
		Vessel disturbance	The sites are located at a significant distance from Hornsea Four and therefore it is considered that vessel traffic at Hornsea Four will not result in disturbance within those sites.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (326 km to the cable corridor, 337 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	No LSE
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, together with the ES conclusions of a negligible impact for marine mammals as a result in any impact on prey items, the potential effect is considered to be negligible. Furthermore, the minimum distance of 326 km from site to the Hornsea Four Order Limits reinforces the low risk of potential effect.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Bottlenose dolphin frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of bottlenose dolphin.	No LSE
Transboundary harbour seal sites (Doggersbank	Harbour seal	Increase in underwater noise	All the designated sites fall within the foraging range (120 km) of harbour seal, with potential for a significant effect.	**Potential for LSE**
		Vessel disturbance	All the designated sites fall within the foraging range (120 km) of harbour seal, with potential for a significant effect.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
(Dutch) SAC and klaverbank SCI))		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (78 km to the cable corridor, 106 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	No LSE
		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology, the potential effect is considered to be negligible. Furthermore, the minimum distance of 78 km from site to the Hornsea Four Order Limits reinforces the low risk of potential effect.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Harbour seal frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of harbour seal.	No LSE
Transboundary grey seal sites (Doggersbank (Dutch), Klaverbank SCI, Bancs des Flandres SCI, Vlaamse Banken SCI, SBZ 1 SCI, SBZ 2 SCI, SBZ 3 SCI, Vlakte van	Grey seal	Increase in underwater noise	All the designated sites fall within the foraging range (145 km) of grey seal, or have been identified through potential for site connectivity, with potential for a significant effect.	**Potential for LSE**
		Vessel disturbance	All the designated sites fall within the foraging range (145 km) of grey seal, or have been identified through potential for site connectivity, with potential for a significant effect.	**Potential for LSE**
		Collision risk	Based on the relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background, combined with an integral VMP (required regardless of the potential for impact on marine mammals) and the minimum distance between Hornsea Four and the closest transboundary site (78 km to the cable corridor, 106 km to the array), it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals from these transboundary sites.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
der Raan SCI, Westerschelde & Saeftinghe SCI, Voordelta SCI, Noordzeekustzone SCI, Waddenzee SCI)		Changes in prey availability and behaviour	Given the large foraging range of this species, the short-term duration and temporary nature of any impact and the conclusions of the Scoping report, PEIR and ES regarding fish and benthic ecology the potential effect is considered to be negligible. Furthermore, the minimum distance of 78 km from site to the Hornsea Four Order Limits reinforces the low risk of potential effect.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Temporary increases in suspended sediments/ smothering	Grey seal frequently occur in relatively turbid environments and are thus adapted to locating prey in such conditions. The construction and decommissioning activities will be localised and intermittent in nature and the extent and duration of any increase in suspended sediment (and subsequent deposition) being negligible, it is considered that there is little potential of a significant effect on the foraging ability of grey seal.	No LSE
Greater Wash SPA	Red-throated diver	Direct disturbance and displacement	A sensitive species, construction close to / in SPA.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Common scoter	Direct disturbance and displacement	A sensitive species, construction close to / in SPA.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Little gull	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
Flamborough & Filey Coast SPA	Fulmar	Direct disturbance and displacement	Not sensitive to construction activities.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Gannet	Direct disturbance and displacement	Not sensitive to initial construction activities, but may be influenced as construction progresses and WTGs are erected over considerable area.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Herring gull	Direct disturbance and displacement	Not sensitive to construction activities.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Kittiwake	Direct disturbance and displacement	Not sensitive to construction activities.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Guillemot	Direct disturbance and displacement	Moderate sensitivity to construction activities.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Razorbill	Direct disturbance and displacement	Moderate sensitivity to construction activities.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Puffin	Direct disturbance and displacement	Moderate sensitivity to construction activities.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
Coquet Island SPA	Kittiwake	Direct disturbance and displacement	Not sensitive to construction activities.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Arctic tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Common tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Roseate tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Sandwich tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Puffin	Direct disturbance and displacement	Moderate sensitivity to construction activities.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
Farne Islands SPA	Kittiwake	Direct disturbance and displacement	Not sensitive to construction activities.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Arctic tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Common tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Sandwich tern	Direct disturbance and displacement	Not sensitive to construction activities in offshore environment when on migration.	No LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Guillemot	Direct disturbance and displacement	Moderate sensitivity to construction activities.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE
	Puffin	Direct disturbance and displacement	Moderate sensitivity to construction activities.	**Potential for LSE**
		Changes in prey availability and behaviour	Experience of other OWFs is no LSE.	No LSE

A further 28 SPAs have been initially screened in, because they support seabirds as breeding interest features that might pass across Hornsea Four on migration, reside within or adjacent to Hornsea Four in the winter or forage very occasionally within Hornsea Four during the breeding season, as the site is within the outermost reaches of their maximum foraging range (the latter point is only applicable for fulmar and gannet). It is recognised that when following the process of attributing birds within and around Hornsea Four to the remaining 28 SPAs, by way of apportionment advocated by Natural England and set out in the Natural England CR164 report for seabirds within the North Sea during the non-breeding bio-season, it can only conclude that the proportion of birds from those 28 sites will be trivial and the potential effects on any given species connected to any of these 28 SPAs would be inconsequential during the construction phase of Hornsea Four, due to the limited nature of any potential impacts both spatially and temporarily. Therefore, LSE can be ruled out with confidence for these 28 SPAs during the construction phase of Hornsea Four, but further consideration of these 28 SPAs is provided within the operation and maintenance phase.

Operations and Maintenance				
Southern North Sea SAC	Harbour porpoise	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. However, in response to concerns raised by Natural England (in light of increasing WTG size) operational underwater noise is screened in for potential LSE.	**Potential for LSE**
		Vessel disturbance	The presence of additional vessels within the SAC may result in disturbance of harbour porpoise. However, the relevant site selection assessment document found a negative relationship only where levels of traffic increased beyond a threshold of approximately 80 ships per day. It is not expected that Hornsea Four will exceed this level, and therefore the potential for effect is considered to be negligible. However, in response to consultee concerns (particularly in-combination) and on a precautionary basis, vessel disturbance has been screened in for assessment.	**Potential for LSE**
		Long-term physical loss of habitat	The SAC extends 36,951 km^2. The long-term but not permanent habitat loss as a result of the projects infrastructure will be a fraction of this total area during the lifetime of Hornsea Four (approximately 0.001% of benthic habitat and 0.0001% of water column habitat within the SNS SAC). Furthermore, the long term but not permanent loss of benthic habitat is that of harbour porpoise prey, not the designated feature of the site itself. The potential for a	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			significant effect is therefore screened out for the project alone. However, in response to consultee concerns, it is screened in for the project in-combination.	
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals). Further, the Advice on Activities for the site found that 'few collisions between harbour porpoise and vessels occur and is not a significant pressure for this species'. However, on a precautionary basis potential collision risk is screened in.	**Potential for LSE**
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
Flamborough Head SAC	Annex I Habitats: • Reefs • Vegetated sea cliffs of the Atlantic and Baltic Coasts, • Submerged or partially submerged sea caves	Temporary habitat disturbance	No physical overlap between work areas and the designated site and therefore no potential for temporary habitat loss or disturbance.	No LSE
		Release of sediment into suspension/ smothering	The potential for sediment release during operation and maintenance is considered less than during construction. There is potential for sediment released into suspension from the cable corridor to reach the designated site and therefore potential to affect the reef feature. Although it is considered unlikely, there is potential for some suspended sediment released during works along the cable corridor to reach a submerged or partially submerged sea cave. The vegetated sea cliffs lie above the level at which any suspended sediment associated with Hornsea Four could reach and therefore will not be subject to a temporary increase in suspended sediment/smothering resulting from Hornsea Four. The distance between the array area and the SAC is such that effects resulting from the array are screened out.	**Potential for LSE for: reefs and submerged or partially submerged sea caves** No LSE for other designated Annex I Habitats
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	
		Changes to physical processes	Any changes to physical processes will be small scale and localised in nature, with any risk limited to Annex I reefs only in close proximity to works.	**Potential for LSE for the following Annex I Habitat features: reefs** No LSE for remaining Annex I Habitats.
		Long-term physical loss of habitat	No physical overlap between work areas and the designated site and therefore no potential for temporary habitat loss or disturbance	No LSE
		Introduction of hard substrate (invasive non-native species)	Potential for invasive non-native species to colonise hard substrates.	**Potential LSE**
		EMF	No physical overlap between the cable corridor and the designated site and therefore no potential for EMF	No LSE
Moray Firth SAC	Bottlenose dolphin	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. The array is located approximately 471km from the SAC with a lack of connectivity evident. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	The site is located at a significant distance from Hornsea Four and therefore it is considered that vessel traffic at Hornsea Four will not result in disturbance within the site.	No LSE
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the Moray Firth SAC (471 km to the cable corridor, 451 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the Moray Firth SAC.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
The Wash and North Norfolk Coast SAC	Harbour seal	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	Hornsea Four is located at least 88 km from the SAC, and following the harbour seal at sea density maps within the ES is not in an area of high usage by harbour seals. This enables a conclusion that disturbance of seals attributed to the SAC is unlikely The potential for LSE was revisited during PEIR, with comments from Natural England which questioned the need to screen in harbour seals at all. However, on a precautionary basis the conclusion on no LSE applied during original screening remains here.	**Potential for LSE**
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). The Advice on Activities for the SAC identifies collision risk for harbour seal, however the text draws on the risk of corkscrew injuries which is considered to be outdated. The advice concludes that incidents of mortality or injury of harbour seals caused by vessels remain a very rare occurrence in UK waters. Overall therefore it isconcluded that the potential for effect is negligible.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
River Derwent SAC	Annex II Species: • Sea lamprey • River lamprey	Temporary habitat disturbance	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Release of sediment into suspension/ smothering	The potential for sediment release during operation and maintenance is considered less than during construction.	No LSE
		Underwater noise	Underwater noise during operation and maintenance is considered less than during construction.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Introduction of hard substrate (invasive non-native species)	Potential for overlap between Annex I Habitats and project structures. There is potential for some positive effect and a subsequent increase in biodiversity. There is already a potential for non-native species to occur due to the presence of other local OWFs and major shipping lanes. No additional risk is posed by Hornsea Four to migratory fish.	No LSE
		Changes to physical processes	Any change in physical processes will be localised and certainly insufficient to reach the River Derwent.	No LSE
Humber Estuary SAC	Grey seal	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	Hornsea Four is located at least 47 km from the SAC, and following the grey seal at sea density maps within the ES is located primarily on the fringes of an area of high usage by seals. Potential LSE as a result of vessel disturbance cannot be ruled out.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). Although the grey seal relevant Advice on Activities for the Humber Estuary SAC states that the risk from collision is low, depending on factors such as vessel speed, nature of the activity and proximity to the feature, Natural England have raised concerns regarding grey seal collision risk. On a precautionary basis, the potential for collision risk has been screened in.	**Potential for LSE**
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
		Changes to physical processes	As confirmed in **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes**, any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE
	River lamprey Sea lamprey	Temporary habitat disturbance	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Release of sediment into suspension/ smothering	The potential for sediment release during operation and maintenance is considered less than during construction.	No LSE
		Underwater noise	Underwater noise during operation and maintenance is considered less than during construction.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Introduction of hard substrate (invasive non-native species)	Potential for overlap between Annex I Habitats and project structures. There is potential for some positive effect and a subsequent increase in biodiversity. There is already a potential for non-native species to occur due to the presence of other local OWFs and major shipping lanes. No additional risk is posed by Hornsea Four.	No LSE
		Changes to physical processes	As confirmed in **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes**, any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE
	Atlantic salt meadows and Salicornia and other annuals colonizing mud and sand	Changes to physical processes	As confirmed in **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes**, any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE
Humber Estuary Ramsar[15]	Grey seal	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	Hornsea Four is located at least 47 km from the SAC, and following the grey seal at sea density maps within the ES is located primarily on the fringes of an area of high usage by seals. At this point it is considered that potential LSE as a result of vessel disturbance cannot be ruled out.	**Potential for LSE**
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). Although the grey seal relevant Advice on Activities for the Humber Estuary SAC states that the risk from collision is low, depending on factors such as vessel speed, nature of the activity and proximity to the feature, Natural England have raised concerns regarding grey seal collision risk. On a precautionary basis, the potential for collision risk has been screened in.	**Potential for LSE**
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on	No LSE

[15] Note that onshore matters associated with the Ramsar site are addressed separately.

