



Hornsea Project Four

Updated Transboundary Screening: September 2019

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Glossary

Term	Definition
Cumulative effect	The combined effect of Hornsea Four in-combination with the effects from a number of different projects, on the same single receptor/source.
Development Consent Order	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIPs).
Effect	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 importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended).
Environmental Impact Assessment (EIA)	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 Impact Assessment (EIA) Report.
Hornsea Four	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).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
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
DCO	Development Consent Order
ECC	Export Cable Corridor
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EU	European Union
HRA	Habitats Regulations Assessment
HSC	Historic Seascape Characteristic
IMO	International Maritime Organization
LAT	Lowest Astronomical Tide

Acronym	Definition
MHWS	Mean High Water Springs
PINS	Planning Inspectorate
REWS	Radar Early Warning System

Units

Unit	Definition
km	Kilometre
nm	Nautical Mile

1 Introduction

1.1 Overview

1.1.1.1 Ørsted Hornsea Project Four Limited (the Applicant) are proposing to develop Hornsea Four Offshore Wind Farm (Hornsea Four). Hornsea Four will be located approximately 65 km offshore 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 offshore Wind Turbine Generators (WTGs), offshore substations, export cables to landfall and connection to the electricity transmission network.

1.1.1.2 The Applicant has published its Preliminary Environmental Information Report (PEIR) for formal consultation between Tuesday 13 August and Monday 23 September 2019 and is currently awaiting feedback from statutory and non-statutory consultees on the proposal. All PEIR related documents, including those referenced in this report, are available online from the Hornsea Four project website (<http://hornsea-project-four.co.uk/documentlibrary>).

1.2 Purpose of this Document

1.2.1.1 Transboundary impacts relate to those impacts that may arise from an activity within one European Economic Area (EEA) state, that significantly affect the environment or other interests of another EEA state.

1.2.1.2 The Planning Inspectorate (PINS) are in the process of undertaking a screening for significant transboundary effects under Regulation 32 of the EIA Regulations, utilising information provided in Annex K of the Hornsea Four Scoping Report. However, given the time that has elapsed since submission of the Scoping Report, PINS have requested an update to that information to enable them to undertake robust and accurate transboundary screening.

1.2.1.3 This document provides an update to the transboundary screening document that was submitted at Scoping and evaluates the likelihood of significant transboundary effects occurring and the transboundary consultation with other member states which has been undertaken to date.

2 Legislative Context

2.1.1.1 The need to consider transboundary impacts has been embodied by The United Nations Economic Commission for Europe Convention on Environmental Impact Assessment in a Transboundary Context, adopted in 1991 in the Finnish city of Espoo and 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 impacts.

2.1.1.2 The Espoo Convention has been implemented by the European Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, which was amended by Directive 97/11/EC, Directive 2003/35/EC and Directive 2009/31/EC. In 2011, the initial 1985 Directive and its three amendments were

codified by Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the Environmental Impact Assessment (EIA) Directive).

2.1.1.3 With regards to NSIPs, the EIA Directive is transposed into UK law by the 2017 EIA Regulations. Regulation 32 of the 2017 EIA Regulations requires that where the Secretary of State is of a view that an EIA application will have significant effects on the environment of another European Economic Area (EEA) State, or the Secretary of State receives a request for involvement from another EEA State, it must undertake a prescribed process of consultation and notification.

2.1.1.4 Planning Inspectorate (PINS) Advice Note 12: Transboundary Impacts (version 5 PINS, March 2018) sets out the procedures for consultation in association with an application for a Development Consent Order (DCO), where such development may have significant transboundary impacts. The note sets out the roles of PINS, other EEA States and developers. In respect of the latter, developers have no formal role under the Regulation 32 process, as the duties prescribed by Regulation 32 in notifying and consulting with other EEA States on potential transboundary impacts are the responsibility of the Secretary of State. However, developers are advised to:

- Carry out preparatory work to complete a transboundary screening matrix to assist the Secretary of State in determining the potential for likely significant effects on the environment in other EEA States; and
- To submit the transboundary screening matrix along with the scoping request, if a scoping opinion is sought by the developer.
- Consider, when preparing documents for consultation and application, that PINS may notify the relevant EEA state of their project;

2.1.1.5 This transboundary screening is provided in response to PINS Advice Note 12 and the bullet points noted above. It provides information about Hornsea Four which will be the subject of the DCO application and sets out information relating to the potential effects of the scheme and the interests of the other member states, to assist PINS in forming a view on the likelihood of significant transboundary effects arising from Hornsea Four.

