

Hornsea Project Four: Environmental Statement (ES)

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Volume A1, Chapter 5: Environmental Impact Assessment Methodology

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Glossary

Term	Definition
Allision	When a vessel strikes a stationary object such as an offshore wind turbine.
Baseline	The status of the environment now without the development in place.
Biodiversity Net Gain	An approach to development that leaves biodiversity in a better state than before. Where a development has an impact on biodiversity, developers are encouraged to provide an increase in appropriate natural habitat and ecological features over and above that being affected to ensure that the current loss of biodiversity through development will be halted and ecological networks can be restored.
BRAG Assessment	<p>An assessment based on quantitative assessment and expert judgement. The ranking is defined as:</p> <ul style="list-style-type: none"> • Black: Potential showstopper to development; • Red: High potential to constrain development; • Amber: Intermediate potential to constrain development; and • Green: Low potential to constrain development. <p>Black and red constraints are critical in determining features that should be avoided wherever possible to avoid consenting risk, reduce EIA complexity and reduce the cost of mitigation. Amber and green constraints are those that may be more readily minimised or managed by employing appropriate mitigation measures.</p>
Code of Construction Practice (CoCP)	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes
Cumulative effects	The combined effect of Hornsea Four in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Project Four.
Cumulative impact	Impacts that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Project Four.

Term	Definition
Commitment	<p>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.</p> <p>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.</p>
Design Envelope	<p>A description of the range of possible elements that make up the Hornsea Project Four design options under consideration, as set out in detail in Volume A1, Chapter 4: Project Description). This envelope is used to define Hornsea Project Four for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the “Rochdale Envelope” approach.</p>
Development Consent Order (DCO)	<p>An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).</p>
Energy balancing infrastructure (EBI)	<p>The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.</p>
Effect	<p>Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the value, or sensitivity, of the receptor or resource in accordance with defined significance criteria.</p>
Environmental Impact Assessment (EIA)	<p>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 EIA Regulations, including the publication of an Environmental Statement (ES).</p>
Environmental Impact Assessment (EIA)	<p>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 EIA Regulations, including the publication of an Environmental Statement.</p>
Environmental Statement (ES)	<p>A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.</p>
Hornsea Project Four Offshore Wind Farm	<p>The proposed Hornsea Four offshore wind farm project; the term covers all elements within the Development Consent Order (i.e. both the offshore and onshore components). Hereafter referred to as Hornsea Four.</p>
Inter Related Effect (or Inter-Relationships)	<p>The likely effects of multiple impacts from the proposed development on one receptor. For example, noise and air quality together could have a greater effect on a residential receptor than each impact considered separately.</p>
Impacts Register	<p>An Excel spreadsheet which identifies all of the potential effects that the project team have identified that could possibly result from the construction, operation and decommissioning of Hornsea Four, relating to each technical topic under consideration in the EIA process</p>

Term	Definition
Maximum Design Scenario	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
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, PEIR or ES).
Order Limits	The onshore limits within which Hornsea Project Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Proportionate EIA	An approach to EIA to reduce un-necessary assessments so that only those which are the focus of the EIA Regulations (i.e. likely significant effects) are discussed in the ES. Such reports need to reflect the scale and complexity of the assessments undertaken and avoid reporting all environmental work where not relevant.
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Scoping	An early part of the EIA process by which the key potential significant impacts of the project are identified, and methodologies identified for how these should be assessed. This process gives the regulator and key consultees opportunity to comment and define the full extent of the final EIA – which can also then be tailored through the consultation process.
Transboundary Impacts	Transboundary effects arise when impacts from the development within one European Economic Area (EEA) state affects the environment of another EEA state(s).

Acronyms

Acronym	Definition
BGS	British Geological Survey
BRAG	Black, Red, Amber, Green assessment
BSI	British Standards Institute
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CoCP	Code of Construction Practice
CEA	Cumulative Effects Assessment
DMRB	Design Manual for Roads and Bridges
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DML	Deemed Marine Licence

Acronym	Definition
EBI	Energy Balancing Infrastructure
EEA	European Economic Area
EEZ	European Economic Zone
EIA	Environmental Impact Assessment
EP	Evidence Plan
ERCoP	Emergency Response Co-operation Plan
ES	Environmental Statement
EU	European Union
HIA	Health Impact Assessment
IEMA	Institute of Environmental Management and Assessment
HRA	Habitats Regulations Assessment
LSE	Likely Significant Effect
MDS	Maximum Design Scenario
MMO	Marine Management Organisation
ML	Marine Licence
MLWS	Mean Low Water Springs
NE	Natural England
NIC	National Infrastructure Commission
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OnSS	Onshore Substation
PEIR	Preliminary Environmental Information Report
PEMMP	Project Environmental Management and Monitoring Plan
PINS	Planning Inspectorate
PRoW	Public Right of Way
SoCG	Statement of Common Ground
SoS	Secretary of State
SWMP	Site Waste Management Plan
UK	United Kingdom

5.1 Introduction

- 5.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km from the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall and on to an onshore substation (OnSS) with electrical balancing infrastructure (EBI), and connection to the electricity transmission network (see [Chapter 4, Project Description](#)).
- 5.1.1.2 This chapter of the Hornsea Four Environmental Statement (ES) describes the Environmental Impact Assessment (EIA) methodology followed for Hornsea Four. Specifically, this chapter describes the approach used to identify, evaluate and mitigate potential likely significant effects (LSE), in EIA terms, using a defined proportionate approach to the assessment process. The requirement for EIA and the proposed temporal, spatial and technical scope of the assessments are described along with details of the Applicant's specific 'commit – design – consult' ethos to developing Hornsea Four.

5.2 Requirement for an EIA

- 5.2.1.1 EIA is a procedure required under the terms of Directive 2011/92/EU, as amended by Directive 2014/52/EU on the assessment of environmental effects of certain public and private projects and as implemented into the law of England and Wales by the EIA Regulations. EIA has become a widely used tool for identifying the potential impacts of new developments (Glasson et al, 1999) and it is intended to provide decision-makers with an understanding of the probable environmental consequences of a proposed project and thereby facilitate the making of more environmentally sound decisions (Bailey and Hobbs, 1990). Further details on the need for EIA is set out in [Chapter 2: Planning and Policy Context](#).
- 5.2.1.2 Article 1(1) of the Directive (as amended) sets the focus of EIA on the assessment of the environmental effects of those public and private projects "which are likely to have significant effects on the environment". Article 2(1) of the Directive states that:

"Member States shall adopt all measures necessary to ensure that, before development consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects on the environment."

- 5.2.1.3 Further emphasis is given to treating each case individually, with a focus on significant effects considering evidence and consultations through the provisions contained in Article 3 and Article 8:

"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project..."

“The results of consultations and information gathered pursuant to Articles 5 to 7 shall be duly taken into account in the development consent procedure”.

- 5.2.1.4 The EIA is being carried out in accordance with the Planning Act 2008 and the Infrastructure Planning (EIA) Regulations 2017 (the EIA Regulations) (see [Chapter 2: Planning and Policy Context](#)). Furthermore, the approach to the EIA and the production of this ES closely follows several relevant guidance notes, policy statements, and industry best practice documents as set out in [Table 5.1](#).

Table 5.1: Documents Used to Guide the EIA Methodology.

Document
<i>Planning Inspectorate (PINS) Advice Notes</i>
Advice Note Three (version 7): EIA Consultation and Notification (PINS, 2017a)
Advice Note Six (version 9): Preparation and submission of application documents (PINS, 2020a)
Advice Note Seven (version 7): Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (PINS, 2020b)
Advice Note Nine (version 3): Rochdale Envelope (PINS, 2018a)
Advice Note Ten (version 8): Habitat Regulations Assessment relevant to nationally significant infrastructure projects (PINS, 2017b)
Advice Note Eleven (version 4): Working with public bodies in the infrastructure planning process (PINS, November 2017c)
Advice Note Twelve (version 6): Transboundary Impacts and Process (PINS, 2020c)
Advice Note Seventeen (version 2): Cumulative effects assessment relevant to nationally significant infrastructure projects (PINS, 2019)
Advice Note Eighteen (version 1): The Water Framework Directive (PINS, 2017d)
<i>National Policy Statements</i>
Overarching National Policy Statement for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a)
National Policy Statement for Renewable Energy Infrastructure EN-3 (DECC, 2011b)
National Policy Statement for Electricity Networks Infrastructure EN-5 (DECC, 2011c)
<i>Industry EIA Guidance Documents</i>
Assessment of the environmental impact of offshore wind-farms (OSPAR Commission, 2008)
Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of Food and Environment Protection Act 1985 and Coastal Protection Act 1949 requirements (Cefas, 2004)
Cumulative Impact Assessment Guidelines - Guiding Principles For Cumulative Impact Assessment in Offshore Wind Farms (RenewableUK, 2013)
Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Cefas, 2012)
<i>Professional EIA Guidance Documents</i>
Design Manual for Roads and Bridges (DMRB) Part 4: LA 104 Environmental Assessment and Monitoring – Revision 1 (Highways England, 2019)
Guidelines for Environmental Impact Assessment (IEMA, 2004)
Guide to Shaping Quality Development (IEMA, 2016)
Delivering Proportionate EIA, A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017)

5.2.1.5 Each technical assessment also refers to a range of specific guidance documents in order to frame and undertake their assessments and all such guidance is set out as appropriate in [Volume A2, Chapters 1 to 12](#) (offshore) and [Volume A3, Chapters 1 to 10](#) (onshore).