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
		Changes to physical processes	As confirmed in **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes**, any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE
	River lamprey Sea lamprey	Temporary habitat disturbance	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Release of sediment into suspension/ smothering	The potential for sediment release during operation and maintenance is considered less than during construction.	No LSE
		Underwater noise	Underwater noise during operation and maintenance is considered less than during construction.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Introduction of hard substrate (invasive non-native species)	Potential for overlap between Annex I Habitats and project structures. There is potential for some positive effect and a subsequent increase in biodiversity. There is already a potential for non-native species to occur due to the presence of other local OWFs and major shipping lanes. No additional risk is posed by Hornsea Four.	No LSE
		Changes to physical processes	Any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE
	Saltmarsh (as part of Ramsar criteria 1 Estuaries)	Changes to physical processes	Any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
Humber Estuary SPA	Saltmarsh (as a supporting habitat of designated feature(s))	Changes to physical processes	Any change in physical processes will be localised and certainly insufficient to reach the Humber Estuary.	No LSE
Berwickshire and North Northumberland Coast SAC	Grey seal	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	Hornsea Four is located beyond 145 km from the SAC but demonstrates potential for site connectivity. Following the grey seal at sea density maps within the ES, the project is located primarily on the fringes of an area of high usage by seals. Potential LSE as a result of vessel disturbance cannot be ruled out.	Potential for LSE
		Long-term physical loss of habitat	The site does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the construction of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for effect on marine mammals). Although the grey seal relevant Advice on Activities for the Humber Estuary SAC states that the risk from collision is low (with no mention of collision risk in the Regulation 33 document for the Berwickshire and North Northumberland EMS), depending on factors such as vessel speed, nature of the activity and proximity to the feature, Natural England have raised concerns regarding grey seal collision risk. On a precautionary basis, the potential for collision risk has been screened in.	**Potential for LSE**
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
	Harbour porpoise	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
Transboundary harbour porpoise sites (48 sites)			noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	
		Vessel disturbance	The sites are all located at a significant distance from Hornsea Four and therefore it is considered that vessel traffic at Hornsea Four will not result in disturbance within those sites.	No LSE
		Long-term physical loss of habitat	The transboundary sites do not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (78 km to the cable corridor, 106 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
Transboundary bottlenose dolphin sites Anse de Vauville (France) SAC, Baie de Seine orientale (France)SAC, Banc et récifs de Surtainville (France) SAC, Estuaires et littoral	Bottlenose dolphin	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	The sites are located at a significant distance from Hornsea Four and therefore it is considered that vessel traffic at Hornsea Four will not result in disturbance within those sites.	No LSE
		Long-term physical loss of habitat	The transboundary sites do not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition, the DCO Application is	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
picards (baies de Somme et d'Authie) (France) SAC, Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant (France) SAC, Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire (France) SAC)			accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (326 km to the cable corridor, 337 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
Transboundary harbour seal sites (Doggersbank (Dutch) SAC and klaverbank SCI)	Harbour seal	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	All the designated sites fall within the foraging range (120 km) of harbour seal, with potential for a significant effect.	**Potential for LSE**
		Long-term physical loss of habitat	The transboundary sites does not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition, the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (78 km to the cable corridor, 106 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
Transboundary grey seal sites (Doggersbank (Dutch), Klaverbank SCI, Bancs des Flandres SCI, Vlaamse Banken SCI, SBZ 1 SCI, SBZ 2 SCI, SBZ 3 SCI, Vlakte van der Raan SCI, Westerschelde & Saeftinghe SCI, Voordelta SCI, Noordzeekustzone SCI, Waddenzee SCI)	Grey seal	Underwater noise	Operational underwater noise associated with WTGs has been shown to be low and localised and is unlikely to produce a significant behavioural response in marine mammals. Underwater noise generated by operational and maintenance vessel traffic is negligible in comparison to the shipping area located near Hornsea Four. No negative effect has therefore been identified.	No LSE
		Vessel disturbance	All the designated sites fall within the foraging range (145 km) of grey seal, or have been identified through potential for site connectivity, with potential for a significant effect	**Potential for LSE**
		Long-term physical loss of habitat	The transboundary sites do not physically overlap with Hornsea Four and therefore does not result in long-term physical loss of habitat.	No LSE
		Collision risk	There is a relatively small increase in vessel traffic associated with the operation and maintenance of Hornsea Four compared to background. In addition the DCO Application is accompanied by an integral VMP (required regardless of the potential for impact on marine mammals), and the minimum distance between Hornsea Four and the closest transboundary site (78 km to the cable corridor, 106 km to the array). Overall, it is considered that there is little potential for increased vessel activity to result in a significant effect in terms of collision risk for marine mammals associated with the transboundary sites.	No LSE
		Accidental pollution	The measures to address risk of accidental pollution (e.g. a PEMMP) are considered integral to the project and have not been included in a plan or project only to respond to likely effects on a habitats site. Therefore, the measures to address the risk of accidental pollution have been included here in the determination of potential for LSE. Given the integral project measures, a conclusion of no LSE is drawn.	No LSE
		Changes in prey availability	The potential for an effect on prey availability during operation and maintenance is significantly reduced from that during construction and therefore the conclusion of negligible drawn for construction remains appropriate for operation and maintenance.	No LSE
Greater Wash SPA	Red-throated diver	Direct disturbance and displacement	A sensitive species, maintenance vessels may pass close to or through the SPA.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Common scoter	Direct disturbance and displacement	A sensitive species, maintenance vessels may pass close to or through the SPA.	**Potential for LSE**
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low numbers.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Little gull	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low numbers, but to be assessed as a precautionary measure.	**Potential for LSE**
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Sandwich tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
Flamborough & Filey Coast SPA	Fulmar	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Gannet	Direct disturbance and displacement	Not sensitive to operation and maintenance activities, but known to avoid array areas once operational.	**Potential for LSE**
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in numbers and proportion fly at Potential Collision Height (PCH).	**Potential for LSE**
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Herring gull	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in numbers and proportion fly at PCH.	**Potential for LSE**
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Kittiwake	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in numbers and proportion fly at PCH.	**Potential for LSE**
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Guillemot	Direct disturbance and displacement	Moderate sensitivity to operation and maintenance activities.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Razorbill	Direct disturbance and displacement	Moderate sensitivity to operation and maintenance activities.	**Potential for LSE**
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Puffin	Direct disturbance and displacement	Moderate sensitivity to operation and maintenance activities.	**Potential for LSE**
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
Humber estuary SPA	Golden plover	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
	Black-tailed godwit	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
	Bar-tailed godwit	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
	Ruff	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
	Shelduck	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
	Dunlin	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
	Knot	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
	Redshank	Risk of collision	Low risk, but species may migrate through array area on twice yearly movements to and from Europe and further afield.	**Potential for LSE**
Coquet Island SPA	Kittiwake	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in numbers and proportion fly at PCH.	**Potential for LSE**
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Arctic tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Common tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Roseate tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Sandwich tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Puffin	Direct disturbance and displacement	Moderate sensitivity to operation and maintenance activities.	**Potential for LSE**
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
Farne Islands SPA	Kittiwake	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in numbers and proportion fly at PCH.	**Potential for LSE**
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Arctic tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Common tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Sandwich tern	Direct disturbance and displacement	Not sensitive to operation and maintenance activities.	No LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	Present in low or zero numbers during migratory period only.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Guillemot	Direct disturbance and displacement	Moderate sensitivity to operation and maintenance activities.	**Potential for LSE**
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE
	Puffin	Direct disturbance and displacement	Moderate sensitivity to operation and maintenance activities.	**Potential for LSE**

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
		Indirect impacts through effects on habitats and prey species	Experience of other OWFs is no LSE.	No LSE
		Risk of collision	A species that flies low to the water.	No LSE
		Barrier effect	Experience of other OWFs is no LSE.	No LSE

For the remaining 27 SPAs that have been screened in it is because they support seabirds as breeding interest features that might pass across Hornsea Four on migration or reside within or adjacent to Hornsea Four in the winter. The approach taken in the Draft RIAA for these sites recognised that through the process of attributing birds detected by survey within and around Hornsea Four to these 27 SPAs the conclusion was that the proportion of birds from those sites was insignificant and that potential LSE can be ruled out with confidence. However, these 27 designated sites and their associated interest features have been screened in, the details of which are presented in Appendix A, form part of a collective assessment within the RIAA to account for any apportioning of any potential effects.

Decommissioning

The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined in the construction phase.

6.2.2 Onshore

6.2.2.1 The assessment and conclusions with regards to potential LSEs on all onshore designated sites and the relevant features identified was initially carried out taking account of the ZOI of potential impacts, location of the European site under consideration and (where known) the distribution of qualifying features within the sites. The approach has been confirmed through the application of IRZs[16] at the request of Natural England, with no change to the screening conclusions resulting. It should be noted that the onshore Order Limits does not overlap with any European or Ramsar site or their IRZ for this type of infrastructure development. The information is presented below in **Table 7**, on a site by site basis.

[16] The Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to: Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts

Table 7: Determination of potential LSE for onshore sites.

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
Construction				
Humber Estuary SPA[17]	Avocet Hen harrier Golden plover Black-tailed godwit Bar-tailed godwit Ruff Marsh harrier Shelduck Dunlin Redshank Red knot	Temporary habitat loss	The site does not physically overlap with Hornsea Four and therefore does not result in loss of habitat, disturbance, damage or fragmentation. The results from the physical process modelling and the ES find that no coastal processes changes will occur, that could be sufficient to reach the Humber Estuary. Therefore no potential for LSE to the supporting habitats of the features.	No LSE
		Temporary disturbance / damage to habitats		No LSE
		Habitat fragmentation or severance		No LSE
		Visual and / or noise disturbance to species	Although it is possible that the species screened in may use habitat within the Hornsea Four ZOI, given the expansive landscape of similar habitat in the project surrounds and immediately adjacent to the SPA site. It is very unlikely that birds will expend large amounts of valuable energy flying over suitable habitat in order to use areas that may be affected by Hornsea Four that are more than 7 km away. Therefore, it is reasonable to conclude that there are no likely significant effects.	No LSE
		Invasive non-native species	The majority of water courses that could be affected by the construction and operation of the onshore elements of Hornsea Four drain to the River Hull and then eventually to the Humber. Construction of the project will involve the storage and handling of small volumes of potentially harmful materials. In the event of accidental pollution of a watercourse, and no mitigating action by Hornsea Four, a small volume of polluting material would need to travel approximately ten to tens of kilometres of watercourse before reaching the Humber Estuary SPA site. A combination of the small volume of material and natural action over the time it takes to travel to the Humber will result in minimal risk of harm to the SPA site. A number of relevant plans have either been submitted with the DCO Application or will be submitted during examination, and will be agreed with relevant the authorities, to address the risk of accidental pollution and the introduction of invasive non-native species (e.g. a CoCP and EMMP). Such plans are considered an integral part of the project, and would be required regardless of HRA matters.	No LSE
		Accidental release of contaminants		No LSE

[17] Intertidal habitats addressed separately in Table 6

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			Taking into account the requirement for such documents, together with the nature of the onshore components of Hornsea Four and distance to the SPA, it is still reasonable to conclude there will be no likely significant effects.	
Humber Estuary Ramsar[18]	Golden plover Dunlin Black-tailed godwit Bar-tailed godwit Redshank Shelduck Red knot	Temporary habitat loss	The site does not physically overlap with Hornsea Four and therefore does not result in loss of habitat, disturbance, damage or fragmentation. The results from the physical process modelling and the ES find that no coastal processes changes will occur, that could be sufficient to reach the Humber Estuary. Therefore no potential for LSE to the supporting habitats of the features.	No LSE
		Temporary disturbance / damage to habitats		No LSE
		Habitat fragmentation or severance		No LSE
		Visual and / or noise disturbance to species	Although it is possible that the species screened in may use habitat within the Hornsea Four ZOI, given the expansive landscape of similar habitat in the project surrounds and immediately adjacent to the Ramsar site. It is very unlikely that birds will expend large amounts of valuable energy flying over suitable habitat in order to use areas that may be affected by Hornsea Four that are more than 7 km away. Therefore, it is reasonable to conclude that there are no likely significant effects.	No LSE
		Invasive non-native species	The majority of water courses that could be affected by the construction and operation of the onshore elements of Hornsea Four drain to the River Hull and then eventually to the Humber.	No LSE
		Accidental release of contaminants	Construction of the project will involve the storage and handling of small volumes of potentially harmful materials. In the event of accidental pollution of a watercourse, and no mitigating action by Hornsea Four, a small volume of polluting material would need to travel approximately ten to tens of kilometres of watercourse before reaching the Humber Ramsar site. A combination of the small volume of material and natural action over the time it takes to travel to the Humber will result in minimal risk of harm to the Ramsar site. However, Hornsea Four will include preventative and contingency mitigation. A number of relevant plans have either been submitted with the DCO Application or will be submitted during examination, and will be agreed with relevant the authorities, to address the risk of accidental pollution (e.g. a CoCP and EMMP); such plans are considered an integral part of the project, and would be required regardless of HRA matters. These plans will also address the risk of introduction of invasive non-native species.	No LSE

[18] Note that Ramsar Criterion 3 (grey seal) and Ramsar Criterion 8 (migratory fish) are addressed in Table 6 above.

Designated Site	Features Screened in	Relevant Effect	Consideration of Potential LSE	Conclusion of Potential LSE
			Taking into account the requirement for the such documents and the nature of the onshore components of Hornsea Four and distance to the SPA, it is reasonable to conclude there will be no likely significant effects.	
Operation and Maintenance				
The likely significant impacts during the operation and maintenance phase are considered similar but less than those outlined in the construction phase due to their smaller extent and shorter duration e.g. repairing a short section of cable.				
Decommissioning				
The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined in the construction phase.				

7 The Screening Process for the Project In-combination

7.1 Overview to In-combination Screening

7.1.1.1 Regulation 63 of the Habitats Regulations includes a requirement for the Competent Authority to consider the need for AA either alone or in-combination with other plans or projects, where these are not directly connected with or necessary to the management of the site. Screening for the project alone is summarised in **Section 6,** with screening for the project in-combination provided here.

7.1.1.2 The legislation does not provide a definition of alone or in-combination. The following list has been applied to Hornsea Four when identifying plans and projects for consideration in-combination (taking account of relevant advice, such as the PINS Advice Note 10, which addresses the HRA process, and PINS Advice Note 17, which addresses Cumulative Effects):

- Permitted ongoing activities;
- Approved or consented plans which have not yet been completed;
- Plans and projects where the application for consent has been submitted but has not yet been approved by the competent authorities; and
- Plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development being assessed and for which sufficient information is available to adequately assess the likelihood of cumulative and in-combination effects.

7.1.1.3 A full review of such plans and projects has been conducted for Hornsea Four, with each individual topic chapter for the ES having undertaken screening of the full list of projects, plans and activities, to identify those relevant to individual receptor groups. The relevant plan/ project screening tables to the receptor groups within the RIAA are presented within the ES chapters as follows:

- **Volume A2, Chapter 2: Benthic and Intertidal Ecology**;
- **Volume A2, Chapter 4: Marine Mammals**;
- **Volume A2, Chapter 5: Offshore and Intertidal Ornithology**;
- **Volume A3, Chapter 3: Ecology and Nature Conservation**; and
- **Volume A2, Chapter 3: Fish and Shellfish Ecology**.

7.1.1.4 No additional plans or projects have been identified through consultation to date.

7.1.1.5 With respect to in-combination effects within the HRA process, the original Screening Report (October 2018 – Orsted, 2018) identified the broad categories of plans and projects to be considered within the RIAA, with the draft RIAA (August 2019) confirming these. The specific plans and projects relevant to individual receptors draw on those identified within the individual ES chapters, as highlighted above. The intention of screening in-combination is to determine, for the plans and projects relevant to each receptor group, which of the designated sites screened in for determination of potential LSE alone may be affected by a spatial and/ or temporal overlap of effect from a relevant plan or project.

7.1.1.6 Further, it is acknowledged that the potential contribution to an AEoI in-combination by Hornsea Four could stem not only from those effects where potential LSE exists in relation to the project alone (as highlighted in **Table 6** and **Table 7** above), but also potentially from a non- significant aspect of the project alone that may become more significant when

considered in-combination. As such, consideration has been given where the potential exists for Hornsea Four, to contribute to potential LSE in-combination, immaterial of whether a potential LSE alone applies or not.

7.1.1.7 The determination of potential LSE in-combination takes into account of the following:

- Level of detail available for project/ plans;
- Potential for an effect-pathway-receptor link;
- Potential for a physical interaction; and
- Potential for temporal interaction.

7.1.1.8 The approach applied to screening in-combination is outlined below in **Section 7.2** (Benthic and Intertidal Ecology), **Section 7.3** (Marine Mammals), **Section 7.4** (Offshore Ornithology) and **Section 7.5** (Onshore Ecology). The overall aim is to determine the plans or projects that may affect the designated sites considered for potential LSE for the project alone.

7.1.1.9 As is typical for an in-combination assessment, for many plans and projects there is uncertainty regarding project design and timeframe but also quantified environmental impacts. For this reason, a tiered approach has been applied to the in-combination assessment, with more detail on this approach provided below. The approach to the in-combination assessment for offshore ornithology follows the advice provided by Natural England (JNCC & Natural England, unpublished, 2013), updated for this report following more recent protocol in current RIAAs submitted to PINS. That advice and updates for this report require that OWF projects should be considered at a finer level of tiering that relates to the stages of their progress through the development / consenting process and the description of this approach is given in **Section 7.4** and **Table 11**.