3 Study Area

3.1.1.1 The Hornsea Four array area is located outside the 12 nautical mile (nm) limit in UK Exclusive Economic Zone (EEZ) waters. The distance of Hornsea Four from the boundary of the EEZ or 'median' of other EEA States considered is presented in [Table 1](#) and [Figure 1](#).

Table 1: Summary of approximate distance to nearest EEZ (median line) of other EEA state.

EEZ	Distance from Hornsea Four to nearest marine border (km)
The Netherlands	84
Germany	222
Denmark	235
Belgium	243
Norway	247
France	271
Republic of Ireland	333
Iceland	1,153

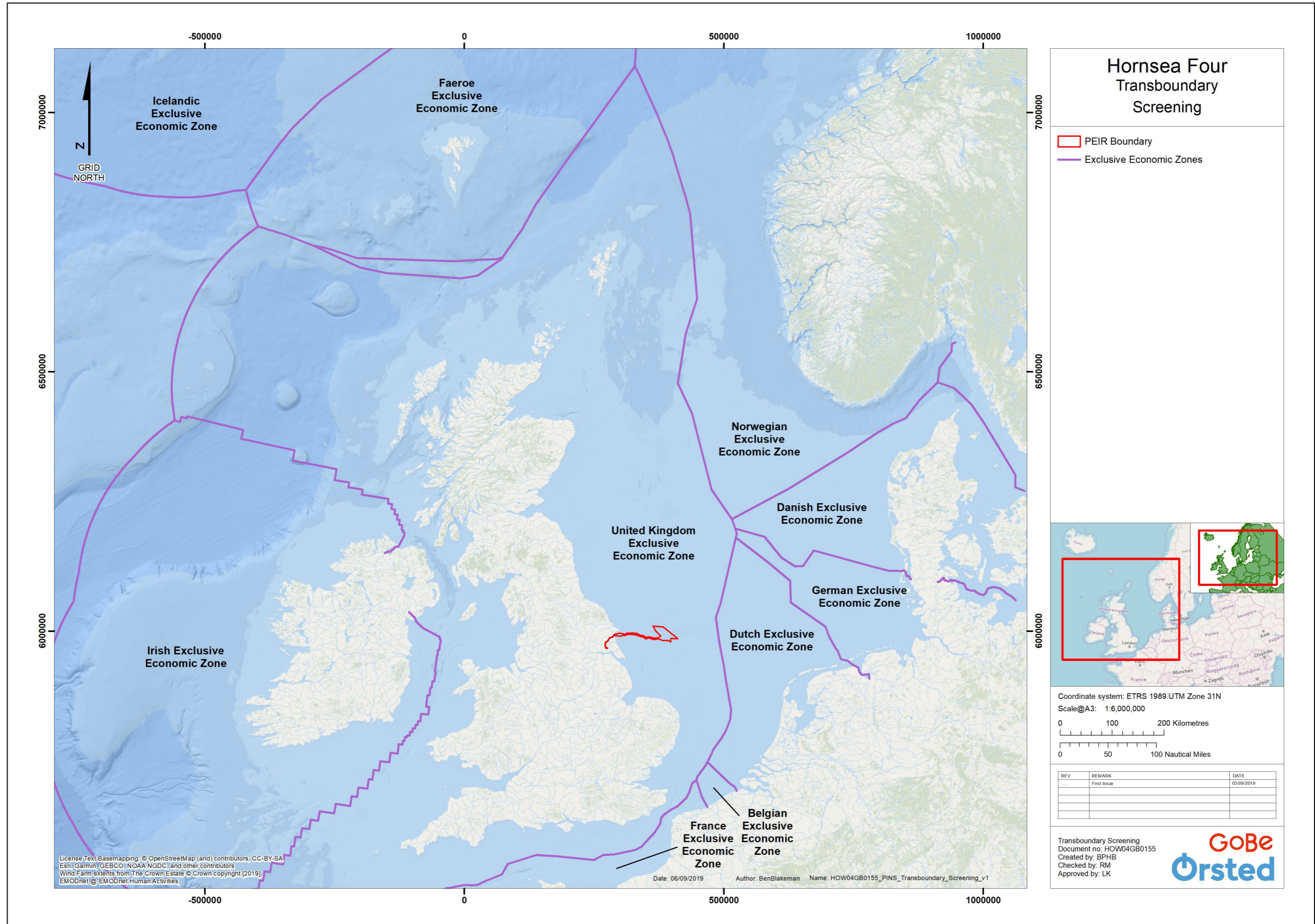


Figure 1: Location of Hornsea Four and relevant jurisdictional boundaries (not to scale).

4 Consultation

4.1.1.1 Hornsea Four will conduct its pre-application consultation in accordance with the Planning Act 2008 plus associated guidance and Regulations, which includes the aforementioned 2017 Regulations. As part of this consultation, the following European Union (EU) ministries, industries and organisations have been consulted:

- Dutch Ministry of Infrastructure and the Environment;
- German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety;
- Flemish Government Environment, Nature and Energy Department, International Environmental Policy Division;
- Environmental Protection Agency, Ministry of the Environment and Food of Denmark;
- Norwegian Environment Agency;
- French Ministère de l'écologie, du développement durable et de l'énergie Commissariat général au développement durable;
- Icelandic Ministry for Foreign Affairs;
- Irish Environmental Planning Policy, Department of Housing, Planning & Local Government;
- EU commercial fisheries organisations:
 - Rederscentrale (Belgian);
 - From Nord (French);
 - Cooperative Maritime Etaploise (C.M.E.) Producer Organisation (French);
 - VisNed (Dutch);
 - Danish Fishermen's Producer Organisation;
 - Swedish Pelagic Federation Producers Organisation;
 - Danish Pelagic Producers Organisation; and
 - Erzeugergemeinschaft der Nord- und Ostseefischer GmbH (German).

4.1.1.2 Hornsea Four will also consult with any additional consultees provided by the EU ministries, industries and organisations.

5 Baseline Environment

5.1 Offshore Physical and Biological Environment

5.1.1.1 Hornsea Four have completed a transboundary screening matrix for the offshore transboundary effects for the physical and biological environment ([Table 2](#)), in line with the suggested format set out in the Annex 1 of PINS Advice Note 12.