5.2.1.6 Over time, EIA practice has become more complex and involved, with very lengthy ESs being produced which arguably consider every conceivable possible impact rather than focussing on those impacts that are LSE as required in the EIA Directive and Regulations. As a result, many EIAs can be unfocussed with key findings inaccessible. As noted by the Institute of Environmental Management and Assessment (IEMA, 2017), delivering *proportionate* EIA is a key issue for both the United Kingdom (UK) planning and consenting system and developers seeking to progress projects. The Applicant has taken an early and positive step in embracing the concept of proportionality in EIA and further details of the approach adopted for Hornsea Four is provided in [Section 5.3](#) of this chapter.

5.2.1.7 The EIA process and its findings are reported within this ES, which has been produced as part of the Development Consent Order (DCO) application for Hornsea Four. Feedback from formal Section 42 consultation has been taken into consideration and where relevant has been used to inform the final design and impact assessment. A summary of the consultation undertaken in relation to Hornsea Four is provided in [Chapter 6: Consultation](#).

The Applicant has developed and instigated a ‘Commit, Consult, Design’ ethos (see [Figure 5.1](#)) in the development of Hornsea Four with such commitments integrated into the project, driving design and minimising adverse environmental effects. This ethos is embedded in the staged approach to route planning and site selection ([Chapter 3: Site Selection and Consideration of Alternatives](#)). In addition to designing a technically feasible project, the Applicant therefore aims to avoid or reduce impacts by committing to avoid the most sensitive, important or valuable features early in project design and in so doing reducing the scope of the Hornsea Four EIA and the amount of assessment required. Further details of the approach and the tools used is provided in [Section 5.4](#) of this chapter.

5.2.1.8 The purpose of the ES is to inform the Secretary of State (SoS) (the decision maker), stakeholders, and all interested parties of any likely significant effects that would result from the project during its construction, operation and (where relevant) decommissioning.

5.2.1.9 The EIA gives due regard to the requirements of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, which makes changes to the Conservation of Habitats and Species Regulations 2017, the Conservation of Offshore Marine Habitats and Species Regulations 2017 following the UK’s exit from the EU, and the Marine and Coastal Access Act 2009, as well as a wide range of other primary and secondary legislation as set out in [Chapter 2: Planning and Policy Context](#).

5.3 A Proportionate Approach to Environmental Assessment

5.3.1.1 The UK’s professional body for EIA, IEMA, noted the following in their 2017 report promoting more proportionate EIA (IEMA, 2017):

“...the drive for improved quality in EIA, combined with the UK’s evidence-based and precautionary approach, has led to substantial challenges for the future of practice. The increased complexity of multi-faceted decisions and the wider range of stakeholders who seek

transparency and clear audit trails, has further compounded the problems. The combined impact of the above good intentions has often led to individual EIAs being too broadly scoped and their related Environmental Statement (ES) to be overly long and cumbersome."

- 5.3.1.2 An unwieldy or disproportionate EIA can make understanding the key environmental impacts of a proposed development difficult and can make the findings inaccessible to decision-makers and the public, adding undue delay.
- 5.3.1.3 Additionally, PINS Advice Note Six: Preparation and Submission of Application Documents (PINS, 2016) encourages applicants to think about the size of documents submitted, with duplication and superfluous content discouraged. ESs are welcomed that are, "proportionate to the characteristics of the Proposed Development and the sensitivity of the receiving environment" although it is appreciated that for Nationally Significant Infrastructure projects (NSIPs) such documents will comprise of several volumes.
- 5.3.1.4 The Applicant took the decision at an early stage to integrate proportionality into the EIA for Hornsea Four. A strategy was developed for promoting this principle through consideration of four key elements consistent with IEMA's guidance on such matters (IEMA, 2017) along with tangible actions, as set out below:
- **Enhancing People:** so that those involved in EIA have the skills, knowledge and confidence to avoid an overly precautionary approach.
 - A proportionality position paper was developed, and internal workshops were run. A proportionate EIA Roadshow was undertaken with key stakeholders to assist their understanding of the approach. These actions generated a momentum for the proportionate EIA approach, developed a culture for its adoption and engaged with those who required an understanding of it to progress assessments and facilitate ease of review.
 - **Improving Scoping:** to generate a more consistently focussed approach to this critical activity.
 - An iterative process for the route planning and site selection phase was adopted with development of tools (see [Paragraph 5.3.1.5](#) to inform and set out clearly the rationale for the EIA scoping document.
 - **Sharing Responsibility:** recognising that disproportionate EIA is driven by many factors and that enabling proportionate assessment will require collaborative actions that work towards a shared goal.
 - A range of activities were undertaken to assist collaboration including proactive engagement with stakeholders; establishment of the Onshore Substation Consultation Group and the Human Environment Expert Group; seeking of Commitments from the public and adopting wherever practicable; and development of a design vision for onshore elements of Hornsea Four.
 - **Embracing Innovation and Digital:** modernising EIA to deliver effective and efficient assessment and reporting that adds value to projects and their interaction with the environment.

- Digital mapping tools and use of a digital tool ('Commonplace') to engage with local communities and assist in Section 42 consultation were adopted, improving the collective knowledge from communities near the Hornsea Four onshore gfootprint. Additionally, a design vision for Hornsea Four has been produced which presents the 'vision' of Hornsea Four, setting out how the project design, mitigation, enhancement and net gain measures interact ([Volume A4, Annex 4.6: Outline Design Vision Statement](#)).
- All agreements within the Evidence Plan Logs, which are produced as part of the Evidence Plan (EP) process, have unique identifier codes which have been used in the technical chapters of this ES to signpost to the specific agreements made (e.g. ON-HUM-1.1). Agreements made with consultees within the Evidence Plan process are referenced within the technical ES chapters, where of relevance, as well as being set out in the topic specific Evidence Plan Logs which are appendices to the Hornsea Four Evidence Plan ([Volume B1, Annex 1.1: Evidence Plan](#)), an annex of the Hornsea Four Consultation Report ([Volume B1, Chapter 1: Consultation Report](#)).

5.3.1.5 A number of tools and processes have been developed to assist implementing the proportionate EIA approach, the key elements of which are set out below:

- making best use of the existing evidence base ([Section 5.3.2](#));
- the Impacts Register ([Section 5.3.3](#) and [Volume A4, Annex 5.1: Impacts Register](#));
- a two-tiered approach (simple and detailed) to define an appropriate level of assessment ([Section 5.3.4](#)); and
- early adoption of mitigation and providing an upfront Commitment Register ([Section 5.4.2](#) and [Volume A4, Annex 5.2: Commitments Register](#)).

5.3.1.6 One key aspect of the ES approach is the identification of the likely significant effects (in EIA terms) of Hornsea Four. This assessment of likely significance is supported by a combination of:

- knowledge acquired by the EIA team on baseline conditions available to date;
- definition of the project;
- national policy and standards;
- the evidence base and experience of similar projects passing through the consenting system;
- topic-specific criteria for impact magnitude, receptor sensitivity to impacts and significance of effect; and
- the professional judgement of experts.

5.3.1.7 In general, a reasonable degree of confidence in the identification of likely significance effects was identified at the scoping stage which was an iterative process in itself, with the evolution of impacts captured in the Impacts Register (see [Section 5.3.3](#)). Further resolution of potential effects has progressed since receipt of the Scoping Opinion (PINS, 2018b). Discussions on impacts and the scope of the EIA (including the evidential requirements to support such decisions) have been progressed through the EP process.

5.3.1.8 Given the various closely associated deliverables that sit alongside this ES, namely: the Impacts Register; Commitments Register; and DCO Application Document Register, the

Applicant has produced a “How to Read this ES” document which is intended to familiarise the reader with the evolution of proportionality from Scoping, via the Preliminary Environmental Impact Report (PEIR) and beyond to this ES and associated DCO application (see [Volume A4, Annex 1.1: How to read this ES](#)). This note has been drafted to assist the reader in navigating and in turn understanding the new approach to delivering proportionate EIA, for which the readers may not be familiar with. For a thorough understanding of all ES and associated deliverables, their content and how they relate to each other, the reader is encouraged to read this guidance document in advance of their detailed review of the ES.

5.3.2 Evidence Base

5.3.2.1 Hornsea Four is located within the former Hornsea Zone, for which large volumes of existing data and knowledge regarding the baseline environment are available from the previous three Hornsea projects, as well as from other sources. Whilst there is no sole reliance on such broad-scale and non-project specific information to underpin assessments and provide the baseline evidence the Hornsea Four EIA maximises the use of these data and related assessments to:

- help characterise the baseline environment to inform the EIA where data are suitable to do so;
- help scope out certain matters from further assessment where there is a clear evidence basis; and
- where certain matters are scoped in, draw upon the evidence base and previous impact assessment work where appropriate as part of the wider consideration of each issue.

5.3.2.2 The Hornsea Four Scoping Report (Orsted, 2018) set out and sought agreement on the data gathering that was considered appropriate to properly characterise the site and enable a robust EIA. Continued discussions with key stakeholders have taken place to further refine and agree the baseline data requirements for the EIA through the EP process. The evolution of the scope has continued through the pre-DCO application phase (as captured in the Impacts Register).