7.1.1.10 All relevant projects/ plans considered in-combination with Hornsea Four have been allocated into 'Tiers', reflecting their current stage within the planning and development process. This allows the in-combination impact assessment to consider several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each scenario (Tier) in the decision-making process when considering the potential in-combination impact associated with Hornsea Four.

7.1.1.11 The tier structure presented below is in common with the ES chapters as below in **Table 8** (including offshore ornithology at a coarser scale, with the finer scale as described above) and is intended to ensure that there is a clear understanding of the level of confidence in the in-combination screening presented here and subsequent assessment within the RIAA. It is noted that within Tier 1, however, there is significant variability in project certainty between a project in planning but not yet submitted to PINS and a project under construction, specifically as regards the 'final' scheme design and construction programme. Experience from other offshore wind projects over many years indicates that the project as assessed at the point of the DCO Application (in terms of maximum design scenario and the overall construction window) is almost always much greater in terms of impact/timeframe than the final project design and the duration of construction activities at the point of construction – e.g. it is commonly the case that fewer turbines are installed, there are more clearly defined (and usually shorter) construction windows etc. Such disparity in the level of certainty as to the 'final' scheme and level of impact within Tier 1 is considered an important point, particularly in the marine mammal assessment.

Table 8: Description of tiers of other developments considered for in-combination assessment (adopted from PINS Advice Note 17).

Tier 1	Project under construction.
	Permitted applications, whether under the Planning Act 2008 or other regimes, but not yet implemented.
	Submitted applications, whether under the Planning Act 2008 or other regimes, but not yet determined.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted.
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

7.2 Benthic and Intertidal Ecology

7.2.1.1 The initial step to screening for plans and projects in-combination for subtidal and intertidal benthic ecology receptors is to identify those plans and projects located within sufficient proximity to the relevant designated sites (based on a receptor specific screening range). Where plans and projects are identified, these will then be considered further to determine if potential LSE in-combination with Hornsea Four applies.

7.2.1.2 For subtidal and intertidal benthic ecology, the full list of plans and projects identified for cumulative assessment are provided within **Volume A2, Chapter 2: Benthic and Intertidal Ecology.** For the purposes of Screening, these have been filtered, through the use of a Geographical Information System (GIS), to identify those plans and projects located within 16 km of the following designated site (applying the maximum project specific screening range):

- Flamborough Head SAC.

7.2.1.3 The conclusions of that screening are provided in **Table 9**.

Table 9: Summary plans and projects to be considered in-combination in relation to Benthic and Intertidal Ecology[19].

Project/ Plan				Range to Flamborough Head SAC (km)
Development Type	Project	Status	Tier	
Dredge spoil site	Bridlington A	Open	Tier 1	0 km
Offshore windfarm ECC	Dogger Bank A[20]	Consented	Tier 1	1.04 km
Offshore windfarm ECC	Dogger Bank B [21]	Consented	Tier 1	1.04 km

[19] With respect to Hornsea Project One and Hornsea Project Two - these are considered as appropriate for the cumulative assessment within the ES as part of the wider benthic assessment however the projects are both beyond the screening range for the Flamborough Head SAC and are therefore not included in-combination here.
[20] Previously Dogger Bank Creyke Beck A
[21] Previously Dogger Bank Creyke Beck B

7.2.1.4 For the plans and projects highlighted above as being in close proximity to the Flamborough Head SAC, it is considered that there is the potential for LSE in-combination with Hornsea Four. The potential for such an effect will vary, depending on parameters such as the timing of works and the nature of those works, with these to be considered in full in the determination of AEoI.

7.2.1.5 The effects considered in-combination for subtidal and intertidal benthic ecology are the same as those screened in for potential LSE for the project alone in **Table 6.**

7.3 Marine Mammals

7.3.1.1 For marine mammals, screening in-combination has considered those designated sites where the potential for LSE was identified for the project alone. For all other designated sites, the distance is such that there is no pathway for effect from Hornsea Four to reach the designated site boundary and therefore no potential for an in-combination effect. The screening ranges applied for marine mammals in-combination are the same as those applied for the project alone, being 26 km for harbour porpoise (JNCC, 2016), 120 km for harbour seal (SMRU, 2011) and 145 km for grey seal (Thompson et al. 1996), together with consideration of site connectivity in the same manner as screening for the project alone. The ranges (in the context of site connectivity) have been applied in GIS to each of the designated sites highlighted below to identify, from the full list of plans and projects identified for marine mammal cumulative assessment within the ES, those that require further consideration for potential LSE in-combination with Hornsea Four. The screening therefore considers the following sites:

- Southern North Sea SAC (harbour porpoise);
- The Wash and North Norfolk Coast SAC (harbour seal);
- Humber Estuary SAC (grey seal);
- Humber Estuary Ramsar (grey seal);
- Berwickshire and North Northumberland SAC (grey seal);
- Transboundary sites for harbour seal (Doggersbank (Dutch) SAC and Klaverbank SCI); and
- Transboundary sites for grey seal (Doggersbank (Dutch) SAC, and Klaverbank SCI, Bancs des Flandres SCI, Vlaamse Banken SCI, SBZ 1 SCI, SBZ 2 SCI, SBZ 3 SCI, Vlakte van de Raan SCI, Westerschelde & Saeftinghe SCI, Voordelta SCI, Noordzeekustzone SCI, Waddenzee SCI).

7.3.1.2 The effects considered in-combination for marine mammals are the same as those screened in for potential LSE for the project alone in **Table 6**, with the addition of habitat loss during operation and maintenance for the SNS SAC (harbour porpoise) (added in response to comments received during pre-application consultation – see **Table 1**).

7.3.1.3 The majority of the effects screened in are highly temporal in nature (with the exception of habitat loss – considered below) and therefore for an in-combination effect to occur, a measure of temporal overlap is required (with respect to the SNS SAC, that relates also to seasonal overlap). It is widely acknowledged that uncertainty exists around the timeframe for certain projects going forward. Certainty of construction in a defined timescale is highly dependent on the stage a project has reached. Some projects, predominantly those 'proposed' or identified in development plans etc. may or may not actually be taken forward or may change considerably (for example construction window changes, array boundary changes, WTG number changes etc).

7.3.1.4 There is thus a need to build in some consideration of certainty (or uncertainty) with respect to the potential impacts which might arise from such proposals. For example, relevant projects/ plans with consent and (if required) Contract for Difference (CfD) (or similar) are more likely to contribute to an in-combination impact with Hornsea Four (providing effect or spatial pathways exist), whereas projects/ plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors (or may be so delayed that there is no meaningful temporal overlap with Hornsea four).

7.3.1.5 A key part of the response to that uncertainty with respect to the SNS SAC specifically is the provision of an Outline Site Integrity Plan (SIP) (**F2.11: Outline Site Integrity Plan**) to accompany the DCO Application; the document is secured by a Condition in the Deemed Marine Licence (DML). The purpose of the SIP is to provide the required level of certainty that such risk will be managed and addressed going forward (following DCO Application, Examination and up to and including construction), thus ensuring that the conclusions of the RIAA remain valid in any given, future scenario. A SIP condition has been included in the DMLs issued for a number of other offshore wind projects to date. Although the SIP is specific to the SNS SAC, management and/or mitigation of underwater noise for one species (harbour porpoise), it nonetheless has wider benefits for other noise sensitive species.

7.3.1.6 The Outline SIP has been drafted in consultation with Natural England and other members of the EP Marine Mammal Technical Panel, and addresses the following key points:

- Introduction – to provide an overview of what the SIP is, the project and the purpose of the SIP. To include timeframe for review, updates and re-issue of the SIP as construction draws closer;
- Final Design Plan – to enable the relevant points of the final scheme design for Hornsea Four, together with an update to plans and projects in-combination, to be provided and compared to the maximum design scenario assessed here – to clarify any changes in the conclusions on AEoI (alone or in-combination) presented here;
- Updated RIAA – if there is a need for an updated RIAA following any changes to scheme design (alone or in-combination);
- Mitigation Measures – measures to address the risk of injury to be included within the piling-Marine Mammal Mitigation Protocol (MMMP), with measures to address the risk of an exceedance of the thresholds provided within the SIP, drawing on those measures provided in Table 2 of the JNCCs Advice on Activities for the SNS SAC[22] but also the most recent (January 2020) JNCC advice on noise management in harbour porpoise SACs. These include primary mitigation measures (described as 'potential for a reduction or limitation of the disturbance / displacement effects by varying the schedule of piling…Limited spatio-temporal restrictions may be needed') and secondary mitigation measures (described as 'sound dampers, i.e. methods that create a barrier to sound transfer (e.g. bubble curtains) and the use of alternative foundation types');
- Additional Licensing Requirements – to be clear on additional licences e.g. Marine Licence (for example, for UXO clearance) and/ or EPS licence.

7.3.1.7 Drawing on the long list of projects identified by the application of the screening ranges, the potential for LSE in-combination has been determined based on the following (for all effects except the potential for habitat loss within the SNS SAC):

[22] http://archive.jncc.gov.uk/pdf/SNorthSea_ConsAdvice.pdf

- For a plan or project where there is potential for the construction period to have temporal overlap with that of Hornsea Four (i.e. the plan/ or project is identified by 'yes' in terms of construction window overlap) AND the plan/ or project is within the relevant species specific screening range of the designated site (or drawn in via potential site connectivity); and
- For a plan/ or project where there is no potential for temporal overlap with the construction period (i.e. the plan/ or project is identified by 'no' or 'unknown' in terms of construction window overlap), only those designated sites with physical overlap with the plan/ or project are screened in for potential LSE.

7.3.1.8 For the potential habitat loss within the SNS SAC, that assessment in-combination takes account of predicted or known habitat loss as a result of all OWF projects constructed or planned within (or partially within) the SNS SAC following initial site proposal in 2015. Such habitat loss may result from the physical presence of turbines or other infrastructure (water column and footprint) and cable protection.

7.3.1.9 The differentiation between construction period and operation and maintenance period impacts is made here for marine mammals, in light of the typical scale of effects that may occur during construction compared to those during operation and maintenance (as evidenced by **Volume A2, Chapter 4: Marine Mammals**).

7.3.1.10 It is acknowledged that other activities have the potential to contribute to an in-combination effect, specifically with regard to underwater noise. Previous assessments within the SNS SAC (e.g. the recent applications made for Hornsea Three) have included consideration of seismic survey associated with oil and gas activity, together with UXO detonations. Where planned seismic survey is known in association with the plans and projects identified in **Table 10**. These will be screened in for assessment. Given the timeframes involved (with offshore construction works at Hornsea Four due to start in 2024 at the earliest, albeit potentially preceded from 2023 by geophysical survey and/or UXO clearance), the available information regarding planned oil and gas works[23] currently extends to 2021 only (website accessed April 2020) and therefore does not cover the required period, with no certainty regarding what or where further applications (if any) would come forward in the relevant timeframe. It is therefore not possible to include such oil and gas works here.

7.3.1.11 Similarly, as regards UXO clearance, where any planned works associated with projects screened in are known, these will be included within the assessment. As regards UXO clearance more widely, previous projects have considered ongoing UXO clearance, with OSPAR data providing a comprehensive source of historic information[24].

7.3.1.12 **B2.2 Report to Inform Appropriate Assessment** only takes account (and should only take account) of planned/consented works within the licensing process. It is not considered appropriate to undertake a speculative in-combination assessment in HRA terms based on historic activity for either oil and gas works or UXO clearance. It is therefore considered appropriate within the RIAA for Hornsea Four to limit the in-combination assessment to works known to be occurring and not based on an assumption of past activity continuing. In any case, any activity that would be included within an in-combination assessment (but for which no information is as yet in the public domain) would be expected to undertake the HRA process in its own right and would therefore be the subject of assessment at that point,

[23] Sourced from https://itportal.beis.gov.uk/eng/fox/live/PETS_EXTERNAL_PUBLICATION/main
[24] Information contained https://www.ospar.org/work-areas/eiha/munitions and data held http://odims.ospar.org/odims_data_files/

including consideration in combination with Hornsea Four. Finally, the delivery of the Outline SIP with the DCO Application for Hornsea Four with respect to the SNS SAC provides certainty that the in-combination assessment will be revisited on a defined timeframe, with additional plans/projects (or if necessary, the relevant project parameters) to be amended/included at that point as relevant. The process provides certainty in the in-combination screening process for marine mammals.

7.3.1.13 **Table 10** summarises plans and projects considered for screening in-combination for marine mammals (excluding those included for habitat loss within the SNS SAC in-combination), including comment on potential for temporal overlap with offshore construction and an assigned tier. Where that plan or project lies within the relevant screening range of a site screened in for potential LSE for marine mammals alone, GIS has again been used to determine the range between the plan or project and that designated site. Where the range exceeds the relevant screening range, the cell is greyed out (unless clear site connectivity is apparent). Where the range is within the relevant screening range, this is acknowledged by 'yes'.

Table 10: Summary of plans and projects screened in for the marine mammal in-combination assessment.

Project	Tier	Relevant Construction Window[25]	Designated Site																
			Southern North Sea SAC	Wash and North Norfolk SAC	Humber Estuary SAC	Humber Estuary Ramsar	Berwickshire & North Northumberland Coast SAC	Doggersbank (Dutch) SAC	Klaverbank SCI	Bancs des Flandres SAC	Vlaamse Banken SAC	SBZ 1 SAC	SBZ 2 SAC	SBZ 3 SAC	Vlakte van de Raan SAC	Westerschelde & Saeftinghe SAC	Voordelta SAC	Noordzeekustzone SAC	Waddenzee SAC
Thanet Extension	1	Piling window until summer 2023	Yes							Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
East Anglia Three	1	Piling window 2021-2023	Yes	Yes					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dogger Bank B	1	Piling window summer 2023-winter 2023/24	Yes					Yes	Yes										
Dogger Bank C	1	Piling window summer 2023-winter 2023/24	Yes					Yes	Yes										
Norfolk Vanguard	1	Piling windows Q2 2024-Q1 2026 and Q2 2027-Q1 2028	Yes	Yes					Yes		Yes				Yes	Yes	Yes	Yes	Yes
Hornsea Project Three	1	Piling windows 2022/23 and 2029/30	Yes	Yes	Yes	Yes		Yes	Yes									Yes	
Norfolk Boreas	1	UXO scheduled Q3 2025-Q1 2026 and piling Q2 2026-Q32027	Yes	Yes				Yes	Yes								Yes	Yes	Yes
East Anglia One North	1	Piling window 2026-2028	Yes	Yes						Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
East Anglia Two	1	Piling window 2025-2027	Yes	Yes						Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
EnBW He Dreiht	1	Commissioning 2025																Yes	Yes

[25] Construction window relates to relevant activity only - typically piling window but where notified other activities too (e.g. UXO clearance). Information sourced from project literature (e.g. RIAA) or project website depending on project status. Updates have taken place to these construction windows since PEIR (with a number of projects no longer having temporal overlap or construction having been completed), a reflection of project progress and development. It should be noted that any remaining uncertainty in construction windows in-combination is addressed through the Outline SIP.