5.1.1.2 The conclusions of the transboundary screening for each environmental topic are presented, together with additional justification, in the following sections.

5.1.2 Marine Processes

5.1.2.1 The offshore components of Hornsea Four lie wholly within UK territorial waters and any impacts on marine processes will be confined to a localised area within the footprint of the Hornsea Four array area and offshore Export Cable Corridor (ECC). Indirect effects are likely to be limited to one tidal excursion (16 km) and therefore, no potential transboundary

impacts upon marine processes anticipated. This is based on the current understanding of the baseline environment (e.g. sediment types and the tidal regime), along with the previous modelling work carried out for the Hornsea Project One, Hornsea Project Two and Hornsea Three EIAs. These assessments and modelling concluded that impacts from sediment disturbance when installing foundations and cables were, and are, likely to be localised and of temporary duration due to resettlement of sediments. As a result, transboundary impacts are therefore not expected.

5.1.2.2 As described in [Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes](#) of the PEIR, the transboundary screening submitted with Scoping concluded that impacts on marine processes would be limited to the UK EEZ. Based on the current understanding of the baseline environment, along with modelling work carried out at Hornsea Project One, Project Two and Hornsea Three (all of which are located closer to the EEZ boundaries of other EEA states), any transboundary impacts were screened out of further assessment at the Scoping stage.

5.1.3 Benthic and Intertidal Ecology

5.1.3.1 It is considered that there is no pathway by which direct or indirect effects arising from Hornsea Four could significantly affect the benthic or intertidal ecology of another EEA State. The extent of any predicted impacts upon benthic and intertidal ecological receptors are likely to be limited in extent to the:

- Hornsea Four offshore footprint (i.e. the Hornsea Four array area and offshore ECC) for temporary/long term habitat loss and habitat modification (i.e. from the introduction of hard substrates); and
- One tidal excursion (16 km) for suspended sediment/deposition assessments.