5.3.2.3 As part of the pre-application consultation process for certain key topics, the nature of the existing baseline data, its sufficiency for the Hornsea Four EIA and Habitats Regulations Assessment (HRA) processes, and any requirements for further data collection have been discussed with the relevant consultees as part of the EP process along with the methods of analysis, and assessment of potential impacts. This process included the establishment of a steering group plus eight Expert Topic Groups (ETGs). Further details of the EP process and the ETGs are presented in [Chapter 6: Consultation](#).

5.3.2.4 Agreement logs have been produced for each of the key stakeholders. These form the basis of the Statements of Common Ground (SoCG) which set out the areas of agreement and disagreement between Hornsea Four and the relevant stakeholder in relation to the proposed DCO.

5.3.3 The Impacts Register

5.3.3.1 A cornerstone of the Hornsea Four approach to delivering both proportionate EIA and delivery of commitments, is the development of an Impacts Register. It provides the following discrete and separate functions:

- Details all potential impacts associated with the proposed development and provides a unique identification reference which can be traced through the subsequent steps/documents;
- Sets the scope of the EIA at Scoping, PEIR and ES with appropriate justification including references to agreements reached with stakeholders through the EP Process;
- States the magnitude, sensitivity and significance for impacts considered in detail in the PEIR and ES stage for all potential impacts associated with all activities, in all phases of development for Hornsea Four;
- Identifies Commitments to reduce or eliminate LSE; and,
- Defines the Maximum Design Scenario (MDS) for any given impact.

5.3.3.2 The Impacts Register is an Excel spreadsheet which identifies the potential impacts (and the resultant effects) that could possibly result from the construction, operation and/or decommissioning phases of Hornsea Four, relating to each technical topic under consideration in the EIA process. The register allows the user to sort and filter the impacts that are most relevant to them.

5.3.3.3 Additionally, the Impacts Register tracks positions on the scope of the EIA through the evolution of the process, e.g. whether PINS agreed with judgements on LSE at scoping stage. Furthermore, post scoping where further data (e.g. baseline) or information (e.g. project description) provide evidence that any potential effects will not be significant, the register has been used to direct consultations with key consultees so that such issues were appropriately discussed, with the scope of the impact assessment evolving through the EIA process. So, whilst the register is a key management tool for the EIA it is also a fundamental aspect of proportionality embedded into Hornsea Four, being a live document updated on an iterative basis throughout the EIA.

5.3.3.4 The Impacts Register is provided as [Volume A4, Annex 5.1: Impacts Register](#).

5.3.4 Tiered Approach to Assessments

5.3.4.1 Implementing the proportionate approach begins with including all reasonably predicted environmental impacts (and the resulting environmental effects) within the Impact Register (see [Section 5.3.3](#)). Once included the effects are then separated into one of three categories which are then tested through the EIA process and open to change through to finalisation of the ES:

- Effects that are judged to be not significant and which have been omitted from further detailed assessment in the EIA, either through agreement by PINS in their Scoping Opinion (PINS, 2018b) or clarified and agreed through the subsequent EP process (i.e. not to be considered further in the EIA). No commentary is provided in the technical chapters within this ES on such effects to ensure effort is directed at likely significant effects only.

However, all impacts and effects identified (including those scoped out) are presented in [Volume A4, Annex 5.1: Impacts Register](#);

- Likely significant effects that the Applicant has addressed through a 'simple assessment' approach where there is confidence that such an approach is robust enough to assess significance based on: a good understanding of scientific principles affecting the potential effect, the nature and strength of any source-pathway-receptor linkages, outcomes from previous similar projects; and/or good or best professional practice which would be recognised by other technical experts); and
- Likely significant effects that the Applicant has addressed through a 'detailed assessment' approach.

5.3.4.2 One of the core concepts above is the difference between effects where a 'simple' approach has been used to identify the significance of the impact verses effects where a 'detailed' approach has been adopted. This concept, which has previously been adopted in the Design Manual for Roads and Bridges (DMRB, Highways England, 2009), provides further proportionality within the assessments, focussing effort on those effects which are more complex. **The use of a simple approach does not infer a lower level of evidence or robustness in the decision to categorise an effect as significant or not.**

5.3.4.3 No fixed or firm view exists on the differences between these two types of assessment within the EIA community. For some technical disciplines there will be an obvious distinction between simple and detailed assessment approaches with well understood methods ratcheting up in complexity. However, distinction between approaches is not always clear, can be subjective and is ultimately a matter of professional judgement. Non-prescriptive guidance on what characterises both types of assessment is provided in [Table 5.2: Characteristics of Simple and Detailed Assessments](#).

Table 5.2: Characteristics of Simple and Detailed Assessments.

Characteristics of a Simple Assessment	Characteristics of a Detailed Assessment
Used to determine the impact of a source-pathway-receptor process where there is high certainty of its existence, how it operates and realistic lack of alternatives.	Used to determine the impact of a complex process with multiple linkages, outcomes and alternatives where greater uncertainty exists in environmental variables, processes and outcomes.
A simple assessment is based on the assembly of data and information that is readily available or, possibly through simple non-intrusive site survey (e.g. walkover) to confirm conclusions of desk-based studies.	Detailed assessments may require intrusive or lengthy data gathering campaigns or sampling of the environment.
Qualitative assessments or less detailed quantitative approaches (e.g. simple spreadsheet modelling) are likely to be used.	Quantitative modelling techniques, or finely argued qualitative cases, may be applied which are not readily available through simple spreadsheet or single-calculation approaches.
Simple assessments can be applied where the outputs sufficiently establish confidently that the forecast environmental effect would not be a fundamental issue in the decision-making process.	The objective is to gain an in-depth appreciation of the beneficial and adverse environmental consequences of the project and to inform project decisions, since they are expected to be key issues in whether the project proceeds in its proposed configuration. Relevant stakeholder and

Characteristics of a Simple Assessment	Characteristics of a Detailed Assessment
	statutory environmental body consultations on likely significant effects are important early in the project development process.
Detailing of the assessment in the reporting document can be restricted to a small number of paragraphs, tables and figures.	Detailing of the assessment in the reporting documentation will consist of a number of logically set out paragraphs, table and figures that may show and discuss complex details. A technical report may accompany such an assessment containing further, even more detailed workings.

5.4 Commit, Consult, Design

5.4.1.1 **Figure 5.1** identifies the iterative Commit, Consult, Design ethos used to help develop Hornsea Four, where the three considerations are:

- **Commit:** Firm commitments are provided by the Applicant to mitigate (reduce or eliminate) LSE with these being set out in the Commitments Register including details of how commitments are secured (see [Section 5.3.3](#)).
- **Consult:** The project description and associated commitments to reduce or avoid LSE have been consulted on widely (see [Section 5.4.3](#) and [Chapter 6: Consultation](#)).
- **Design:** The earliest stages of the design process relate to route planning and site selection which incorporated a number of commitments to avoid or reduce LSE (see [Section 5.4.4](#)). Good design principles have also been incorporated in to Hornsea Four through a range of measures as set out in [Section 5.4.2](#).



Figure 5.1: Commit, Consult, Design Ethos

5.4.1.2 A number of specific elements incorporated into the EIA and design evolution of Hornsea Four to help deliver this ethos are set out in the following sections.

5.4.2 Commit

5.4.2.1 For each topic the EIA process has systematically identified impacts and has classified mitigation measures in accordance with the IEMA 'Guide to Shaping Quality Development' (IEMA,2016) definitions, as follows:

- Primary (inherent) mitigation are measures that form an intrinsic part of the design that are described in the design evolution narrative and included within the project description e.g. reducing infrastructure heights to reduce visual impact;
- Secondary (foreseeable) mitigation: those measures that require further activity in order to achieve the anticipated outcome, e.g. development of the optimal reinstatement measures for restoring a disturbed sensitive natural habitat; and
- Tertiary (inexorable): are measures which will be required regardless of the EIA process as they are imposed e.g. as a result of legislative requirements and/or standard industry practices e.g. via a Code of Construction Practice (CoCP) or similar.

5.4.2.2 Following consultation on the PEIR, Hornsea Four developed a number of 'Enhancement' commitments which are over and above those required to adequately reduce or eliminate LSE, as set out above. 'Enhancement' commitments are clearly marked as such within the Commitment Register.

5.4.2.3 As advocated in the EIA guidance (IEMA, 2004) it is only necessary to assess potential effects arising from the final design, incorporating all primary and tertiary mitigation (only pre-mitigation effects and residual effects need both be set out where secondary mitigation is required). In this respect the EIA team has considered mitigation measures that Hornsea Four has already committed to adopt in making an initial assessment of the likely significant effects. A number of offshore wind farms and cable connections have been built and are operating in UK waters and many more have passed and are passing through the consenting processes. As a result, mitigation measures (usually 'primary' and 'tertiary') for most of the impacts associated with offshore wind developments can be well-developed and are widely-accepted as part of the project design process.

5.4.2.4 Hornsea Four has developed further mitigation measures (mainly 'secondary') to address certain site and area-specific conditions and sensitivities.

5.4.2.5 Once agreed by Hornsea Four, all mitigation commitments are recorded in the Commitments Register ([Volume A4, Annex 5.2: Commitments Register](#)) which is maintained as an Excel spreadsheet. Hornsea Four has actively encouraged stakeholders and communities to propose mitigation commitments. Each proposed commitment has then been considered and where appropriate adopted within the Commitments Register.