7.4 Offshore Ornithology

7.4.1.1 In assessing the potential in-combination impacts of Hornsea Four against offshore ornithology receptors, account is taken in the assessment process of the fact that some projects, such as those put forward by developers in to the consenting process, may not be consented or built out as described within their ES or the final DCO where this has been granted by the Secretary of State. There is therefore a need to build in some consideration of certainty (or uncertainty) with respect to the potential impacts which might arise from such proposed but as yet unconsented projects. For example, a comparison with regards certainty of effects can be made between those projects that are under construction and those proposals not yet approved where there is, in this second example, much less certainty about the scale of an impact, as some may not achieve approval or may not ultimately be built due to other factors (or will be built out at a scale less than the maximum described in the scoping report or ES.

7.4.1.2 To account for this in the offshore ornithology in-combination assessment all projects considered alongside Hornsea Four have been allocated into 'tiers' and 'sub-tiers' reflecting their current stage within the planning and development process. This allows the in-combination impact assessment to present several future development scenarios, each with a differing potential for being ultimately built out. This approach also allows appropriate weight to be given to each scenario (tier) when considering the potential in-combination impact. The proposed tier structure is intended to ensure that there is a clear understanding of the level of confidence in the in-combination assessment for Hornsea Four RIAA. The arrangement of 'tiers' and 'sub-tiers' also reflects the responses received from Natural England when consulted about this issue. An explanation of each tier is included in **Table 11** below.

Table 11: Description of tiers and sub-tiers considered in the offshore ornithology in-combination assessment.

Tier	Sub-Tier	Description of stage of development of project
Tier 1	Tier 1a	Project in operation
	Tier 1b	Project under construction
	Tier 1c	Consented project, whether under the Planning Act 2008 or other regimes, but not yet implemented
	Tier 1d	Consent application submitted for the project, whether under the Planning Act 2008 or other regimes, but not yet determined
Tier 2	Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted and/or the developer has released details in, for instance, a PEIR but no consent application has been made
Tier 3	Tier 3a	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted
	Tier 3b	Project identified in a Development Plan or emerging Development Plans noting that any information on the project will be limited
	Tier 3c	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward

7.4.1.3 The plans and projects identified as relevant to the in-combination assessment of impacts to offshore ornithology receptors are based on an initial screening exercise undertaken on a long list and published in the ES (see **Volume A4, Annex 5.3: Offshore Cumulative Effects**).

A consideration of effect-receptor pathways, data confidence and temporal and spatial scales has been made in order to select projects that will be included in the detailed in-combination assessment.

7.4.1.4 Where planned and operational projects were screened out of further consideration for potential in-combination effects this was because there was not an identified potential impact-receptor-pathway that occurred during construction, operation and maintenance or decommissioning for the following reasons:

- There is no potential impact-receptor-pathway due to the project being outside of the North Sea;
- There is no temporal overlap between projects / activities;
- The project / activity is ongoing and is part of the current baseline; and
- There is no data available or there is low confidence in the data.

7.4.1.5 The projects screened out included UK offshore wind farms evaluated as having low data confidence on the basis that no construction or operational period is known and / or it is a UK offshore wind farm outside of the North Sea, though the migratory and non-breeding distribution of some bird species may require consideration of UK offshore wind farms within the English Channel also. Other projects from non-offshore energy projects screened out included commercial fisheries as well as shipping and navigations, which due to already being present were evaluated as being part of the offshore baseline.

7.4.1.6 The specific projects screened into the in-combination assessment for offshore ornithology receptors, which includes only offshore wind farm projects, as well as the tiers (and sub-tiers) into which they have been allocated are presented in **Table 12** below.

Table 12: Projects screened into the offshore ornithology in-combination assessment.

Tier	Long List Project Name	Project Details/ Relevant dates (cf. Hornsea Four Construction Period Of 2026-28)[26]	Distance to Hornsea Four Array	Distance to Hornsea Four ECC	Distance to Hornsea Four HVAC Booster Station Search Area	Reason for Project Inclusion in Hornsea Four In-Combination Assessment
1a	Beatrice	Operational	>500.00	489.40	497.77	Potential temporal overlap of operation with Hornsea Four
1a	Beatrice Demonstrator	Operational	497.86	484.58	493.60	Potential temporal overlap of operation with Hornsea Four
1a	Blyth Demonstration Site	Operational	174.71	139.88	155.81	Potential temporal overlap of operation with Hornsea Four
1a	Dudgeon	Operational	70.83	72.72	101.65	Potential temporal overlap of operation with Hornsea Four
1a	EOWDC	Operational	379.67	369.14	376.52	Potential temporal overlap of operation with Hornsea Four
1a	Galloper	Operational	219.97	223.34	251.02	Potential temporal overlap of operation with Hornsea Four
1a	Greater Gabbard	Operational	221.71	224.96	251.61	Potential temporal overlap of operation with Hornsea Four
1a	Gunfleet Sands	Operational	244.85	246.51	261.47	Potential temporal overlap of operation with Hornsea Four
1a	Humber Gateway	Operational	66.37	40.96	42.02	Potential temporal overlap of operation with Hornsea Four
1a	Hywind 2 Demonstration	Operational	381.06	379.01	383.20	Potential temporal overlap of operation with Hornsea Four
1a	Lincs, Lynn & Inner Dowsing[27]	Operational	96.62	83.65	89.25	Potential temporal overlap of operation with Hornsea Four
1a	Kentish Flats I	Operational	276.33	277.51	290.21	Potential temporal overlap of operation with Hornsea Four

[26] Note that construction window here relates to overall window and not piling window as in Table 10.
[27] Values specified are for Lincs only. Inner Dowsing values are 101.69, 88.07 & 92.99. Lynn values are 107.20, 94.96 & 100.34.

Tier	Long List Project Name	Project Details/ Relevant dates (cf. Hornsea Four Construction Period Of 2026-28)[26]	Distance to Hornsea Four Array	Distance to Hornsea Four ECC	Distance to Hornsea Four HVAC Booster Station Search Area	Reason for Project Inclusion in Hornsea Four In-Combination Assessment
1a	Kentish Flats II	Operational	277.24	278.22	290.25	Potential temporal overlap of operation with Hornsea Four
1a	London Array	Operational	249.99	252.41	270.96	Potential temporal overlap of operation with Hornsea Four
1a	Race Bank	Operational	78.83	72.40	82.66	Potential temporal overlap of operation with Hornsea Four
1a	Scroby Sands	Operational	144.84	148.15	178.47	Potential temporal overlap of operation with Hornsea Four
1a	Sheringham Shoal	Operational	89.51	88.65	106.44	Potential temporal overlap of operation with Hornsea Four
1a	Teesside	Operational	136.72	86.37	108.47	Potential temporal overlap of operation with Hornsea Four
1a	Thanet	Operational	277.04	279.59	298.70	Potential temporal overlap of operation with Hornsea Four
1a	Westermost Rough	Operational	62.75	21.63	25.40	Potential temporal overlap of operation with Hornsea Four
1b	East Anglia One	Under Construction	194.09	198.56	236.63	Potential temporal overlap of construction with Hornsea Four
1b	Hornsea Project One	Under Construction	5.08	21.32	82.50	Potential temporal overlap of construction with Hornsea Four
1b	Hornsea Project Two	Under Construction	0.00	5.84	66.43	Potential temporal overlap of operation with Hornsea Four
1b	Kincardine	Under Construction	353.00	343.00	350.00	Potential temporal overlap of construction with Hornsea Four
1b	Moray East	Under Construction	494.29	484.40	491.93	Potential temporal overlap of operation with Hornsea Four
1b	Triton Knoll	Under construction	56.99	49.70	60.93	Potential temporal overlap of operation with Hornsea Four

Tier	Long List Project Name	Project Details/ Relevant dates (cf. Hornsea Four Construction Period Of 2026-28)[26]	Distance to Hornsea Four Array	Distance to Hornsea Four ECC	Distance to Hornsea Four HVAC Booster Station Search Area	Reason for Project Inclusion in Hornsea Four In-Combination Assessment
1c	Dogger Bank A	Consented– construction expected 2021-2024	65.86	83.65	107.52	Potential temporal overlap of operation with Hornsea Four
1c	Dogger Bank B	Consented– construction expected 2021-2024	76.14	94.18	111.26	Potential temporal overlap of operation with Hornsea Four
1c	Dogger Bank C	Consented - construction expected 2023-2026	120.86	135.62	170.16	Potential temporal overlap of construction with Hornsea Four
1c	East Anglia Three	Consented - construction expected 2021-2023	157.84	164.73	211.81	Potential temporal overlap of operation with Hornsea Four
1c	Inch Cape	Consented- construction expected 2020-2021	311.89	291.43	303.06	Potential temporal overlap of operation with Hornsea Four
1c	Moray West	Consented	490.62	478.40	486.94	Potential temporal overlap of operation with Hornsea Four
1a	Methil	Consented	332.20	297.23	315.03	Potential temporal overlap of construction with Hornsea Four
1c	Neart na Gaoithe	Consented- construction expected 2020-2023	296.16	271.32	284.45	Potential temporal overlap of operation with Hornsea Four
1c	Seagreen Alpha	Consented	312.11	295.09	304.91	Potential temporal overlap of operation with Hornsea Four
1c	Seagreen Bravo	Consented	312.11	295.09	304.91	Potential temporal overlap of operation with Hornsea Four
1c	Sofia	Consented - construction expected 2023-2026	97.75	113.14	143.26	Potential temporal overlap of construction with Hornsea Four
1d	Hornsea Three	In planning – construction expected 2024-2030	36.34	55.47	116.10	Potential temporal overlap of construction with Hornsea Four
1d	Norfolk Boreas	In planning construction expected 2023-2025	123.34	133.68	187.40	Potential temporal overlap of construction with Hornsea Four
1d	Norfolk Vanguard	In planning construction expected 2024-2028	123.39	130.86	175.94	Potential temporal overlap of construction with Hornsea Four

Tier	Long List Project Name	Project Details/ Relevant dates (cf. Hornsea Four Construction Period Of 2026-28)[26]	Distance to Hornsea Four Array	Distance to Hornsea Four ECC	Distance to Hornsea Four HVAC Booster Station Search Area	Reason for Project Inclusion in Hornsea Four In-Combination Assessment
1d	Thanet Extension	In planning	275.87	278.37	279.02	Potential temporal overlap of construction with Hornsea Four
1d	East Anglia One North	Pre-examination construction expected 2025-2028	178.58	182.88	219.69	Potential temporal overlap of construction with Hornsea Four
1d	East Anglia Two	Pre-examination construction expected 2026-2029	187.28	191.13	224.09	Potential temporal overlap of construction with Hornsea Four
2	Sheringham Shoal and Dudgeon Extensions[28]	In planning	65.00	68.00	93.00	Potential temporal overlap of construction with Hornsea Four
3b	Galloper Extension	In planning	223.00	227.00	256.00	Potential temporal overlap of construction with Hornsea Four
3b	Greater Gabbard Extension	In planning	218.00	222.00	249.00	Potential temporal overlap of construction with Hornsea Four
3b	Rampion Extension	In planning	>400.00	>400.00	>400.00	Potential temporal overlap of construction with Hornsea Four

[28] Projects currently combined on websites

7.4.1.7 The key risks in terms of potential in-combination effect on offshore ornithology receptors relates to the combined impacts on breeding and non-breeding seabirds (on passage or over-wintering) of displacement during the construction, operational and maintenance and decommissioning phases and mortality resultant from collision in the operational phase.

7.4.1.8 In relation to those breeding and non-breeding seabirds, for there to be an in-combination effect to be assessed it is considered that an effect arising from Hornsea Four assessed alone has to be of sufficient magnitude to make a material contribution to an in-combination assessment at the wider, usually North Sea, scale. For those breeding and non-breeding seabirds the screening of Hornsea Four alone is provided in **Section 6**. That assessment of the project alone defines where potential for an LSE has been identified, but it does not identify what is the magnitude of the effect. That definition of the magnitude is provided in the more detailed, quantitative assessments of potential collision risk and potential displacement. Those more detailed assessments form part of the RIAA. Those more detailed assessments found that for the following species there is a contribution from Hornsea Four alone that was considered to be a material contribution, and in all cases this related only to the birds that could be attributed back to a European site close to Hornsea Four: Little gull and Greater Wash SPA; gannet, kittiwake, guillemot, razorbill and puffin and Flamborough and Filey Coast SPA. For all other species and European sites, Hornsea Four does not make a material contribution to a potential in-combination effect.

7.4.1.9 It is not relevant to this assessment of the proposed Hornsea Four that another offshore wind farm developer has carried out an in-combination assessment of the same seabird species from the same European site since that decision was made based upon the magnitude of its contribution to the potential in-combination effect and not that of Hornsea Four.

7.4.1.10 Additional consideration was provided to review potential in-combination effects on non-breeding waterbird species from European and Ramsar sites. Non-breeding waterbirds from these sites may pass through or visit the Hornsea Four array area during the non-breeding season and were considered for assessment, but due to a thinning of the potential risk when considering birds from multiple designated sites the relative impact on a specific SPA or Ramsar population is considered to be inconsequential if any potential mortalities were apportioned between those sites. Therefore, no migratory non-breeding waterbird species or the sites for which they are designated were screened in from the in-combination assessment for Hornsea Four.

7.4.1.11 The specific European sites with offshore ornithology interest features screened into the in-combination assessment are presented in **Table 13** below. **Table 13** presents only the particular interest features of a site that have been screened in and does not list all those particular interest features that are screened out [that information is contained in **Appendix A.**

Table 13: European sites with offshore ornithology interest features screened into the in-combination assessment.

Designated Site	Feature(s) screened in*	Potential for Likely Significant Effect		
		Construction	O&M	Decommissioning
Greater Wash SPA	Little gull	-	Risk of Collision	-
Flamborough and Filey Coast SPA	Gannet Kittiwake	-	Risk of Collision	-
	Guillemot Razorbill Puffin	-	Disturbance and displacement	-

7.5 Onshore Ecology

7.5.1.1 The conclusion of no LSE alone for onshore ecology applies equally to in-combination, with the caveat of the air quality/nitrogen deposition and the Humber Estuary saltmarsh (addressed in the benthic ecology section). The conclusion is confirmed through the application of the study areas that have been identified for in-combination effects for onshore ecology, which are in line with the study areas for the project alone and apply a maximum 5 km buffer of the onshore elements of Hornsea Four, taking into consideration the Natural England IRZs. This is in order to account for highly mobile bat and bird species. For other protected species and habitats, a maximum extent of impact is considered to be 2 km, taking into consideration potential pathways (i.e. connecting habitats between projects) as well as temporal overlap on shared habitat resources.