5.1.3.2 Therefore, it is concluded that no potential transboundary impacts upon the benthic and intertidal ecology are anticipated, which as a result means that transboundary impacts on the benthic and intertidal ecological receptors are screened out of the EIA process.

5.1.4 Fish and Shellfish Ecology

5.1.4.1 It is considered that there are potential transboundary impacts upon fish and shellfish ecology due to construction, operational and decommissioning impacts of Hornsea Four.

5.1.4.2 These include direct impacts as a result of underwater noise from piling operations during the installation of subsea infrastructure. Indirect impacts may occur in relation to fish and shellfish habitat or disturbance to habitat due to increased suspended sediment concentrations and deposition from the placement/removal of foundations and cables in or on the seabed. These activities have the potential to directly affect Annex II migratory fish species that are listed as features of European Sites in other EEA States, or species that are of commercial importance for fishing fleets of other EEA States.

5.1.4.3 Indirect effects will include loss of, or disturbance to, fish spawning and nursery habitats in the North Sea that are important for either migratory fish species designated as Annex II species or for fish species of commercial importance to other EEA states. The fish and

shellfish receptors likely to be present within Hornsea Four fish and shellfish study area are outlined in [Volume 2, Chapter 3: Fish and Shellfish Ecology](#) of the PEIR, which also identifies the key spawning and nursery grounds located within and around the Hornsea Four array area and offshore ECC.

5.1.4.4 During construction the probability of impacts arising from underwater noise is high. The potential effects associated with electromagnetic fields (EMF) and long-term habitat loss are, by nature, longer term effects which may be reversible depending upon the decommissioning strategy.

5.1.4.5 [Volume 2, Chapter 3: Fish and Shellfish Ecology](#) of the PEIR considered the following transboundary impacts:

- Direct effects as a result of underwater noise from piling operations during the installation of subsea infrastructure; and
- Indirect effects may occur in relation to fish and shellfish habitat or disturbance to habitat due to increased suspended sediment concentrations and deposition from the placement/removal of foundations and cables in or on the seabed.

5.1.4.6 Underwater noise levels expected to elicit behavioural responses in certain fish and shellfish, are predicted to extend to several 10s of kilometres beyond Hornsea Four and therefore have the potential to affect fish and shellfish originating from the Netherlands, an EEA state (84 km from Hornsea Four) during the construction period. These impacts were predicted to be short term and intermittent, with recovery of fish and shellfish populations to affected areas following completion of all piling activities. Overall, the sensitivity of fish and shellfish receptors to this impact were assessed as low to high (herring) and the magnitude predicted to be minor adverse.

5.1.4.7 Effects of increases in SSC are predicted to be limited in extent to a number of kilometres of Hornsea Four and are therefore not predicted to extend into the waters of other EEA states.

5.1.4.8 No significant transboundary impacts were predicted to occur on fish and shellfish ecology receptors.

5.1.5 Marine Mammals

5.1.5.1 There is the potential for transboundary impacts upon marine mammals due to the mobile nature of marine mammal species and the proximity of Hornsea Four to the borders of surrounding EEA States, which are within migration ranges of certain species. The marine mammal species likely to be present in the Hornsea Four marine mammal study area are outlined in full in [Volume 2, Chapter 4: Marine Mammals](#) of the PEIR, and include harbour porpoise *Phocoena phocoena*, minke whale *Balaenoptera acutorostrata*, white-beaked dolphin *Lagenorhynchus albirostris*, grey seal *Halichoerus grypus* and harbour seal *Phoca vitulina*.

5.1.5.2 Direct impacts may occur due to underwater noise generated during construction and decommissioning, particularly piling during the installation of foundations. Indirect impacts may cause disturbance to prey (fish) species from loss of fish spawning and nursery habitat

and suspended sediments and deposition. The operation and maintenance phase is considered less likely to result in significant transboundary impacts although the effects associated with the operational noise of turbines and EMF are, by nature, longer term effects which will be reversible depending on the decommissioning strategy.