5.4.2.6 It should be noted that the Applicant has responded to comments in the Scoping Opinion (PINS, 2018b) that in certain cases that there was insufficient certainty in relation to the effectiveness of some of the commitments at scoping. Specifically, PINS stated:

"...a number of these 'Commitments' are broad in nature, and/or are reliant on site-specific considerations which are not documented. For example, several of the Commitments are caveated with phrases such as 'where practical' and 'where possible'."

5.4.2.7 Following on from scoping, commitments have been updated and refined through the EIA process in order to make them clearer, specific and more precise ensuring they are fit for purpose and enforceable.

5.4.2.8 Included within the Commitments Register are details on how each of the commitments will be legally secured i.e. through provisions in the DCO, deemed Marine Licence (DML), separate Marine Licence (ML) or other documents such as management plans. The DCO application includes a number of 'outline' plans (see [Volume F2](#)) which are submitted to support the commitments made and provide further detail where appropriate. Such outline plans will be finalised post-consent in agreement with relevant organisations such as the local authority (East Riding of Yorkshire Council), Natural England (NE), Marine Management Organisation (MMO) etc. All such plans are identified in [Volume 1, Chapter 2: DCO Application Document Register](#).

5.4.3 Consult

5.4.3.1 Pre-application consultation is a key part of the EIA process, helping to identify key issues that need addressing, scoping out others where it is agreed that they are not significant and establishing dialogue and agreements on specific methodologies for assessment, evidence bases etc.

5.4.3.2 This consultation process is prescribed as part of the Planning Act 2008 and as part of the process a Scoping Report (Orsted, 2018) was submitted to PINS in October 2018. A formal response from PINS (on behalf of the Secretary of State) was received in November 2018 (PINS, 2018b). Subsequently, a PEIR (Orsted, 2019) was compiled, which set out the preliminary results of the EIA process, and was made available for formal consultation between 13th August and 23rd September 2019. A number of discrete additional changes to the Hornsea Four Order Limits were made after this date, due to the ongoing evolution of onshore project aspects and in response to stakeholder feedback, a further targeted consultation was therefore undertaken in February 2020 to ensure that all refinements were consulted on appropriately in advance of the submission of the DCO application. The Applicant has reviewed the responses to the PEIR as well as subsequent targeted statutory consultation section under Section 42 of the Planning Act 2008, and in response has made appropriate changes to the Hornsea Four Order Limits as well as implementing further changes to the EIA itself which are reflected in this ES.

5.4.3.3 To ensure key stakeholders were consulted on a regular and formalised basis an EP process was adopted. This process aimed to gain agreement with key stakeholders on the data and information to be included in this ES. The process additionally facilitated wider understanding of project decisions, ways of working and improved the flow of information to and from the project team.

5.4.3.4 A detailed description of the consultation process (including EP process, landowner, public and community aspects) is set out in [Chapter 6: Consultation](#).

5.4.4 Design

Route Planning and Site Selection

5.4.4.1 Route planning and site selection is described in [Chapter 3: Site Selection and Consideration of Alternatives](#). In addition to designing a technically feasible project, the site selection process has incorporated some fundamental commitments to avoid or reduce impacts by avoiding sensitive, important or valuable features early in project design and in so doing reduce any adverse impacts of Hornsea Four and contribute to proportionate EIA and the level of assessment required. These commitments are all presented in the commitments register ([Volume A4, Annex 5.2: Commitment Register](#)).

Good Design Principles

5.4.4.2 In recognition that great infrastructure uses design to solve problems and seeks to maximise the different types of benefits it provides over its whole life, the National Infrastructure Commission (NIC) has identified four design principles to guide the planning and delivery of major projects (NIC Design Group, 2020):

- Climate: Mitigate greenhouse gas emissions and adapt to climate change;
- People: Reflect what society wants and share benefits widely;
- Places: Provide a sense of identity and improve our environment; and
- Value: Achieve multiple benefits and solve problems well.

5.4.4.3 Additionally, Overarching National Policy Statement for Energy (EN-1) contains 'criteria for "good design" for energy infrastructure', and states how 'good design can help mitigate adverse impacts'. Furthermore, paragraph 4.5.1 of EN-1 states that high quality design goes beyond aesthetic considerations with functionality, fitness for purpose and sustainability being equally important.

5.4.4.4 Clearly, good design is a key aspect of developing national infrastructure and a Design Vision Statement ([Volume A4, Annex 4.6: Outline Design Vision Statement](#)) has been produced for the onshore elements of Hornsea Four which, "helps to ensure sense of place is considered and integrated throughout the design process and adverse environmental effects are mitigated where possible whilst respecting landscape character" whilst additionally seeking, "to bring not only greater visual mitigation as part of Hornsea Four, but also encourage ecological and amenity enhancements." The document explores a number of design principles for the Onshore Substation (OnSS) - the largest visible onshore massing of infrastructure, and compares a number of options under each of the principles identifying preferred approaches to each. The design principles include (*inter alia*): building form, composition and layout; materials, colour and finishes; landscape treatments; and access, circulation and wayfinding. Design principles for both the landfall, and onshore Electrical Cable Corridor (ECC) are also set out.

5.4.4.5 In addition to adopting good design principles, and although not a mandatory requirement for NSIPs, the Applicant has committed to reducing any net loss to biodiversity as a result of the development of the OnSS and [Volume F2, Chapter 16: Outline Net Gain Strategy](#) presents the proposed net gain opportunities at this location. The production of an outline

Net Gain Strategy fulfils project commitment Co199 ([Volume A4, Annex 5.2: Commitment Register](#)).

- 5.4.4.6 On a wider basis the Applicant has also set out an outline enhancement strategy (see [Volume F2, Chapter 14: Outline Enhancement Strategy](#)) which details and secures broader enhancement that Hornsea Four seeks to deliver across a range of environmental aspects including social, economic, amenity value and biodiversity.
- 5.4.4.7 The outline Design Vision Statement ([Volume A4, Annex 4.6: Outline Design Vision Statement](#)) encompasses information found in various Hornsea Four reports and documents as presented in [Figure 5.2](#).

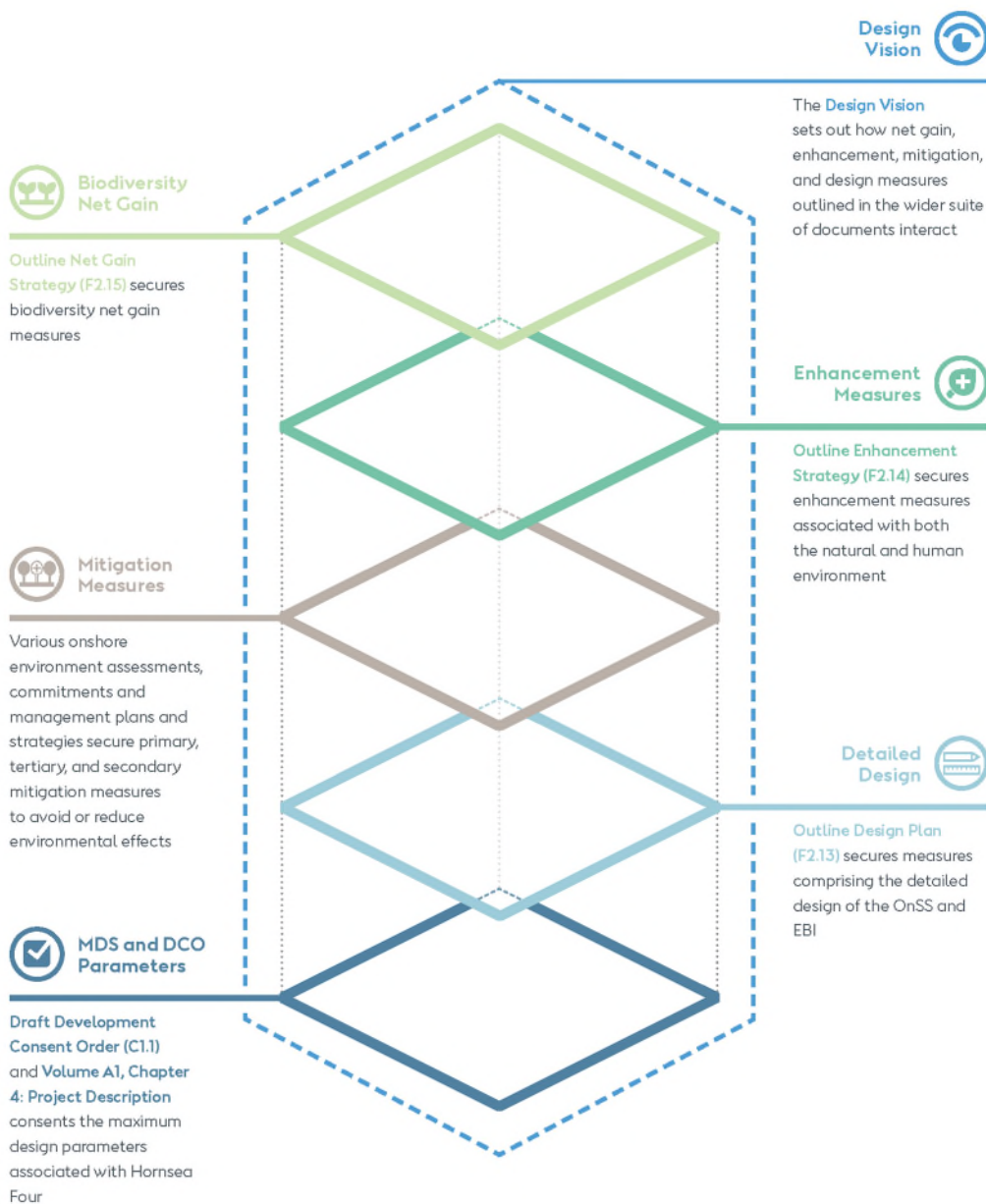


Figure 5.2: Information used to inform the Design Vision Statement

5.5 Information for Inclusion in the ES

5.5.1.1 **Table 5.3** summarises the information requirements set out in Schedule 4, Part 1 of the EIA Regulations and where such information can be found within this document. The reader is directed to the original legislation for a full description of the requirements which are only summarised below.