7.6 Migratory Fish

7.6.1.1 No potential for LSE alone has been identified and therefore no potential for LSE in-combination has been identified.

7.7 Summary of the Potential for Likely Significant Effect (LSE)

7.7.1.1 A summary of the European sites, features and potential impacts for which a potential for a LSE has been identified as a result of Hornsea Four alone or in combination with other plans or projects, is given in **Table 14** (offshore and intertidal). No potential for LSE has been identified for onshore sites (and relevant features). The table excludes all features screened out and excludes all those effects for which no LSE has been identified.

Table 14: European sites and features for which potential LSEs have been identified (offshore and intertidal) for the project alone or in-combination.

Site	Feature	Project Phase	Effect
Southern North Sea SAC	Harbour porpoise	Construction	Increase in underwater noise
Southern North Sea SAC	Harbour porpoise	Construction	Vessel disturbance
Southern North Sea SAC	Harbour porpoise	Construction	Collision risk
Southern North Sea SAC	Harbour porpoise	Operation and Maintenance	Underwater noise
Southern North Sea SAC	Harbour porpoise	Operation and Maintenance	Vessel disturbance
Southern North Sea SAC	Harbour porpoise	Operation and Maintenance	Collision risk
Southern North Sea SAC	Harbour porpoise	Operation and Maintenance	Long term physical loss of habitat (in-combination only)
Flamborough Head SAC	Reefs Submerged and partially submerged caves (cable corridor only)	Construction	Temporary increases in suspended sediments / smothering
Flamborough Head SAC	Reefs Submerged and partially submerged caves	Construction	Invasive non-native species
Flamborough Head SAC	Reefs Submerged and partially submerged caves (cable corridor only)	Operation and Maintenance	Temporary increases in suspended sediments / smothering
Flamborough Head SAC	Reefs	Operation and Maintenance	Changes to physical processes
Flamborough Head SAC	Reefs Submerged and partially submerged caves	Operation and Maintenance	Introduction of hard substrate (invasive non-native species)
The Wash and North Norfolk Coast SAC	Harbour seal	Construction	Increase in underwater noise
The Wash and North Norfolk Coast SAC	Harbour seal	Construction	Vessel disturbance
The Wash and North Norfolk Coast SAC	Harbour seal	Operation and Maintenance	Vessel disturbance
Humber Estuary SAC	Grey seal	Construction	Increase in underwater noise

Site	Feature	Project Phase	Effect
Humber Estuary SAC	Grey seal	Construction	Vessel disturbance
Humber Estuary SAC	Grey seal	Construction	Collision risk
Humber Estuary SAC	Grey seal	Operation and Maintenance	Vessel disturbance
Humber Estuary SAC	Grey seal	Operation and Maintenance	Collision risk
Humber Estuary SAC	Atlantic saltmeadows and Salicornia and other annuals colonizing mud and sand	Construction	Increased nitrogen deposition
Humber Estuary Ramsar	Grey seal	Construction	Increase in underwater noise
Humber Estuary Ramsar	Grey seal	Construction	Vessel disturbance
Humber Estuary Ramsar	Grey seal	Construction	Collision risk
Humber Estuary Ramsar	Grey seal	Operation and Maintenance	Vessel disturbance
Humber Estuary Ramsar	Grey seal	Operation and Maintenance	Collision risk
Humber Estuary Ramsar	Atlantic saltmeadows and Salicornia and other annuals colonizing mud and sand	Construction	Increased nitrogen deposition
Berwickshire and North Northumberland Coast SAC	Grey seal	Construction	Increase in underwater noise
Berwickshire and North Northumberland Coast SAC	Grey seal	Construction	Vessel disturbance
Berwickshire and North Northumberland Coast SAC	Grey seal	Construction	Collision risk
Berwickshire and North Northumberland Coast SAC	Grey seal	Operation and maintenance	Vessel disturbance
Berwickshire and North Northumberland Coast SAC	Grey seal	Operation and maintenance	Collision risk
Transboundary harbour seal sites (2 sites)	Harbour seal	Construction	Increase in underwater noise
Transboundary harbour seal sites (2 sites)	Harbour seal	Construction	Vessel disturbance
Transboundary harbour seal sites (2 sites)	Harbour seal	Operation and Maintenance	Vessel disturbance
Transboundary grey seal sites (12 sites)	Grey seal	Construction	Increase in underwater noise
Transboundary grey seal sites (12 sites)	Grey seal	Construction	Vessel disturbance

Site	Feature	Project Phase	Effect
Transboundary grey seal sites (12 sites)	Grey seal	Operation and Maintenance	Vessel disturbance
Greater Wash SPA	Red-throated diver	Construction	Disturbance and displacement
Greater Wash SPA	Red-throated diver	Operation and maintenance	Disturbance and displacement
Greater Wash SPA	Common scoter	Construction	Disturbance and displacement
Greater Wash SPA	Common scoter	Operation and maintenance	Disturbance and displacement
Greater Wash SPA	Little gull	Operation and maintenance	Risk of collision
Flamborough ad Filey Coast SPA	Gannet	Construction	Disturbance and displacement
Flamborough and Filey Coast SPA	Gannet	Operation and maintenance	Risk of collision
Flamborough and Filey Coast SPA	Gannet	Operation and maintenance	Disturbance and displacement
Flamborough and Filey Coast SPA	Herring gull	Operation and maintenance	Risk of collision
Flamborough and Filey Coast SPA	Kittiwake	Operation and maintenance	Risk of collision
Flamborough and Filey Coast SPA	Guillemot	Construction	Disturbance and displacement
Flamborough and Filey Coast SPA	Guillemot	Operation and maintenance	Disturbance and displacement
Flamborough and Filey Coast SPA	Razorbill	Construction	Disturbance and displacement
Flamborough and Filey Coast SPA	Razorbill	Operation and maintenance	Disturbance and displacement
Flamborough and Filey Coast SPA	Puffin	Construction	Disturbance and displacement
Flamborough and Filey Coast SPA	Puffin	Operation and maintenance	Disturbance and displacement
Humber Estuary SPA	Golden plover	Operation and maintenance	Risk of collision
Humber Estuary SPA	Black-tailed godwit	Operation and maintenance	Risk of collision
Humber Estuary SPA	Bar-tailed godwit	Operation and maintenance	Risk of collision
Humber Estuary SPA	Ruff	Operation and maintenance	Risk of collision
Humber Estuary SPA	Shelduck	Operation and maintenance	Risk of collision
Humber Estuary SPA	Dunlin	Operation and maintenance	Risk of collision

Site	Feature	Project Phase	Effect
Humber Estuary SPA	Knot	Operation and maintenance	Risk of collision
Humber Estuary SPA	Redshank	Operation and maintenance	Risk of collision
Humber Estuary SPA	Saltmarsh (as a supporting habitat of designated species)	Construction	Increased nitrogen deposition
Coquet Island SPA	Kittiwake	Operation and maintenance	Risk of collision
Coquet Island SPA	Puffin	Construction	Disturbance and displacement
Coquet Island SPA	Puffin	Operation and maintenance	Disturbance and displacement
Farne Islands SPA	Kittiwake	Operation and maintenance	Risk of collision
Farne Islands SPA	Guillemot	Construction	Disturbance and displacement
Farne Islands SPA	Guillemot	Operation and maintenance	Disturbance and displacement
Farne Islands SPA	Puffin	Construction	Disturbance and displacement
Farne Islands SPA	Puffin	Operation and maintenance	Disturbance and displacement

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Appendix A – Site Selection

1 Site Selection Process

1.1.1.1 The site selection process is based on five 'site selection' criteria built around the sensitivities, ecological characteristics and specific behaviours of likely receptors and the type of European site that could be affected. The criteria consolidate the parameters for potential (and ecologically viable) connectivity between the project and mobile receptors and provides a method that applies to receptor groups, both on and offshore.

1.1.1.2 Links (theoretical connectivity) to European sites for mobile species that use or traverse the project's direct sphere of influence (direct-effect footprint) are typically defined by species' foraging ranges, distribution or migratory corridors.

1.1.1.3 The criteria used to identify European sites are set-out in **Table A 1**.

1.1.1.4 It is recognised that impacts could result via impacts to undesignated supporting habitat or resources present within the project's sphere of influence. The potential for such effects is informed by wider project assessment as presented at PEIR and within the ES, together with the consultation process.

Table A 1: Criteria used for initial site selection.

1A	European or Ramsar site with physical overlap with Hornsea Four Order Limits.
1B	European or Ramsar site with supporting, or functionally linked habitat located within the Hornsea Four Order Limits.
2	European or Ramsar site with qualifying mobile species whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) may interact with potential effects from Hornsea Four.
3	European or Ramsar site with a qualifying feature located within the potential range of effect (the ZOI) associated with Hornsea Four.

1.1.1.5 The initial site selection process identified sites where, based purely on proximity, further consideration is needed of the potential for Hornsea Four to result in LSE. The conclusions on the site selection process, together with the potential impacts associated with the construction, operation and maintenance and decommissioning of Hornsea Four, are presented in **Section 5** of the main body of the text. Consideration is then given to both the feature(s) of the sites highlighted during site selection (including the conservation objectives) and the potential effects associated with Hornsea Four to enable determination of the potential for LSE to be made in **Section 6**.

1.2 Initial Site Selection

1.2.1.1 The following section lists those sites (and the relevant features) identified through one or more of the site selection criteria listed in **Table A 1** above. The results from each criterion are presented as follows:

- Criteria 1: depicted in **Figure A 1**;
- Criteria 2: depicted in **Figure A 2** and summarised in **Table A 1**;
- Criteria 3: depicted in **Figure A 3** and summarised in **Table A 4**; and
- Criteria 4: summarised in **Table A 5**.

1.2.1.2 The citations used during screening of the criteria to identify the features associated with individual sites are referenced in **Appendix B** of **B2.2, Annex 1: Habitats Regulations Assessment Screening Report**.

1.3 Criteria 1

1.3.1.1 Criteria 1 has been subdivided, with 1A effectively identifying those designated sites which have physical overlap with Hornsea Four. Following the boundary changes since the original screening report was issued, Hornsea Four now only has overlap with a single relevant site, the Southern North Sea SAC (depicted in **Figure A 1**).

1.3.1.2 There are no European or Ramsar sites within the Hornsea Four onshore Order Limits.

1.3.1.3 The sub-category of criterion 1 (criteria 1B) relates to European or Ramsar sites for which there is then a physical overlap with the Hornsea Four Order Limits and functionally linked habitat. The existence of any areas of 'functionally linked habitat' cannot be determined from standard published sources such as MAGIC and a case by case approach has to be taken. Two cases of potential overlap with functionally linked habitat are considered. The first relates to seabird breeding colonies and marine waters and the second to birds of wetland and adjacent habitats using adjacent habitats outside of the European or Ramsar site.

1.3.1.4 With respect to breeding seabirds that are interest features of a European or Ramsar site and use marine waters adjacent to the breeding colony for functions such as preening, bathing and courtship (McSorley et al. 2003), the Flamborough & Filey Coast SPA already provides for such habitat uses by the fact that the boundary extends 2 km into marine waters. By virtue of the SPA boundary extending out from the sea cliff the habitat that is used for such functions has already been included within the Flamborough & Filey Coast SPA. There is no overlap between this SPA and the Hornsea Four boundary and this site is not screened in on criterion 1B (note that this is a change from the initial screening outcome set out in the original October 2018 Screening Report with the boundary of Hornsea Four having been altered since then). No other European or Ramsar sites with a breeding seabird interest are sufficiently close to be screened in on the basis of overlap with 'functionally linked habitat'.

1.3.1.5 With respect to waterbirds using intertidal wetlands that are European or Ramsar sites, these birds can use habitat outside the boundary of the site for functions such as feeding and roosting. Examples include geese that roost within an estuary but fly out to feed on agricultural land; waders that feed within an estuary but fly out to roost on agricultural land; and waders that roost within an estuary but fly out to feed on agricultural land. The nearest European or Ramsar site with intertidal wetlands is the Humber Estuary SPA and Humber Estuary Ramsar site. Studies and reviews of the use of habitats outside of the site boundary have been undertaken for all waterbirds (Allen et al. 2003), waterbird foraging and roost sites (Mander et al. 2006), roost use by waterbirds (Cutts et al. 2015) and habitat use by golden plover (*Pluvialis apricaria*), lapwing (*Vanellus vanellus*) and curlew (*Numenius arquata*) (Bériro & Goddall 2007). Those studies identify that there will be no overlap between habitats used by the waterbird interest features of the Humber Estuary SPA / Ramsar site (whether specifically identified as 'functionally linked habitat' or not) and Hornsea Four. No other European or Ramsar sites with intertidal wetland habitat and waterbird interest features are sufficiently close to be screened in on the basis of overlap with 'functionally

linked habitat'. Specific to onshore ecology, the project boundary is at least 7 km from the intertidal wetland area, so this will not affect hen harrier (*Circus cyaneus*) that may utilise for foraging the habitat adjacent to the Humber Estuary SPA that could be functionally linked. Therefore, no designated sites are identified under Criteria 1B.