5.1.5.3 The following impacts were screened into the transboundary impact assessment:

- Underwater noise generated during construction and decommissioning, particularly piling during the installation of foundations; and
- Disturbance to prey (fish) species from loss of fish spawning and nursery habitat and suspended sediments and deposition.

5.1.5.4 As described in [Volume 2, Chapter 4: Marine Mammals](#) of the PEIR, potentially injurious effects are not expected to extend into the waters of other EEA states. Behavioural disturbance resulting from underwater noise during construction could occur over large ranges (tens of kilometres) and therefore there is the potential for transboundary effects to occur where subsea noise arising from Hornsea Four could affect individuals originating from other EEA states. These impacts were predicted to be short term and intermittent, with recovery of marine mammal populations to affected areas following completion of all piling activities. Overall, this effect was considered to be a maximum of minor significance, which is not significant in EIA terms.

5.1.5.5 Effects from reduction in prey availability are predicted to be limited in extent to a number of kilometres of Hornsea Four and are therefore not expected to extend into the waters of other EEA states. [Volume 2, Chapter 3: Fish and Shellfish Ecology](#) concluded no significant impacts on all fish species.

5.1.5.6 Potential significant adverse effects on transboundary Special Areas of Conservation (SACs) designated for marine mammals were considered separately in the Report to Inform Appropriate Assessment (RIAA) through the Habitats Regulations Assessment (HRA) process. No adverse effects on the integrity of marine mammal sites were predicted.

5.1.6 Ornithology

5.1.6.1 Transboundary impacts upon ornithological receptors (up to the Mean High Water Springs (MHWS) mark) are possible due to the wide foraging and migratory ranges of typical bird species in the North Sea. In addition, a number of bird species that have been recorded during previous surveys include those that are listed as qualifying features of European Sites in other EEA States. The bird species likely to be present in the Hornsea Four array area and offshore ECC, based on the outputs of the Hornsea Project One, Hornsea Project Two and Hornsea Three boat-based surveys are outlined in full in [Volume 2, Chapter 5: Offshore and Intertidal Ornithology](#) of the PEIR.

5.1.6.2 The key direct impacts for ornithological receptors are likely to arise during the operation and maintenance phase as a result of potential collisions (with rotating turbine blades which may result in direct mortality of individuals) and barrier effects (caused by the physical presence of structures which may prevent transit of birds between foraging and breeding sites, or on migration). Direct impacts to ornithological receptors may, however, also occur

due to temporary habitat loss/ disturbance across all development phases of Hornsea Four and permanent habitat loss during the operation and maintenance phase. Indirect impacts may cause disturbance to prey (fish) species from important bird feeding areas or changes to prey availability due to changes to physical processes and habitat as a result of the presence of operational infrastructure.

- 5.1.6.3 As described in **Volume 2, Chapter 5: Offshore and Intertidal Ornithology** of the PEIR, the final Hornsea Four DCO submission (including the ES) will include a summary of consultations conducted with other EU Member States surrounding the North Sea. Protected sites in countries beyond the UK that may have connectivity with Hornsea Four were listed in Table 13.9 of the EIA Scoping Report and included, in order of distance from Hornsea Four; the Netherlands (84 km), Germany (222 km), Denmark (235 km), Belgium (243 km), Norway (247 km), France (271 km), Ireland (333 km) and Iceland (1,153 km).
- 5.1.6.4 To inform the PEIR assessment, consideration has been given to the consultation responses received between the EIA Scoping Stage and the PEIR Stage. One response was received that raised a potential concern over transboundary impacts on ornithology receptors. This was provided by Rijkswaterstaat (RWS) in the Netherlands and noted that non-UK wind farms in the southern North Sea had not been included in the cumulative assessment. The response also noted that this would require an international cumulative approach, which has not been developed to date. Furthermore, owing to the different approaches to impact assessment adopted by each EU Member State it is not currently clear how this could be undertaken quantitatively.
- 5.1.6.5 With regards to the potential for transboundary cumulative impacts, there is some limited potential for collisions and displacement at offshore wind farms outside UK territorial waters. However, the operational offshore wind farms in Belgium, the Netherlands and Germany are comparatively small (collectively, these projects are of a similar size to no more than one to two of the more recent UK offshore wind farms, such as East Anglia One).
- 5.1.6.6 Since the spatial scope for a transboundary assessment would be much larger than that considered for Hornsea Four alone or cumulatively with other UK projects then any assessment of potential impacts and effects would be against larger seabird population sizes accounting for wider a Biologically Defined Minimum Population Scale (BDMPS). Therefore, it is apparent that the scale of offshore wind farm developments within such a wider context would be relatively much smaller with respect to any potential impacts. Therefore, the inclusion of non-UK offshore wind farms is considered very unlikely to alter the conclusions of the existing cumulative assessment, and highly likely to reduce estimated impacts at population levels if calculated at larger spatial scales.
- 5.1.6.7 Potential impacts upon European Sites with birds as qualifying features, have been considered in the RIAA through the HRA process. No significant adverse effect on the integrity of Natura 2000 sites in other EEA states were predicted.