Table 5.3: EIA Regulations – Information for Inclusion in Environmental Statements.

Schedule 4 Requirement	Where Set Out in This ES
<p>A description of the development including: its location; its physical characteristics and land-use requirements during the construction and operational phases; the main characteristics of the operational phase; and an estimate of expected residues and emissions (e.g. water, air, soil, noise, vibration, light, heat, radiation and wastes) produced during the construction and operation phases.</p>	<p>Chapter 4: Project Description provides a comprehensive description of the project.</p>
<p>A description of the reasonable alternatives studied by the developer, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.</p>	<p>Chapter 3: Site Selection and Consideration of Alternatives provides a description of the site selection process and the alternatives considered by the Applicant. Included within this chapter are references to the comparative environmental appraisals that have taken place through the project’s development to assist in routing and site selection.</p>
<p>A description of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development.</p>	<p>Each of the technical chapters (Volume A2, Chapters 1 to 12 (offshore) and Volume A3, Chapters 1 to 10 (onshore)) includes information characterising the baseline scenario along with a description how this may evolve over the lifetime of the project without any development occurring. A number of technical reports are also included as annexes to the ES often presenting baseline information (for example, collected through survey effort). Such technical reports are provided in Volume A5 (offshore) and Volume A6 (onshore).</p>
<p>A description of the factors likely to be significantly affected by the development: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, landscape and the interaction of these factors.</p>	<p>The EIA has been progressed in line with the Scoping Opinion from PINS and subsequent consultations. Following the proportionate approach, the EIA has focussed on significant effects.</p> <p>The technical assessments are provided in Volume A2 Chapters 1 to 12 (offshore) and Volume A3 Chapters 1 to 10 (onshore). A Health Impact Assessment is set out in Volume A4 Annex 5.8.</p>

Schedule 4 Requirement	Where Set Out in This ES
<p>A description of the likely significant effects of the development on the environment covering the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.</p>	<p>Likely significant effects are set out in each of the technical chapters, Volume A2, Chapters 1 to 12 (offshore) and Volume A3, Chapters 1 to 10 (onshore) and the Impacts Register (Volume A4, Annex 5.1).</p> <p>Assessments of cumulative effects, inter-related effects and any transboundary effects (where they have been screened in) are also presented in the technical chapters of the ES.</p>
<p>A description of the forecasting methods or evidence, used to identify and assess significant effects, including details of the difficulties encountered and the main uncertainties involved.</p>	<p>Each of the technical chapters of the ES contain details of the forecasting methods used along with difficulties and uncertainties.</p> <p>See Volume A2, Chapters 1 to 12 (offshore) and Volume A3, Chapters 1 to 10 (onshore).</p>
<p>A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements.</p>	<p>Each of the technical chapters contains details of the mitigation measures used to avoid or reduce environmental effects as well as recommendations for any future monitoring. See Volume A2, Chapters 1 to 12 (offshore) and Volume A3, Chapters 1 to 10 (onshore). Additionally, the Commitments Register holds details of all measures the Applicant has signed up to which will reduce environmental impacts (see Volume A4, Chapter 5 Annex 2).</p>
<p>A description of the expected significant adverse effects deriving from the vulnerability of the development to risks of major accidents and/or disasters.</p>	<p>Commentary on risks from major accidents and/or disasters is provided in this chapter in Section 5.8.2.</p>
<p>A non-technical summary of the information.</p>	<p>A non-technical summary of the ES is provided as a standalone document.</p>
<p>A reference list detailing the sources used for the descriptions and assessments.</p>	<p>References are provided at the end of each ES chapter.</p>

5.6 The Project Design Envelope and Maximum Design Scenarios

5.6.1.1 The Hornsea Four EIA is based on a project envelope approach, also known as a ‘Rochdale Envelope’ approach. Paragraph 2.6.43 of National Policy Statement (NPS) EN-3 (DECC, 2011b) and PINS Advice Note Nine (PINS, 2018a) recognise that, at the time of submitting an application, offshore wind developers may not know the precise nature and arrangement of turbines, infrastructure and associated infrastructure that make up the proposed development. This is due to several factors such as the evolution of technology, the need for flexibility in key commercial project decisions and the need for more detailed pre-construction engineering surveys which are required before a final design and layout can be determined. It is therefore important that a design envelope approach is used to provide flexibility to maximise the potential for Hornsea Four to proceed and be successful whilst providing sufficient detail to enable a robust EIA to be carried out. A degree of necessary

flexibility has, therefore, been built into the Hornsea Four design by applying the design envelope approach, consistent with EN-3 and the PINS advice note.

- 5.6.1.2 To inform the assessments, a range of parameters for each aspect of the project has been defined (the design envelope) with a MDS identified for each potential effect that has been assessed. So, whilst the design envelope is broad enough to encompass the potential variations in design and other aspects of Hornsea Four, the MDS ensures that assessment is based on a likely worst-case approach, specific to the effect being assessed. For each aspect of the project, a range of parameters has been defined and subsequently, the worst-case scenario associated with each parameter dependent on the receptor has been used in each impact assessment. This provides confidence that the EIA process robustly considers the likely worst-case impact of the project on each aspect of the environment, whilst also allowing the project to be optimised and refined at the time of construction noting that this may be several years after the final DCO submission is made. The project design envelope therefore provides the maximum extent of the consent sought. The detailed design of the project can then be developed, refined and procured within this consented envelope prior to construction. The technical chapters contain MDSs for each of the potential effects assessed, with MDSs for each effect considered during the EIA process presented in [Volume A4, Annex 5.1: Impacts Register](#).
- 5.6.1.3 Such an approach is good practice, as reflected in case law on the ‘Rochdale Envelope’ principle. Suitably applied in EIA it can help to avoid the need for protracted consenting procedures, whilst giving a comprehensive assessment of the worst likely environmental effects.
- 5.6.1.4 Hornsea Four includes a number of differing foundation types for the offshore structures as part of the design envelope, and each of these have variable seabed footprints as well as differing requirements for scour protection, seabed preparation etc. Where there are a number of differing build-out scenarios in relation to project envelope the MDS includes all foundation types under consideration. This approach ensures environmental effects would not be any greater than assessed and presented in this ES. However, recognising that this does not allow the reader to view the maximum parameter for each discrete foundation type the ES includes a further annex setting out the relevant metrics for each differing type of foundation under consideration, and this is provided in [Volume A4, Annex 4.8: Pro-rata Annex](#).

5.7 The EIA Process

- 5.7.1.1 EIA is a systematic, iterative and prescribed process which moves through a number of stages from scoping through to production of the ES (and beyond, if monitoring and compliance is included). The process is framed by statutory requirements as well as the pertaining planning and policy context (see [Chapter 2: Planning and Policy Context](#)). Furthermore, consideration of best, good and advised EIA practice (see [Table 5.1](#)) and adoption of a Proportionate EIA approach (see [Section Error! Reference source not found.](#)) has guided the specific approach followed by Hornsea Four.
- 5.7.1.2 The key elements of the EIA process and the identification of significant effects are described in the following sections. While these provide a general framework for identifying impacts

and assessing the significance of their effect(s), in practice the approaches and criteria applied across different EIA topics vary.

5.7.2 Concept, Feasibility and Site Selection

5.7.2.1 Whilst not strictly a stage in the EIA process the conceptual, feasibility and early stage site selection work ([Chapter 3: Site Selection and Consideration of Alternatives](#)) all included the environment as a key consideration, alongside engineering and cost considerations. The history of the site within the former Hornsea Zone means that there have been many years' work studying the offshore area and identifying wider scheme requirements to connect to the National Grid. The commitments to avoid sensitive locations and assessment of scheme components using, for example Black, Red, Amber, Green (BRAG) criteria, are all early stage impact assessments to resolve Hornsea Four down to its current description and configuration.

5.7.3 Technical Scope of the EIA

5.7.3.1 The technical scope evolved through the EIA process, notably in response to the Scoping Opinion (PINS, 2018b) and subsequent consultations (see [Chapter 6: Consultation](#)) so that scoping became an iterative process, not just responding to the Scoping Opinion as a discrete event. Evolution of the scope (see [Paragraph 5.3.2.2](#) through the EIA process reflected the gathering of further baseline information as it became available through site surveys, the evolution of the project description or inclusion of commitments which were incorporated to implement mitigation throughout the pre-application period.