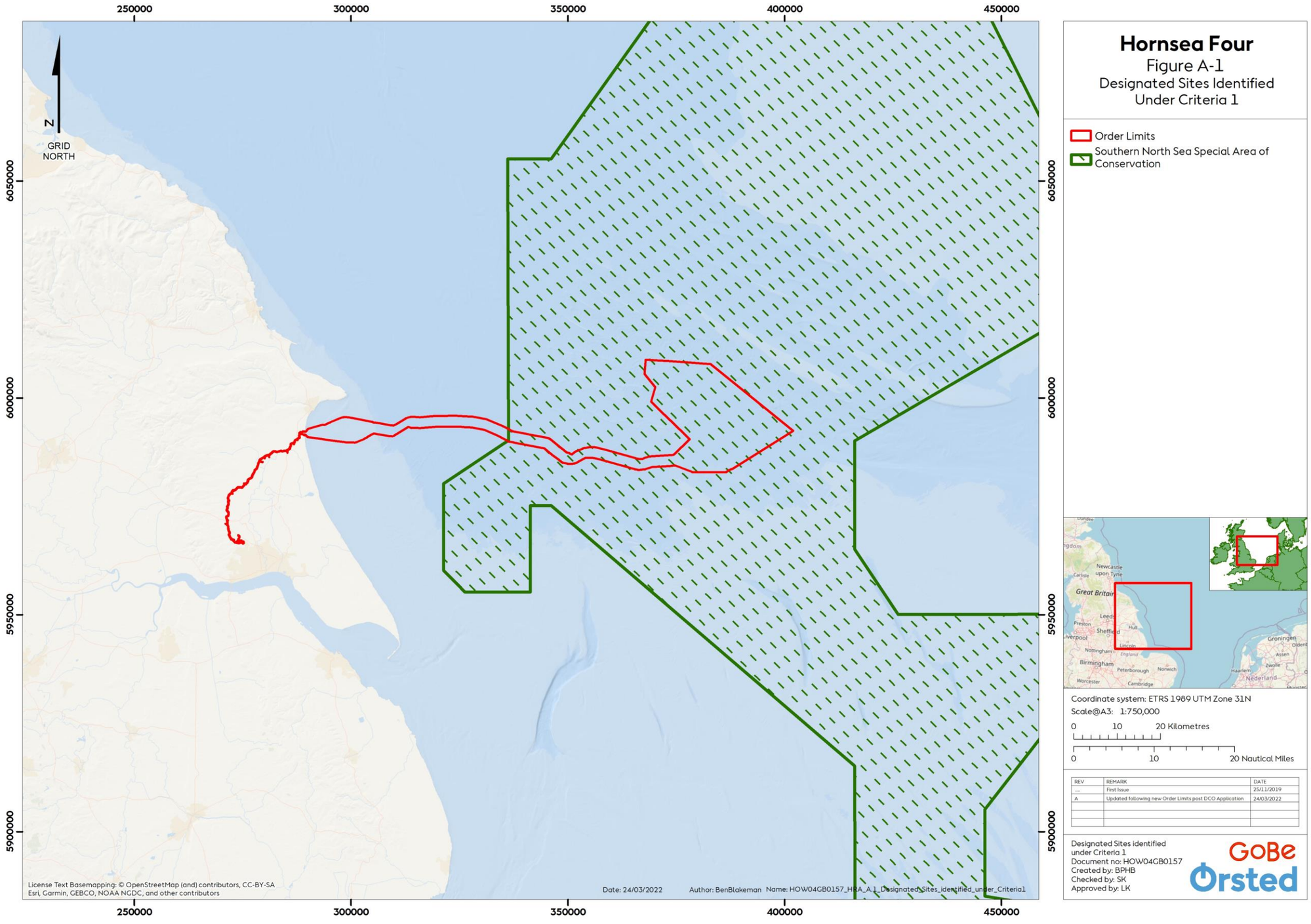

Figure A 1: Designated sites identified under Criteria 1.

1.4 Criteria 2

1.4.1.1 Criteria 2 is focused on identifying European and Ramsar sites within the relevant receptor spatial extents or range from Hornsea Four. The relevant receptors are identified in **Table A 2** below including the relevant spatial extent or range.

1.4.1.2 The issue of potential site connectivity has been raised with respect to harbour seal and grey seal during the Evidence Plan process (Table 1 of **B2.2, Annex 1: Habitats Regulations Assessment Screening Report**). The original Screening Report (October 2018) applied ranges for both harbour and grey seal, based on published foraging ranges, for the initial site selection process. Subsequent discussions during the Evidence Plan Process and following the availability of **Volume A5, Annex 4.1: Marine Mammal Technical Report**, additional sites have now been identified and included here as a result of potential site connectivity.

1.4.1.3 For offshore ornithology receptors the application of this criterion is to screen sites only with receptors that are interest features in the breeding season since it is only at that part of the year that a numeric range can be stated based on foraging distances from the designated site. A precautionary approach was applied to any species with a foraging range that fell just short of Hornsea Four, for instance herring gull from Flamborough and Filey Coast SPA that was screened in at this stage.

1.4.1.4 The screening of ornithology receptors that might pass through Hornsea Four on migration or use Hornsea Four over the winter is based on the application of Criteria 4.

Table A 2: Receptor ranges and/or spatial extents applied to identify sites.

Receptor	Range	Reference
Benthic (subtidal and intertidal) habitats	16 km	Original screening range applied for consistency throughout. Drew on sediment plume modelling from previous Hornsea projects. All Hornsea Four specific modelling and technical reporting confirms that potential for change in coastal processes, sediment transport and sediment plume would be within the 16 km range (and likely to be less) and therefore the 16 km range remains appropriate as a precautionary measure.
Cetaceans	Harbour porpoise = North Sea Management Unit. Bottlenose dolphin = Greater North Sea and Coastal East Scotland Management Unit	IAMMWG 2015
Harbour seal	120 km No wider site connectivity suggested by the Marine Mammal Technical Report (Annex 04.1).	SMRU 2011
Grey seal	Original range: 145 km Refined following availability of the **Volume A5, Annex 4.1: Marine Mammal Technical Report** to include sites for which potential site	Thompson et al. 1996 **Volume A5, Annex 4.1: Marine Mammal Technical Report**

Receptor	Range	Reference
	connectivity beyond the range applied has been identified.	
Migratory fish	100 km	This is a precautionary value used during the Hornsea Three HRA Screening report. To remain precautionary and continue consistency across projects within the Hornsea Zone, this range has been used for Hornsea Four. The range refers to the distance between the project boundary and the mouth of the estuary (as the point of access to the SAC).
Fulmar (breeding season)	542 km (mean max foraging)	Woodward et al. 2019
Gannet (breeding season)	315 km (mean max foraging) FFC SPA specific max: 404 km	Woodward et al. 2019
Shag (*Phalacrocorax aristotelis*) (breeding season)	13.2 km (mean max foraging)	Woodward et al. 2019
Cormorant (*Phalacrocorax carbo*) (breeding season)	25.6 km (mean max foraging)	Woodward et al. 2019
Black-headed gull (breeding season)	18.5 km (mean max foraging)	Woodward et al. 2019
Common gull *(Larus canus)* (breeding season)	50.0 km (mean max foraging)	Woodward et al. 2019
Herring gull (breeding season)	58.8 km (mean max foraging)	Woodward et al. 2019
Lesser Black-backed gull (breeding season)	127 km (mean max foraging)	Woodward et al. 2019
Kittiwake (breeding season)	156 km (mean max foraging) FFC SPA specific max: 317 km FI SPA specific max: 111 km	Woodward et al. 2019
Sandwich tern (breeding season)	34.3 km (mean max foraging)	Woodward et al. 2019
Roseate tern (breeding season)	12.6 km (mean max foraging)	Woodward et al. 2019
Common tern (breeding season)	18.0 km (mean max foraging)	Woodward et al. 2019
Arctic tern (breeding season)	25.7 km (mean max foraging)	Woodward et al. 2019
Little tern (breeding season)	5.0 km (mean max foraging)	Woodward et al. 2019
Guillemot (breeding season)	73.2 km (mean max foraging)	Woodward et al. 2019
Razorbill (breeding season)	88.7 km (mean max foraging)	Woodward et al. 2019
Puffin (breeding season)	137 km (mean max foraging)	Woodward et al. 2019

Receptor	Range	Reference
Eurasian otter	The closest European site designated for otter is 24 km west of the onshore boundary - Lower Derwent Valley SAC. This site's impact risk zone[29] does not overlap with Hornsea Four. Therefore, no sites designated for otter will be considered in this assessment under this criterion[30].	
Bat	The closest European site designated for Annex II bat species is 161 km south of the onshore boundary in East Anglia – Paston Great Barn SAC. This site's impact risk zone[31] does not overlap with Hornsea Four. Therefore, no European sites designated for bats will be considered in this assessment under this criterion[32].	
Onshore ornithology	Although there are European sites with qualifying bird species with ranges that could overlap the onshore components of Hornsea Four, taking into account the habitat and context of the project, only those sites with a reasonably realistic chance of qualifying bird species using the habitat within Hornsea Four ZOI e.g. data from environmental record centres or local ornithology groups of qualifying species within the maximum ZOI of Hornsea Four) and potentially being affected by project activities will be screened in.	

Table A 3: European or Ramsar site with qualifying mobile species whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range for marine mammals or just breeding foraging range for birds) may interact with Hornsea Four.

ID	Designated Site	Relevant feature(s)[33] [34]	Range from			
			Array boundary	Offshore ECC	Onshore ECC	Substation
1	Agger Tange, Nissum Bredning, Skibsted Fjord og Agerø (Denmark) SAC	• Harbour porpoise	511 km	534 km	N/A	N/A
2	Anse de Vauville (France) SAC	• Harbour porpoise • Bottlenose dolphin	512 km	494 km	N/A	N/A
3	Baie de Canche et couloir des trois estuaires (France) SAC	• Harbour porpoise	362 km	372 km	N/A	N/A
4	Baie de Seine occidentale (France) SAC	• Harbour porpoise	497 km	491 km	N/A	N/A
5	Baie de Seine orientale (France)SAC	• Harbour porpoise • Bottlenose dolphin	494 km	503 km	N/A	N/A
6	Banc et récifs de Surtainville (France) SAC	• Harbour porpoise	528 km	513 km	N/A	N/A

[29] The Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to: Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.
[30] This follows Hornsea Three approach where only sites within 5 km were screened in for assessment of the potential for likely significant effects
[31] The Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to: Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.
[32] This follows Hornsea Three approach where only sites within 10 km were screened in for assessment of the potential for likely significant effects.
[33] Sites with mention of harbour porpoise initially identified through http://natura2000.eea.europa.eu/#, followed by cross checking site details and other HRA documents to confirm as a designated feature
[34] Note that other features may be included within the citation at these sites, however only features highlighted under Criteria 2 are listed here. Full details on the features associated with the designated sites are available in the site citations, referenced in Appendix B

ID	Designated Site	Relevant feature(s)[33 34]	Range from			
			Array boundary	Offshore ECC	Onshore ECC	Substation
		• Bottlenose dolphin				
7	Bancs des Flandres (France) SAC	• Harbour porpoise	284 km	296 km	N/A	N/A
8	Borkum-Riffgrund (Germany) SAC	• Harbour porpoise	292 km	320 km	N/A	N/A
9	Doggerbank (Germany) SAC	• Harbour porpoise	222 km	239 km	N/A	N/A
10	Doggersbank (Dutch) SAC	• Harbour porpoise • Grey seal • Harbour seal	84 km	109 km	N/A	N/A
11	Dråby Vig (Denmark) SAC	• Harbour porpoise	554 km	577 km	N/A	N/A
12	Estuaire de la Seine (France) SAC	• Harbour porpoise	485 km	495 km	N/A	N/A
13	Estuaires et littoral picards (baies de Somme et d'Authie) (France) SAC	• Bottlenose dolphin • Harbour porpoise	383 km	394 km	N/A	N/A
14	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant (France) SAC	• Harbour porpoise • Bottlenose dolphin	326 km	337 km	N/A	N/A
15	Gule Rev (Denmark) SAC	• Harbour porpoise	535 km	555 km	N/A	N/A
16	Hamburgisches Wattenmeer (UK) SAC	• Harbour porpoise	431 km / 436 km	459 km / 464 km	N/A	N/A
17	Helgoland mit Helgoländer Felssockel (Germany) SAC	• Harbour porpoise	403 km	431 km	N/A	N/A
18	Humber Estuary (UK) SAC	• Sea lamprey (Petromyzon marinus) • River lamprey (Lampetra fluviatilis) • Grey seal	74 km	47 km	N/A	N/A
19	Jyske Rev, Lillefiskerbanke (Denmark) SAC	• Harbour porpoise	442 km	461 km	N/A	N/A
20	Klaverbank (Netherlands) SAC	• Harbour porpoise • Grey seal • Harbour seal	78 km	106 km	N/A	N/A
21	Kosterfjorden-Väderöfjorden (Sweden) SAC	• Harbour porpoise	768 km	788 km	N/A	N/A

ID	Designated Site	Relevant feature(s)[33 34]	Range from			
			Array boundary	Offshore ECC	Onshore ECC	Substation
22	Løgstør Bredning, Vejlerne og Bulbjerg (Denmark) SAC	• Harbour porpoise	560 km	582 km	N/A	N/A
23	Lønstrup Rødgrund (Denmark) SAC	• Harbour porpoise	625 km	646 km	N/A	N/A
24	Moray Firth (UK) SAC	• Bottlenose dolphin	471 km	451 km	N/A	N/A
25	Nationalpark Niedersächsisches Wattenmeer (Germany) SAC	• Harbour porpoise	326 km	354 km	N/A	N/A
26	Noordzeekustzone (Netherlands) SAC	• Harbour porpoise	221 km	244 km	N/A	N/A
27	NTP S-H Wattenmeer und angrenzende Küstengebiete (Germany) SAC	• Harbour porpoise	416 km	444 km	N/A	N/A
28	Oosterschelde (Netherlands) SAC	• Harbour porpoise	285 km	302 km	N/A	N/A
29	Récifs et landes de la Hague (France) SAC	• Harbour porpoise	501 km	483 km	N/A	N/A
30	Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire (France) SAC	• Harbour porpoise • Bottlenose dolphin	484 km	475 km	N/A	N/A
31	Récifs Gris-Nez Blanc-Nez (France) SAC	• Harbour porpoise	316 km	326 km	N/A	N/A
32	Ridens et dunes hydrauliques du détroit du Pas-de-Calais (France) SAC	• Harbour porpoise	320 km	330 km	N/A	N/A
33	River Derwent (UK) SAC	• Sea lamprey	107 km	36 km	N/A	N/A
34	Sandbanker ud for Thorsminde (Denmark) SAC	• Harbour porpoise	480 km	503 km	N/A	N/A
35	SBZ 1 / ZPS 1 (Belguim)	• Harbour porpoise	301 km	315 km	N/A	N/A
36	SBZ 2 / ZPS 2 (Belguim)	• Harbour porpoise	291 km	306 km	N/A	N/A
37	SBZ 3 / ZPS 3 (Belguim)	• Harbour porpoise	295 km	311 km	N/A	N/A
38	Skagens Gren og Skagerak (Denmark) SAC	• Harbour porpoise	657 km	678 km	N/A	N/A
39	SPA Östliche Deutsche Bucht (Germany) SCI	• Harbour porpoise	378 km	406 km	N/A	N/A
40	Steingrund (Germany) SAC	• Harbour porpoise	414 km	442 km	N/A	N/A
41	Store Rev (Denmark) SAC	• Harbour porpoise	622 km	643 km	N/A	N/A
42	Sydlige Nordsø (Denmark) SAC	• Harbour porpoise	373 km	399 km	N/A	N/A

ID	Designated Site	Relevant feature(s)[33 34]	Range from			
			Array boundary	Offshore ECC	Onshore ECC	Substation
43	Sylter Aubenriff (Germany) SCI	• Harbour porpoise	321 km	347 km	N/A	N/A
44	The Wash and North Norfolk Coast (UK) SAC	• Harbour seal	88 km	98 km	N/A	N/A
45	Thyborøn Stenvolde (Denmark) SAC	• Harbour porpoise	479 km	501 km	N/A	N/A
46	Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde (Denmark) SAC	• Harbour porpoise	443 km	469 km	N/A	N/A
47	Venø, Venø Sund (Denmark) SAC	• Harbour porpoise	523 km	546 km	N/A	N/A
48	Vlakte van de Raan (Belguim/Netherlands) SAC	• Harbour porpoise	291 km / 280 km	306 km / 296 km	N/A	N/A
49	Vlaamse Banken (Belguim) SAC	• Harbour porpoise	266 km	279 km	N/A	N/A
50	Voordelta (Netherlands) SAC	• Harbour porpoise	265 km	282 km	N/A	N/A
51	Waddenzee (Netherlands) SAC	• Harbour porpoise	229 km	253 km	N/A	N/A
52	Westerschelde and Saeftunghe (Netherlands) SAC	• Harbour porpoise	290 km	306 km	N/A	N/A
53	Southern North Sea (UK) SAC	• Harbour porpoise	0 km	0 km	N/A	N/A
55	Flamborough & Filey Coast (UK) SPA[35]	• Gannet • Kittiwake • Herring gull • Guillemot • Razorbill • Fulmar • Puffin	63.0 km	2.5 km	N/A	N/A
56	Forth Islands (UK) SPA[36]	• Fulmar • Gannet	272 km	272 km	N/A	N/A

[35] Presented as species in range of project boundaries.
[36] Presented as species in range of project boundaries.