5.7.4 Spatial Scope of the EIA

5.7.4.1 In general terms, the spatial or geographical, scope of each technical assessment takes into account the following factors:

- the physical extent of the proposed works, as defined by the project design envelope;
- the nature of the baseline environment and the way the impacts are likely to be propagated (e.g. through defining source-pathway-receptor approaches); and
- the pattern of governmental administrative boundaries, which provide the planning and policy context for the project.

5.7.4.2 For example, any potential effects on buried archaeology would tend to be confined to those areas physically disturbed by the works, whilst the effects of noise or visual intrusion could potentially be experienced at some distance from the works.

5.7.4.3 Appropriate study areas have been considered for each environmental topic by the specialists undertaking that assessment. Such study areas have been discussed with the relevant consultees and each technical chapter includes commentary on how the study area has been defined.

5.7.5 Temporal Scope of the EIA

5.7.5.1 The temporal scope of the assessment generally refers to the time periods over which impacts may be experienced which may be permanent, temporary, long term or short term.

This has been established for each technical discipline, and where appropriate through discussion with the relevant statutory consultees. Terms used to qualify the duration of an impact or effects will tend to be specific to the topic being considered.

5.7.5.2 Where there is a direct cause-effect relationship relating to a specific project phase it is important to understand what these are, and the project programme is set out in [Chapter 4: Project Description](#). In summary the high-level project durations are:

- Construction (including site preparation activities): Whole project maximum duration of 4 years 6 months (54 months), but variable between differing components;
- Operation: 35 years; and
- Decommissioning: No programme to be created until nearer end of the life of the project.

5.7.6 Characterisation of the Existing Environment (The Baseline)

5.7.6.1 Characterisation of the existing environment has been undertaken to determine the baseline conditions in the area covered by the project and relevant surrounding study areas. This characterisation includes usage of readily available information from desktop study, and where it is relevant through site specific survey. The available data is reviewed to ensure it is robust and allows the required level of assessment in order to determine the significance of any potential effect with sufficient confidence.

5.7.6.2 The specific approach to establishing a robust baseline (upon which impacts can be assessed) is set out within each relevant chapter of this ES ([Volume A2, Chapters 1 to 12](#) (offshore) and [Volume A3, Chapters 1 to 10](#) (onshore)). This approach is based on feedback from the Scoping Opinion (PINS, 2018b), the PEIR (Ørsted, 2019) and through the EP process (incorporating topic specific technical panels) as described in [Chapter 6: Consultation](#). Where through discussion with regulators and technical groups further data is required, the scope and scale of surveys has been agreed prior to such survey work being carried out where at all possible. New data has been gathered for this EIA on a consultative basis.

5.7.6.3 Schedule 4, paragraph 3, of the EIA Regulations require that an outline of the likely evolution of the baseline, in the absence of the development (as far as this can be assessed 'with reasonable effort' based on available information and scientific knowledge) is provided. Each technical assessment sets out the anticipated evolution of the baseline that is predicted to occur over the time that Hornsea Four will be built/operated (35 years). This reflects changes in the baseline that might be expected from natural changes (e.g. natural changes in habitat condition etc.) or other built development.

5.7.6.4 Limitations with the data collected to inform the baseline are provided in each technical assessment chapter, setting out clearly where either the data itself, or any subsequent subjective evaluation may introduce error. An explanation on how data limitations were managed or commentary on confidence levels is included. Key data limitations with the baseline data and their ability to materially influence the outcome of the EIA are noted and commented on.

5.7.7 Identification of Receptors

- 5.7.7.1 Elements of the environment which are potentially subject to variation (i.e. receptors) due to environmental changes brought about by Hornsea Four are identified on a subject by subject basis. Each technical assessment defines the study area that is covered for that topic, providing justification of the area selected to incorporate potential significant effects, which include direct and indirect effects.
- 5.7.7.2 Receptors may be placed into groups if there are multiple numbers of very similar receptors with assessments made on the worst-case basis (e.g. using the receptor in closest proximity to Hornsea Four where distance is a key factor affecting significance such as when assessing noise impacts from construction activity).

5.7.8 Impacts, Effects, Mitigation and Significance

- 5.7.8.1 Taking account of the IEMA EIA Quality Mark Article¹, 'Impacts' are defined as the physical (or chemical) changes that will be caused by Hornsea Four activities. 'Effects' are defined as the consequences of these impacts to biological populations, ecosystems and humans (including their physical and cultural assets). It should be noted that in some technical chapters 'impact' and 'effect' are used interchangeably due to differing conventions and best practice adopted by differing technical areas.
- 5.7.8.2 For many technical topics the likely significance of an effect is established by combining the magnitude of an impact with the sensitivity of the receptor to that impact (noting that sensitivity is not considered as an inherent characteristic but how something specifically responds to an external factor). The value of a resource or receptor is also considered.
- 5.7.8.3 As set out in various widely accepted methodologies (e.g. DMRB LA104 Environmental Assessment and Monitoring (Highways England, 2019) and PD 6900:2015 Environmental impact assessment for offshore renewable energy projects – Guide (British Standards Institute (BSI), 2015), most technical topics assess the likely significance of effects as follows:
- The level of effect has been determined by considering the magnitude of an impact together with the value of an affected resource or receptor and its sensitivity to the impact (see [Figure 5.3: Deriving the Level of Significance of an Impact](#)); and
 - A level of effect of moderate or more is considered a 'significant' effect for the purposes of the EIA. A level of effect of minor or less is considered 'not significant'.

¹ <https://transform.iema.net/article/impacts-and-effects-do-we-really-understand-difference>

		Magnitude of impact (degree of change)			
		Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Low	Neutral or Slight (Not Significant)	Neutral or Slight (Not Significant)	Slight (Not Significant)	Slight (Not Significant) or Moderate (Significant)
	Medium	Neutral or Slight (Not Significant)	Slight (Not Significant) or Moderate (Significant)	Moderate or Large (Significant)	Moderate or Large (Significant)
	High	Slight (Not Significant)	Slight (Not Significant) or Moderate (Significant)	Moderate or Large (Significant)	Large or Very Large (Significant)
	Very High	Slight (Not Significant)	Moderate or Large (Significant)	Large or Very Large (Significant)	Very Large (Significant)

Figure 5.3: Deriving the Level of Significance of an Impact

5.7.8.4 The significance matrix used is taken from the 2019 DMRB methodology (Highways Agency, 2019). Further modifications have been introduced in the interest of proportionate assessment and in accordance with guidance presented in BSI (2015) such that:

- a magnitude of impact of ‘no change’ is not assessed since it will always lead to a not significant effect;
- a negligible magnitude impact is not considered further since it will always lead to a not significant effect; and
- resources and receptors of negligible value or sensitivity are not considered further since any magnitude of impact on them would not lead to a significant effect.

5.7.8.5 It should be noted that the significance matrix has evolved since the PEIR where the matrix used was based on the older 2009 DMRB methodology. A review of the 2019 DMRB versus the 2009 DMRB matrix has been undertaken to ensure that appropriate translation of significance from the PEIR to ES has been applied on a consistent basis. There is only one area where additional interpretation is required, and this relates to instances where an impact falls within the formerly ‘minor’ (non-significant) category resulting from a receptor of medium sensitivity and a magnitude of minor. In this instance the 2019 DMRB methodology allows for the impact to be categorised as either ‘slight’ (non-significant) or ‘moderate’ (significant). All of the impacts set out in the Impacts Register have been reviewed to identify such instances and a decision taken as to whether the impact is defined at ES stage as ‘slight’ or ‘moderate’. Within each technical chapter such cases are identified within the section ‘Project Basis for Assessment’ and appropriate commentary is set out within the Impact Register. Where the impact is confirmed as moderate the chapter sets out the appropriate level of assessment for the impact under consideration.

5.7.8.6 For some topics, significance is established by simply comparing the magnitude of an impact with a quantified standard which is based on a level at which recognised effects are triggered (e.g. sleep disturbance for noise). Topic specific methodologies that will be

followed during the EIA are included in in each chapter with assessments carried out by suitably qualified technical experts.

- 5.7.8.7 The generic methodology set out above is overarching guidance to enable a more consistent approach and more comparative results within the impact assessment. However, EIA remains an expert judgement based on science, expertise and experience.
- 5.7.8.8 Mitigation measures (commitments) are developed to eliminate or reduce any negative effects identified. In this context, commitments are taken to include design measures (primary mitigation) and construction practices, as well as management actions (both secondary and tertiary mitigation). The Commitments Register identifies which type of mitigation is associated with which commitment (see [Volume A4, Annex 5.2: Commitment Register](#)).
- 5.7.8.9 Residual effects (i.e. those following incorporation of identified mitigation) of moderate significance or above are considered important to decision making, warranting careful attention to ensure conditions regarding mitigation and monitoring employ the most appropriate (technically feasible and cost-effective) measures.
- 5.7.8.10 Effects of slight significance or less may be brought to the attention of decision makers but will typically be identified as warranting little if any weight in the decision-making process. In order to deliver a proportionate EIA effects of slight significance are deemed as being 'not significant' in the context of the EIA Regulations and as such are not considered in detail in the relevant chapters of the ES but are set out in the Impacts Register (see [Volume A4, Annex 5.1](#)).
- 5.7.8.11 For effects that are initially assessed as being significant (even with primary or tertiary mitigation applied) secondary mitigation is further incorporated to reduce LSE to environmentally acceptable (i.e. non-significant) levels following the initial assessment. Secondary mitigation is normally receptor specific and may make reference to management plans to control activities or specific commitments which were not either inbuilt in to the Hornsea Four design nor are required through legislation or good practice (e.g. Commitment 165 which commits to closure of Public Rights of Way (PRoWs) for no longer than three months at any one time, or for six months in total over the whole construction period along the ECC or at the landfall).
- 5.7.8.12 EIA is intended to ensure that decisions on projects are made in full knowledge of their likely effects on the environment and society. The residual effects and their significance reported in the ES are based on Hornsea Four as planned and designed fully inclusive of all proposed mitigation.
- 5.7.8.13 The mitigation measures developed during the EIA process (secondary mitigation), as well as standard industry practice measures (tertiary mitigation), are fully committed to by the Applicant as integral aspects of Hornsea Four. [Volume A4, Annex 5.2: Commitments Register](#) identifies whether mitigation is primary, secondary or tertiary and how commitments are secured.
- 5.7.8.14 Predictions of impacts and their effects on resources and receptors can be uncertain. Predictions can be made using varying means ranging from qualitative assessment and

expert judgement (including reference to the evidence base) through to quantitative techniques (e.g. modelling). The accuracy of predictions depends on the methods used and the quality of the input data for Hornsea Four and the environment. Where an assumption has been made, the nature of any uncertainty which stems from it is presented.

5.7.8.15 Where uncertainty affects the assessment of effects, a conservative (i.e. reasonable worst case) approach to assessing the likely residual effects has been adopted with mitigation measures developed accordingly.

5.7.8.16 To verify predictions and to address areas of uncertainty, monitoring is proposed as a key aspect of environmental management for the construction and operation of Hornsea Four. Where agreed, such monitoring is also be included in the Commitments Register.

5.7.9 Inter-relationships (or Inter Related Effects)

5.7.9.1 Potential inter-related effects are assessed through consideration of all effects on a receptor through an assessment of the scope of all effects on that receptor to interact, whether spatially or temporally, to result in inter-related effects on a receptor. The approach identifies where potential interactions may occur, resulting in an inter-related effect on a specific receptor, and where knock-on effects may occur to other receptors.

5.7.9.2 Inter-related effects can be divided into two categories, described below:

- Project-lifetime effects: Assessment of the scope for effects that occur throughout more than one project phase (i.e. construction, operation and decommissioning) to interact to potentially create an effect of greater significance than if assessed just within individual project phases. For example, increases to suspended sediment concentrations from activities across all three of the project phases stated above may combine to create an additive effect of greater significance than these impacts considered alone in each discrete project phase.
- Receptor-led effects: Assessment of the scope for all effects to interact (spatially and temporally) to create an effect on a receptor of greater significance than when the effects are considered in isolation. For example, effects due to increased noise and poorer air quality during the construction phase together could have an effect of greater significance on a residential receptor than each impact considered in isolation. The receptor-led effects assessment also considers whether a project lifetime inter-related effect is predicted for that impact.

5.7.9.3 The inter-related effects assessment thereby incorporates the findings of the individual assessment chapters to describe potential additional effects that may be of greater significance when compared to individual effects acting on a single receptor (or group). If there are additional effects, these are considered additively and qualitatively using expert judgement. The proposed approach is summarised in the following steps. For each EIA topic chapter:

- Identification of relevant receptors from assessments undertaken for individual EIA technical topics. This involves high-level description of the potential to produce inter-related effects on the topic area being assessed.

- Identification of the impact source and pathways that could affect that receptor and where those pathways are described and assessed. This involves cross referencing to other chapters and the impacts assessed within them relevant to the inter-related effects assessment for that topic. For project-lifetime effects, it is also determined whether there is potential for inter-related effects from the same impact across multiple project phases.
- Production of an inter-related effects assessment within the technical chapter, tabulating potential inter-related effects (both project-lifetime and receptor-led effects) and providing the relevant assessment narrative.

5.7.9.4 Effects that represent no change to the baseline (i.e. no impact) are unlikely to have inter-related effects when combined with other impacts and can be scoped out of the inter-related effects assessment. However, where impacts that have an impact significance of negligible or higher, interactions of greater significance than the impacts in isolation may occur. These are then considered through expert judgement.

5.7.9.5 In relation to project-lifetime effects, those that only occur over one project phase (e.g. just the construction phase) have no potential to interact with impacts of the same nature over multiple project phases and can therefore be scoped out of assessment. Effects that may be seen in the construction and decommissioning phases (but not the operational phase) are considered to be isolated and therefore recovery between these two phases is expected. It is not considered that there is the potential for inter-related effects where this situation arises, however expert judgement is applied on a case-by-case basis.

5.7.9.6 It should be noted that some elements of the impact assessment inherently consider inter-related effects. For example: the effects on fish and shellfish ecology have knock-on effects for both marine mammals and offshore ornithology in terms of potential loss of prey resource. Where these potential inter-related effects are identified as being inherently considered in the impact assessment, this is described within the individual topic chapters.

5.7.9.7 The inter-related effects relating to each technical assessment are provided in the relevant technical chapters (see [Volume A2, Chapters 1 to 12](#) (offshore) and [Volume A3, Chapters 1 to 10](#) (onshore)).

5.7.9.8 It is important to note that the inter-related effects assessment considers only effects produced by Hornsea Four, and not those from other projects (these will be considered within the cumulative effects assessment (CEA)).

5.7.10 Cumulative Effects Assessment

5.7.10.1 Cumulative effects can be defined as effects upon a single receptor from Hornsea Four when considered alongside other proposed and reasonably foreseeable projects and developments. This includes all projects that result in a comparative effect that is not intrinsically considered as part of the existing environment.

5.7.10.2 The approach for cumulative impacts is based upon the PINS Advice Note Seventeen: Cumulative Effects Assessment (PINS, 2019). The approach to the CEA is intended to be specific to Hornsea Four and takes account of the extensive available knowledge of the

environment and other activities around Hornsea Four. The potential for, and scope of, cumulative effects have been discussed during the EP process with key stakeholders.

5.7.10.3 The approach to cumulative assessment for Hornsea Four also takes into account the Cumulative Impacts Assessment Guidelines (RenewableUK, 2013) and PINS Advice Note Nine: Rochdale Envelope (PINS, 2018a).

5.7.10.4 More specific details of how the approach has been applied to Hornsea Four is provided in [Volume A4, Annex 5.3: Offshore Cumulative Effects](#) and [Volume A4, Annex 5.5: Onshore Cumulative Effects](#). Each of the technical assessment chapters include a section on CEA, providing subject specific assessments which incorporate the foreseeable projects and developments that have passed through the identification process and all such developments are listed in [Volume A4, Annex 5.4: Location of Offshore Cumulative Schemes](#) and [Volume A4, Annex 5.6: Location of Onshore Cumulative Schemes](#).

5.7.11 Transboundary Impacts

5.7.11.1 Transboundary effects arise when impacts from the development within one European Economic Area (EEA) state affects the environment of another EEA state(s). The need to consider such transboundary effects has been embodied by the United Nations Economic Commission for Europe Convention on EIA in a Transboundary Context (commonly referred to as the 'Espoo Convention'). The Convention requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary effects. [Table 5.4](#) identifies the approximate distances of Hornsea Four from the Exclusive Economic Zone (EEZ) boundaries of other EEA states that share a maritime border with the UK.

Table 5.4: Summary of approximate distance to nearest EEZ (median line) of other EEA states.

EEA state	Distance from Hornsea Four to the nearest marine boundary (km)
The Netherlands	87
Germany	222
Denmark	235
Norway	247
Belgium	249
France	278
Republic of Ireland	333
Iceland	1,114

5.7.11.2 The Espoo Convention has been implemented in the UK for the purposes of NSIPs by the Infrastructure Planning (EIA) Regulations 2017. Regulation 32 sets out a prescribed process of consultation and notification.

5.7.11.3 In addition, PINS Advice Note Twelve: Transboundary Impacts and Processes (PINS, 2020c) sets out the procedures for a consultation in association with an application for a DCO where such a development may have significant transboundary effects. It recommends that the developer undertakes independent consultation with other EEA states that may be affected to speed up the consultation process and reduce the risk to the development of a lack of

time to consider transboundary impacts at a later stage, which could lead to consent refusal. It is suggested that all relevant environmental bodies within the identified EEA states and any relevant interest groups should be consulted as appropriate.

5.7.11.4 Where consultation is required and undertaken by the developer, they are recommended to collate the names and contact details for the relevant EEA states and share the information with PINS and the SoS. All consultation is recorded within [Volume B1 Chapter 1: Consultation Report](#).

5.7.11.5 A transboundary screening process has been carried out and presented as Annex J of the Scoping Report (Orsted, 2018) and this has confirmed that only certain offshore (marine) technical aspects could result in such effects, namely: fish and shellfish ecology; marine mammals; ornithology; commercial fisheries; shipping and navigation; and aviation and radar. Each of these technical assessment chapters includes a short section of such potential transboundary effects with a summary of the transboundary effects is provided in [Volume A2, Chapter 12: Cumulative and Transboundary Effects Offshore Summary](#).

5.8 Other EIA Matters

5.8.1 Human Health

5.8.1.1 Under the EIA Regulations (Regulation 5(2) and paragraph 4 of Schedule 4) the EIA must identify, describe and assess, the direct and indirect significant effects of a proposed development (including any operational effects if appropriate) on several factors including human health.