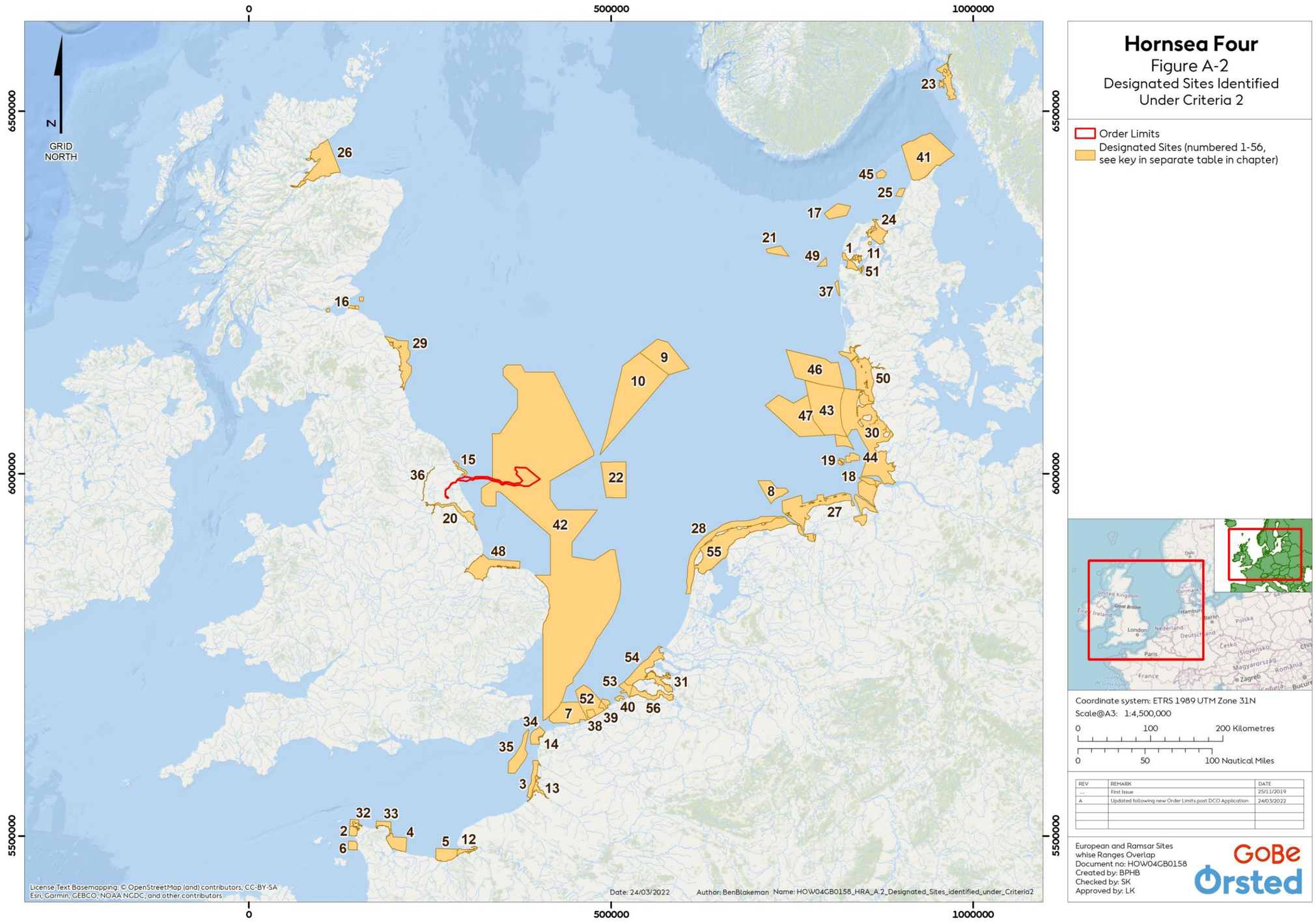

Figure A 2: Designated site identified under Criteria 2.

1.5 Criteria 3

1.5.1.1 Criteria 3 is focused on identifying those designated sites that occur within range of the maximum expected extent of project related effects. The relevant range for each receptor group is identified in Table A 4 below.

Table A 4: Effect ranges applied to identify sites for consideration.

Receptor	Range	Reference
Subtidal and intertidal benthic ecology	16 km	Original screening range applied for consistency throughout. Drew on sediment plume modelling from previous Hornsea projects. All Hornsea Four specific modelling and technical reporting confirms that potential for change in coastal processes, sediment transport and sediment plume would be within the 16 km range (and likely to be less) and therefore the 16 km range remains appropriate as a precautionary measure.
Cetaceans	26 km	For harbour porpoise, drawing on literature associated with the SNS SAC (e.g. JNCC et al 2020). The original Screening for Hornsea Four applied an effect range for other cetacean species derived from modelling undertaken for previous Hornsea projects (modelled at 11 km, with a precautionary 26 km applied for screening for consistency). Underwater noise modelling for Hornsea Four is now available (**Volume A4, Annex 4.5: Subsea Noise Technical Report**), which does not provide modelling results for disturbance but does for various measures of Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS). The largest of these ranges for high frequency cetaceans (and therefore including bottlenose dolphin) are all well within the 11 km range. Therefore the precautionary 26 km range for cetacean species other than harbour porpoise is considered to remain valid.
Harbour seal	120 km	SMRU 2011 No evidence for wider site connectivity within **Volume A5, Annex 4.1: Marine Mammal Technical Report**.
Grey seal	145 km	Thompson et al. 1996 Together with evidence for some wider site connectivity within **Volume A5, Annex 4.1: Marine Mammal Technical Report**.
Migratory fish	100 km	This is a precautionary value used during the Hornsea Three HRA Screening Report. To remain precautionary and continue consistency across projects within the Hornsea Zone, this range has been used for Hornsea Four.
Offshore and intertidal ornithology	Intertidal: 0.5 km displacement / disturbance due to project activities Offshore: 4 km displacement/disturbance due to project activities	SNCBs 2017

Receptor	Range	Reference
Onshore terrestrial ecology	Original screening distance: 1 km Confirmed through the use of IRZs	The screening distance takes account of disturbance from Hornsea Four activities e.g. noise, lighting and presence of work force during Construction, with the use of the IRZs confirming the lack of risk to designated sites.
Onshore aquatic ecology	Original screening distance; 5 km Confirmed through the use of IRZs	The screening distance Takes account of potential for impact, however when standard mitigation measures are applied (post screening) e.g. measures in a Code of Construction Practice (CoCP), the maximum extent of effects are likely to be less. The use of the IRZs confirms the lack of risk to designated sites.

1.5.1.2 All designated sites identified under Criteria 3 are summarised in **Table A 5** below and depicted in **Figure A 3**.

1.5.1.3 There are no onshore (i.e. above MHW) European sites within 5km. Therefore, no sites have been identified under this criterion for onshore ecology.

Table A 5: European or Ramsar site with a qualifying feature located within the potential range of effect associated with Hornsea Four.

Designated Site	Feature(s)	Within the relevant range of effect			
		Array boundary	Offshore ECC	Onshore ECC	Substation
Humber Estuary SAC	Annex I Habitats (noting that these habitats fall outside the benthic ecology range of 16 km, noting the nitrogen deposition issue highlighted through air quality modelling for Atlantic salt meadows only): • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Coastal lagoons • Dunes with *Hippophaë rhamnoides* • Embryonic shifting dunes • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Fixed coastal dunes with herbaceous vegetation ('grey dunes') • Salicornia and other annuals colonising mud and sand • Sandbanks which are slightly covered by sea water all the time • Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') • Annex II Species (noting that seals and migratory fish fall within the relevant offshore ranges): • Grey seal • River lamprey • Sea lamprey	74 km	47 km	N/A	N/A
Humber Estuary Ramsar	• Ramsar criterion 1 (estuary – outwith the benthic ecology range of 16 km, noting the nitrogen deposition issue highlighted through air quality modelling for saltmarsh which is noted as being present within Ramsar criteria 1) • Ramsar criterion 3 (grey seal – within grey seal range) • Ramsar criteria 5 (assemblage of international importance) • Ramsar criterion 6 (species/populations occurring at levels of international importance) • Ramsar criterion 8 (migratory fish river lamprey and sea lamprey) –within range for migratory fish	74 km	47 km	N/A	N/A
Southern North Sea SAC	Annex II Species: • Harbour porpoise	0 km	0 km	N/A	N/A

Designated Site	Feature(s)	Within the relevant range of effect			
		Array boundary	Offshore ECC	Onshore ECC	Substation
Doggersbank (Dutch) SAC	Annex I Habitats (outwith range): • Sandbanks which are slightly covered by sea water all the time Annex II Species: • Harbour porpoise • Grey seal • Harbour seal	84 km	109 km	N/A	N/A
Klaverbank SCI	Annex II Species: • Harbour porpoise • Grey seal • Harbour seal	78 km	106 km	N/A	N/A
The Wash and North Norfolk Coast SAC	Annex I Habitats (outwith range): • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Coastal lagoons • Large shallow inlets and bays • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) • Mudflats and sandflats not covered by seawater at low tide • Reefs • Salicornia and other annuals colonising mud and sand • Sandbanks which are slightly covered by sea water all the time Annex II Species (only harbour seal in range): • Harbour seal • Eurasian otter	88 km	98 km	N/A	N/A
River Derwent SAC	Annex I Habitats (outwith range): • Water courses of plain to montane levels with the *Ranunculion fluitantis; and* • *Callitricho-Batrachion* vegetation. Annex II Species (migratory fish species only within range): • Bullhead (*Cottus gobio*) • River lamprey • Eurasian otter • Sea lamprey	140 km	36 km	N/A	N/A

Designated Site	Feature(s)	Within the relevant range of effect			
		Array boundary	Offshore ECC	Onshore ECC	Substation
Flamborough Head SAC	Annex I Habitats (within range of the cable corridor only): • Reefs • Vegetated sea cliffs of the Atlantic and Baltic Coasts • Submerged or partially submerged sea caves.	60 km	1.64 km	N/A	N/A
Flamborough & Filey Coast SPA	• Guillemot • Razorbill • Puffin	63 km	2.5 km	N/A	N/A
Greater Wash SPA	• Red-throated diver • Common scoter	64.00 km	0.4 km	N/A	N/A

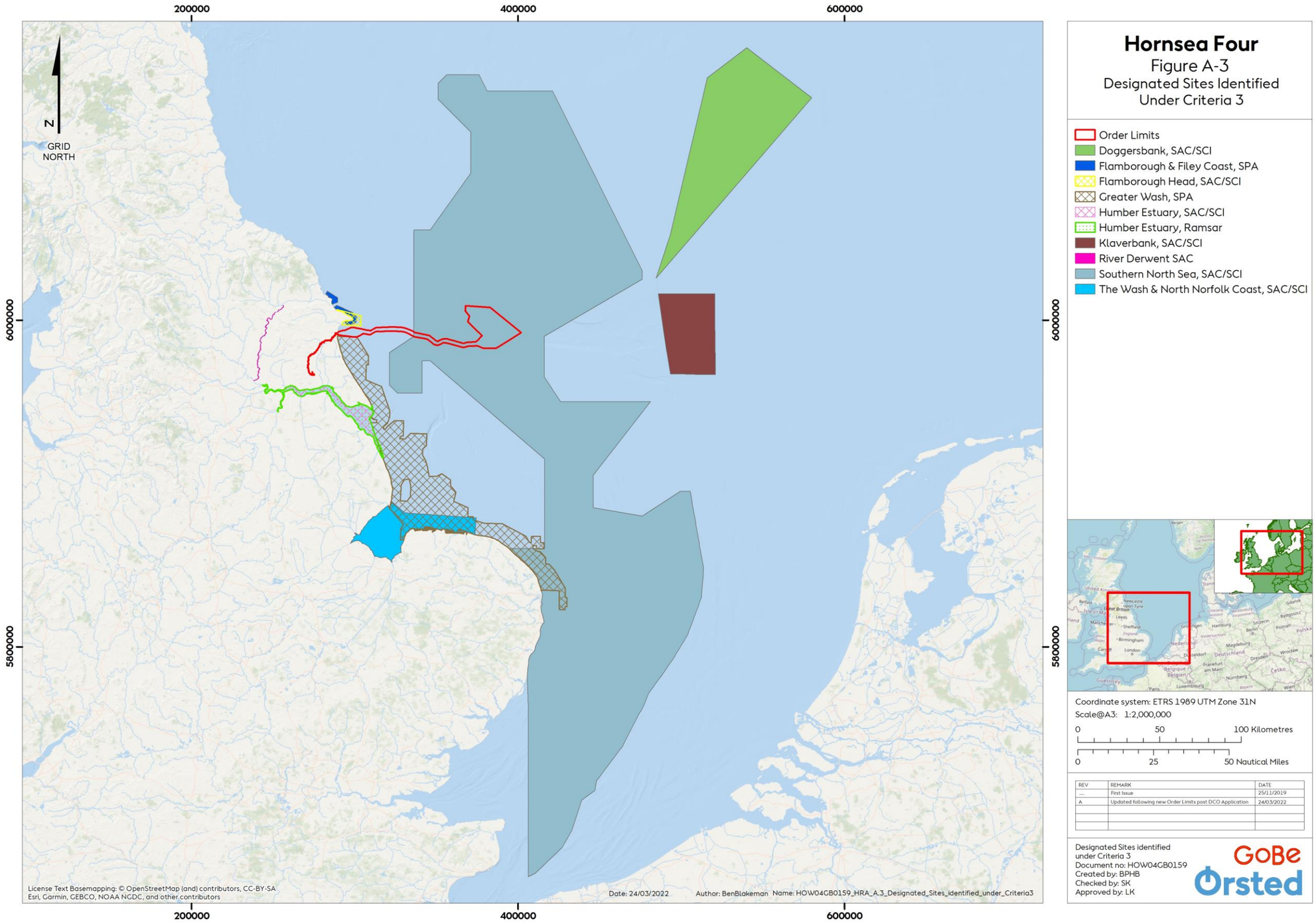

Figure A 3: Designated sites identified under Criteria 3.