5.8.1.2 The PEIR (Orsted, 2019) set out a proposed method for assessing health effects from Hornsea Four with this information to be provided as a technical annex to the ES. The Health Impact Assessment (HIA) draws on information provided in various ES chapters (notably: air quality; noise and vibration; geology and ground conditions; and, land use and agriculture) with the assessment itself provided in [Volume A4 Annex 5.8: Health Impact Assessment](#). The HIA approach was discussed with Public Health England on 17th January 2020.

5.8.2 Major Accidents and / or Disasters

5.8.2.1 Regulation 5 (4) of the EIA Regulations requires the EIA to consider:

“expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.”

5.8.2.2 The EIA Regulations go on to say in Paragraph 8 of Schedule 4 the ES should include:

“A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should

include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.”

5.8.2.3 Hornsea Four will not include any large inventories of hazardous material that would be released in the event of a major disaster or accident. The main areas of vulnerability for the development stem from its marine operating conditions – notably in relation to navigational safety, coastal erosion at the landfall and onshore flood risk.

5.8.2.4 The assessments set out in this ES provide details of potential risk e.g. due to flooding, and potential consequential risks to the environment and people. **Table 5.5** sets out a summary of the various major accidents and risks that pertain to Hornsea Four along with signposting of where relevant information is provided in the ES, and where risks will be managed by relevant management plans. Overall, no significant risk from major accidents has been identified due to the site selection process undertaken, the potential configuration of the offshore array (taking in to account safety / search and rescue requirements etc.), the lack of any large amounts of hazardous materials that will be stored as part of the project and commitments embedded to reduce environmental impacts in general.

Table 5.5: Relevant risks pertaining to major accidents for Hornsea Four.

Major Accident Type	Risk	Relevant Information in ES	Management Plans
<i>Offshore</i>			
Human error or Equipment Failure	Vessel collision and allision	<p>Volume A2, Chapter 7: Shipping and Navigation</p> <p>Volume A5, Annex 7.1: Navigational Risk Assessment</p>	<p>Safety zones will be applied for in advance of construction (500m around infrastructure under construction, and 50m around incomplete structures where construction is paused) and operation and maintenance (500m around manned infrastructure such as accommodation platform and around locations where major maintenance is taking place e.g. blade replacement). See F1.2: Safety Zone Statement</p> <p>A Vessel Management Plan (incorporated within the Project Environmental Management and Monitoring Plan (PEMMP)) is required under the DMLs contained within the draft DCO (Volume C1, Chapter 1: Draft DCO).</p>
	Pollution from accident at sea	Scoped out of the EIA	A Marine Pollution Contingency Plan (incorporated within the PEMMP) is be required under the DMLs contained within the draft DCO (Volume C1, Chapter 1: Draft DCO).
	Aircraft accident	Volume A2, Chapter 8: Aviation and Radar	No management plan is required in relation to aircraft accidents.

Major Accident Type	Risk	Relevant Information in ES	Management Plans
		Volume A5, Annex 8.1: Aviation and Radar Technical Report	
Natural Disaster	Coastal erosion	<p>Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes</p> <p>Volume A5, Annex 1.1: Marine Processes Technical Report</p>	<p>Baseline information relating to physical processes in the vicinity of the landfall is set out within the ES, including forecasts of changes due to climate change. Changes to wave and sediment dynamics are covered within the assessment. The landfall technique is by Hydraulic Directional Drilling informed by an intrusive geotechnical survey. Given the above the Applicant has taken all reasonable steps to assess, design and mitigate for any likely implications of the Hornsea Four landfall leading to increased natural erosion and the risk of a natural disaster occurring is considered low. Taken together the risk is considered low.</p> <p>Additionally, a Cable Specification and Installation Plan is required under the DMLs contained within the draft DCO (Volume C1, Chapter 1: Draft DCO).</p>

Onshore

Human error or Equipment Failure	Road vehicle accidents	<p>Volume A3, Chapter 7: Traffic and Transport</p> <p>Volume A6, Annex 7.1: Traffic and Transport Technical Report</p>	<p>An outline Construction Traffic Management Plan is included within Volume F2, Chapter 2: Outline Code of Construction Practice (CoCP).</p> <p>A detailed Code of Construction Practice is required under the draft DCO (Volume C1, Chapter 1: Draft DCO)</p>
	Accidents to pedestrians	<p>Volume A3, Chapter 7: Traffic and Transport</p> <p>Volume A6, Annex 7.1: Traffic and Transport Technical Report</p> <p>Volume A3, Chapter 6: Land Use and Agriculture</p>	<p>An outline Construction Traffic Management Plan and outline Public Right of Way (PRoW) Management Plan are included within Volume F2, Chapter 2: Outline Code of Construction Practice (CoCP).</p> <p>A detailed Code of Construction Practice is required under the draft DCO (Volume C1, Chapter 1: Draft DCO)</p>

Major Accident Type	Risk	Relevant Information in ES	Management Plans
	Waste	<p>Chapter 4: Project Description sets out that waste is covered in the Site Waste Management Plan (SWMP)</p>	<p>An outline SWMP is included within Volume F2, Chapter 2: Outline Code of Construction Practice (CoCP).</p> <p>A detailed Code of Construction Practice is required under the draft DCO (Volume C1, Chapter 1: Draft DCO)</p>
	Pollution of controlled waters through accidental releases	Scoped Out of the EIA	<p>An outline Pollution Prevention Plan is included in Volume F2, Chapter 2: Outline Code of Construction Practice (CoCP) covering onshore areas.</p> <p>A detailed Code of Construction Practice is required under the draft DCO (Volume C1, Chapter 1: Draft DCO)</p>
	Fire at the ONSS (including the EBI)	Not covered in the EIA	<p>The risk fire at substations is historically low but it is recognised that impacts can be severe if one does occur. There are clear safety implications with respect to site staff, the emergency services, nearby residents, workers and visitors in close proximity to the OnSS. Wider risks include temporary air quality issues down wind of the fire.</p> <p>Hazards at the OnSS potentially include oil insulated circuit breakers, transformers, generators and infrastructure associated with the EBI such as hydrogen.</p> <p>The Applicant will ensure all relevant regulations requiring fire safety are rigorously applied, and that any additional permits or consents relating to the OnSS are applied for if required.</p> <p>Additionally, Volume F2, Chapter 12 Outline Energy Balancing Infrastructure HAZID Report is provided with the application. A final report is secured by Volume C1, Chapter 1: Draft DCO and will be approved by the relevant Local Planning Authority</p>

Major Accident Type	Risk	Relevant Information in ES	Management Plans
Natural disaster	Flood Risk	<p>Volume A3, Chapter 2: Hydrology and Flood Risk</p> <p>Volume A6, Annex 2.2: Onshore Infrastructure Flood Risk Assessment</p>	<p>An outline Onshore Infrastructure Drainage Strategy is included in Volume F2, Chapter 6: Outline Onshore Infrastructure Drainage Strategy.</p> <p>A detailed Onshore Infrastructure Drainage Strategy is required under the draft DCO (Volume C1, Chapter 1: Draft DCO). This document will inform the Schemes to be approved under Requirements 13 and 15 of the draft DCO (Volume C1, Chapter 1: Draft DCO.)</p>
	Seismic event	<p>The British Geological Survey (BGS) state that the UK is an area of low seismicity and that <i>"The overall values of [seismic] hazard are not particularly high"</i>.²</p> <p>Given the level of hazard presented in the UK from seismic activity plus the likely residual effect on the environment and people from any such seismic event from the Hornsea Four infrastructure seismic activity is not considered a significant risk and is not discussed further in this ES.</p>	

5.9 Environmental Management

- 5.9.1.1 In addition to the specific mitigation measures identified for each of the environmental topics, Hornsea Four will conform to general environmental management practices. To comply with the Construction (Design and Management) Regulations 2015, Hornsea Four will include general environmental and health and safety considerations within **Volume F2, Chapter 2: Outline Code of Construction Practice (CoCP)**.
- 5.9.1.2 It is no longer a statutory requirement for developers to produce SWMP. Nevertheless, it is recognised that construction, operation and demolition stages all have the potential to create waste and the Applicant is committed to providing a SWMP (Commitment 65). An outline SWMP is provided as part of the CoCP. The project description (see **Chapter 4: Project Description**) sets out the waste management measures that Hornsea Four will adopt during construction, operation and decommissioning (in principle only for the latter) to avoid any significant adverse effects on the environment or people from the handling and disposal of waste.

² <http://www.earthquakes.bgs.ac.uk/hazard/UKhazard.html>

5.10 Competent Experts

5.10.1.1 The Applicant is being supported in the undertaking of the Hornsea Four EIA by a number of organisations experienced in assessing the environmental impacts from offshore wind farms in UK waters:

- Royal HaskoningDHV: EIA co-ordination and onshore assessments;
- GoBe Consultants: Offshore assessments and HRA; and
- Pinsent Masons: Legal Aspects.

5.10.1.2 In all cases the assessments have been led by a technical author who is a specialist professional, often a recognised expert in their field and/or a chartered member of a relevant professional body and has significant experience in the preparation of impact assessments. The lead author takes responsibility for the quality and veracity of the data gathered; the assessment methodology to be undertaken, the impact assessments made and any proposed mitigation measures. The lead author is usually supported by a team of consultants and their work is subject to both technical and consistency review by a lead author and the EIA core team.

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