1.6 Criteria 4

1.6.1.1 Criteria 4 is focused on migratory bird species. It seeks to identify European and Ramsar species that are features of sites that are outside of the Hornsea Four Order Limits and outside of the zone of any effect and for which there is the potential for those species to pass through or visit Hornsea Four during the non-breeding season. This may be as they:

- Migrate north or south through the North Sea (applicable to seabirds); or
- Migrate east or west across the North Sea (applicable to intertidal waterbirds); or
- Migrate south to winter in the North Sea (applicable to seabirds).

1.6.1.2 These bird species may or may not have been recorded during the project specific aerial surveys conducted between April 2016 and March 2018 (HiDef 2018), but are breeding interest features at SPA sites to the north or east of Hornsea Four and either pass through the area on migration or reside in the area during the winter. The identification of such species has been supported by information on migratory routes contained in a number of publications including the Migration Atlas (Wernham et al. 2002), the SOSS-05 report for The Crown Estate (Wright et al. 2012) and the assessment for Marine Scotland of the collision risk to migrating birds (WWT Consulting Ltd 2014), through discussion with Natural England and RSPB staff at the Evidence Plan meetings and through expert judgement of the consultancy team working on Hornsea Four. The information on such species is detailed within **Volume A5, Annex 5.5: Offshore Ornithology Migratory Birds Report**.

1.6.1.3 All potential features identified under Criteria 4 are summarised in **Table A 6** below.

Table A 6: European or Ramsar qualifying bird species for which there is the potential to pass through the Hornsea Four boundary on their annual migration or visit in winter.

Bird species	SPA sites to the north of Hornsea Four with these species as breeding interest features and from which they might pass through on migration or visit in winter
Fulmar	Hermaness, Saxa Vord and Valla Field; Fetlar; Foula; Noss; Sumburgh Head; Fair Isle; West Westray; Calf of Eday; Rousay; Hoy; Copinsay; North Caithness Cliffs; East Caithness Cliffs; Buchan Ness to Collieston Coast; Troup, Pennan and Lion's Heads; Fowlsheugh; and Forth Islands
Gannet	Forth Islands; Fair Isle; Hermaness, Saxa Vord and Valla Field; Noss; and Outer Firth of Forth and St Andrews Complex
Great skua	Hoy, Rouasy, Fair Isle, Noss, Foula, Fetlar and Hermaness, Saxa Vord and Valla Field
Arctic skua	Hoy, Rousay, West Westray, Fair Isle, Foula and Fetlar
Kittiwake	Hermaness, Saxa Vord and Valla Field; Foula; Noss; Sumburgh Head; Fair Isle; West Westray; Calf of Eday; Marwick Head; Rousay; Copinsay; Hoy; North Caithness Cliffs; East Caithness Cliffs; Troup, Pennan and Lion's Heads; Buchan Ness to Collieston Coast; Fowlsheugh; Forth Islands; Outer Firth of Forth and St Andrews Complex; St Abbs Head to Fast Castle; Coquet Island and the Farne Islands
Little gull	Greater Wash
Common gull	Tips of Corsemaul and Tom Mor
Herring gull	Buchan Ness to Collieston Coast; East Caithness Cliffs; Forth Islands; Fowlsheugh; St Abb's Head to Fast Castle; Troup, Pennan and Lion's Heads; Outer Firth of Forth and St Andrews Complex
Lesser black-backed gull	Forth Islands

Bird species	SPA sites to the north of Hornsea Four with these species as breeding interest features and from which they might pass through on migration or visit in winter
Great black-backed gull	Calf of Eday; Copinsay; Hoy; and East Caithness Cliffs
Razorbill	Foula; Fair Isle; West Westray; North Caithness Cliffs; East Caithness Cliffs; Troup, Pennan and Lion's Heads; Fowlsheugh; Forth Islands; and St Abb's Head to Fast Castle
Guillemot	Hermaness, Saxa Vord and Valla Field; Foula; Noss; Sumburgh Head; Fair Isle; West Westray; Calf of Eday; Rousay; Marwick Head; Hoy; Copinsay; North Caithness Cliffs; East Caithness Cliffs; Troup, Pennan and Lion's Heads; Buchan Ness to Collieston Coast; Fowlsheugh; Forth Islands; Outer Firth of Forth and St Andrews Complex; St Abb's Head to Fast Castle and Farne Islands
Puffin	Hermaness, Saxa Vord and Valla Field; Foula; Noss; Fair Isle; Hoy; North Caithness Cliffs; East Caithness Cliffs; Forth Islands; Outer Firth of Forth and St Andrews Complex; Farne Islands and Coquet Island
Arctic tern	Coquet Island
Common tern	Teesmouth and Cleveland Coast (as extended); Coquet Island
Roseate tern	Coquet Island
Sandwich tern	Teesmouth and Cleveland Coast (as extended) and Coquet Island
Bird species	SPA sites to the west of Hornsea Four with these species as interest features and from which they might pass through on migration across the North Sea
Golden plover	Humber Estuary Ramsar; and Humber Estuary SPA
Black-tailed godwit	Humber Estuary Ramsar; and Humber Estuary SPA
Bar-tailed godwit	Humber Estuary Ramsar; and Humber Estuary SPA
Ruff	Humber Estuary Ramsar; and Humber Estuary SPA
Shelduck	Humber Estuary Ramsar; and Humber Estuary SPA
Dunlin	Humber Estuary Ramsar; and Humber Estuary SPA
Knot	Humber Estuary Ramsar; and Humber Estuary SPA
Redshank	Humber Estuary Ramsar; and Humber Estuary SPA
Waterbird assemblage	Humber Estuary Ramsar; and Humber Estuary SPA

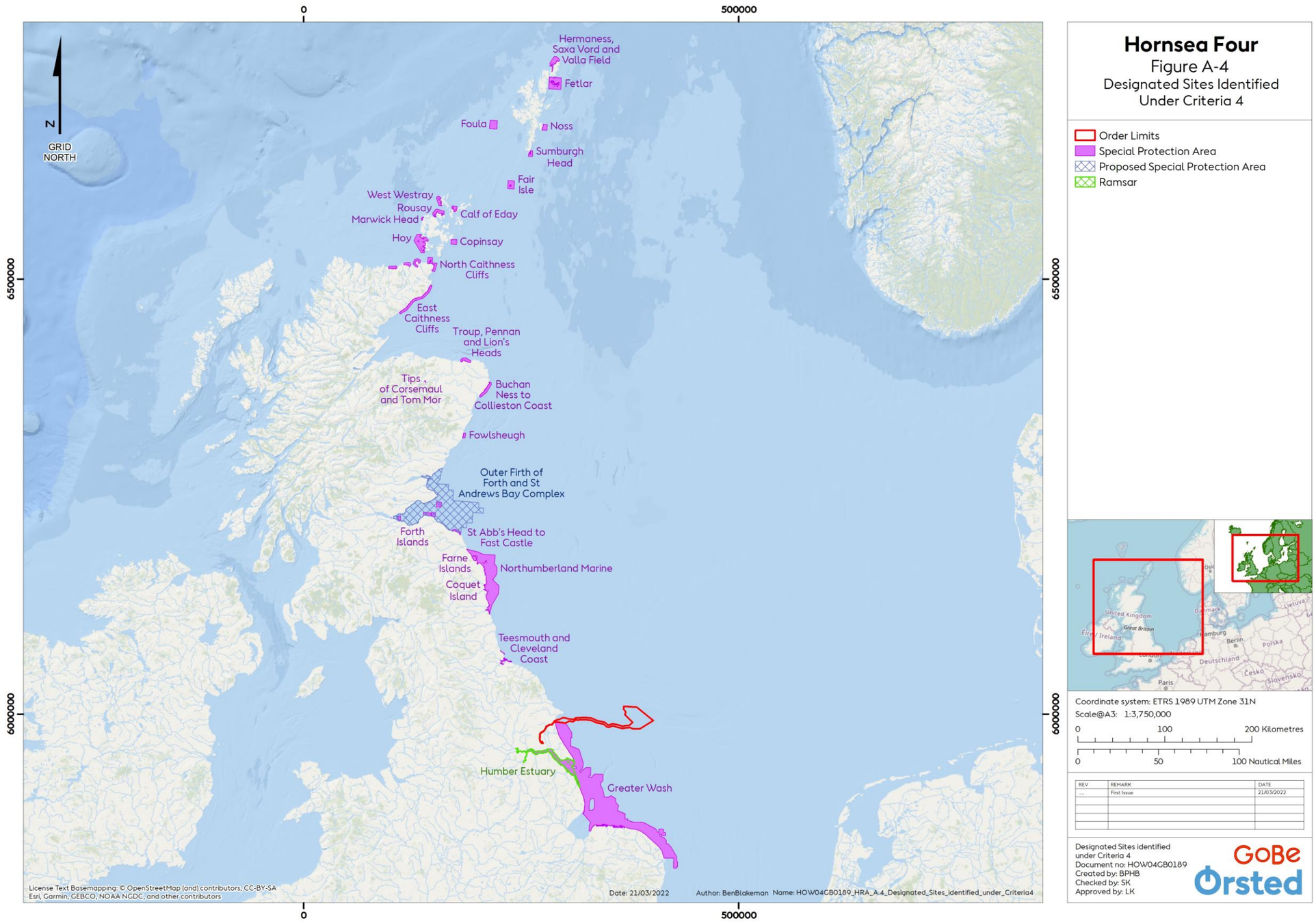

Figure A 4: Designated sites identified under Criteria 4.

Appendix B - All Designated Sites Identified through Initial Site Selection

Designated Site	Information Source
Agger Tange, Nissum Bredning, Skibsted Fjord og Agerø SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00EY133
Anse de Vauville SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 502019
Baie de Canche et couloir des trois estuaires SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR3 102005
Baie de Seine occidentale SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 502020
Baie de Seine orientale SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2
Banc et récifs de Surtainville SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 502018
Bancs des Flandres SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR3 102002
Borkum-Riffgrund SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE2 104301
Doggerbank (Germany) SCI	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE1 003301
Doggersbank (Dutch) SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL2 008001
Dråby Vig SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00EX026
Estuaire de la Seine SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 300121
Estuaires et littoral picards (baies de Somme et d'Authie) SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 200346
Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR3 100478
Flamborough Head SAC	https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0013036&SiteName=flamborough&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Gule Rev SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA259
Hamburgisches Wattenmeer SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE2 016301
Helgoland mit Helgoländer Felssockel SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE1 813391
Humber Estuary SAC	http://publications.naturalengland.org.uk/publication/5009545743040512
Humber Estuary SPA	http://publications.naturalengland.org.uk/file/496867483425177 6
Humber Estuary Ramsar	http://jncc.defra.gov.uk/pdf/RIS/UK11031.pdf
Jyske Rev, Lillefiskerbanke SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA257
Klaverbank SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL2 008002
Kosterfjorden-Väderöfjorden SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=SE0 520170
Løgstør Bredning, Vejlerne og Bulbjerg SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00EY124

Designated Site	Information Source
Lønstrup Rødgrund SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA301
Moray Firth SAC	http://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=8327
Nationalpark Niedersächsisches Wattenmeer SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE2 306301
Noordzeekustzone SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL9 802001
NTP S-H Wattenmeer und angrenzende Küstengebiete SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE0 916391
Oosterschelde SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL3 009016
Récifs et landes de la Hague SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 500084
Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR2 500085
Récifs Gris-Nez Blanc-Nez SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR3 102003
Ridens et dunes hydrauliques du détroit du Pas-de-Calais SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR3 102004
River Derwent SAC	http://publications.naturalengland.org.uk/publication/4824082210095104
Sandbanker ud for Thorsminde SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA341
SBZ 1 / ZPS 1 SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BE MNZ0002
SBZ 2 / ZPS 2 SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BE MNZ0003
SBZ 3 / ZPS 3 SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BE MNZ0004
Skagens Gren og Skagerak SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00FX112
SPA Östliche Deutsche Bucht SPA	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE1 011401
Steingrund SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE1 714391
Store Rev SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA258
Sydlige Nordsø SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA347
Sylter Aubenriff SCI	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DE1 209301
The Wash and North Norfolk Coast SAC	https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0017075&SiteName=the%20wash&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Thyborøn Stenvolde pSCI	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00VA348
Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00AY176

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Venø, Venø Sund SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=DK 00CY040
Vlakte van de Raan SCI	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BE MNZ0005
Vlaamse Banken SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BE MNZ0001
Voordelta SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL4 000017
Waddenzee SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL1 000001
Westerschelde and Saeftunghe SAC	http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=NL9 803061
Southern North Sea SAC	http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0030395
Greater Wash SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9020329&SiteName=greater%20wash&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Hornsea Mere SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006171&SiteName=hornsea&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Flamborough & Filey Coast SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006101&SiteName=flamborough&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Northumberland Marine SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9020325&SiteName=northumber&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Northumbria Coast SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006131&SiteName=northumbria&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Lindisfarne SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006011&SiteName=lindisfarne&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Lindisfarne Ramsar	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK11036&SiteName=lindisfarne&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Teesmouth and Cleveland Coast SPA (as extended in January 2020)	https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK9006061&SiteName=teesmouth&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&HasCA=1&NumMarineSeasonality=4&SiteNameDisplay=Teesmouth%20and%20Cleveland%20Coast%20SPA
Coquet Island SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006031&SiteName=coquet&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
Farne Islands SPA	https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006021&SiteName=farne&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=
St Abb's Head to Fast Castle SPA	https://sitelink.nature.scot/site/8579
Forth Islands SPA	https://sitelink.nature.scot/site/8500
Outer Firth of Forth and St Andrews Complex pSPA	https://sitelink.nature.scot/site/10478
Fowlsheugh SPA	https://sitelink.nature.scot/site/8505

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Buchan Ness to Collieston Coast SPA	https://sitelink.nature.scot/site/8473
Troup, Pennan and Lion's Heads SPA	https://sitelink.nature.scot/site/8587
Tips of Corsemaul and Tom Mor SPA	https://sitelink.nature.scot/site/8584
East Caithness Cliffs SPA	https://sitelink.nature.scot/site/8492
North Caithness Cliffs SPA	https://sitelink.nature.scot/site/8554
Copinsay SPA	https://sitelink.nature.scot/site/8485
Hoy SPA	https://sitelink.nature.scot/site/8513
Marwick Head SPA	https://sitelink.nature.scot/site/8544
Rousay SPA	https://sitelink.nature.scot/site/8573
Calf of Eday SPA	https://sitelink.nature.scot/site/8478
West Westray SPA	https://sitelink.nature.scot/site/8589
Fair Isle SPA	https://sitelink.nature.scot/site/8496
Sumburgh Head SPA	https://sitelink.nature.scot/site/8582
Noss SPA	https://sitelink.nature.scot/site/8561
Foula SPA	https://sitelink.nature.scot/site/8504
Fetlar SPA	https://sitelink.nature.scot/site/8498
Hermaness, Saxa Vord and Valla Field SPA	https://sitelink.nature.scot/site/8512