Table 2: Offshore transboundary screening matrix for Hornsea Four – physical and biological environment.

Screening Criteria	Marine processes	Benthic subtidal and intertidal ecology	Fish and shellfish ecology	Marine mammals	Ornithology
<p>Characteristics of development (for a detailed description, see Volume 1, Chapter 4: Project Description of the PEIR)</p>	<p>Offshore</p> <p>The proposed development is for an offshore generating station (wind farm) comprising of up to 180 wind turbines. A range of turbine models will be considered; however, it is anticipated that each turbine will have a maximum rotor diameter of 305m and a maximum blade tip height of 370m Lowest Astronomical Tide (LAT) (highest point of the structure). The minimum distance between the bottom of the blade and the water surface will be 35 m LAT.</p> <p>Foundation design has yet to be finalised with a final decision depending on final site investigation and procurement negotiations. The options under consideration include; steel monopile, a monopod suction caisson, a 3 or 4-legged suction caisson jacket, 3 or 4-legged piled jacket and Gravity Base Systems (GBS). Scour protection including rock and gravel dumping is being considered as part of the Project Description.</p> <p>Up to 11 offshore platforms will be installed which, depending on the transmission system, may include an offshore converter substation and offshore High Voltage Alternating Current (HVAC) booster substation. Offshore platform supporting accommodation facilities for operation and maintenance will also be required. The exact number of platforms to be installed is yet to be determined.</p> <p>Subsea array cables, offshore interconnector cables and subsea export cables will be installed to connect the turbines to the substations and to connect the substations to the onshore transition pits at the landfall. Cable protection (type not specified) will also be installed.</p> <p>Onshore</p> <p>Export cables will connect the offshore cables to the onshore substation located at Creyke Beck.</p> <p>The project is described in full in Volume 1, Chapter 4: Project Description.</p>				
Geographical area	The Hornsea Four array area is located approximately 65km east from the coast of Yorkshire, and 84 km from the Dutch EEZ.				
Location of development (including existing use)	The Hornsea Four array area is located within the former Hornsea Zone, which covers approximately 4,735 km ² . Hornsea Four will cover an area within this approximately 600 km ² in area and will sit alongside the Hornsea Project One, Hornsea Project Two and Hornsea Three offshore wind farms.				
Cumulative impacts	See Volume 2, Chapter 1 .	See of Volume 2, Chapter 2 .	See of Volume 2, Chapter 3 .	See of Volume 2, Chapter 4 .	See of Volume 2, Chapter 5 .
Carrier	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	See Section 5.1.5.4 .
Environmental importance					
Extent					
Magnitude	The magnitude of the impacts will be subject to the assessment to be undertaken for the EIA and have, therefore, not been determined here.				
Probability					See Section 5.1.5.4 .
Duration					

Frequency	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	
Reversibility	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	

5.2 Human Environment

5.2.1.1 Hornsea Four has completed a transboundary screening matrix for offshore transboundary effects for the human environment, in line with the suggested format set out in Annex 1 of PINS Advice Note 12. This screening is set out in [Table 3](#) below.

5.2.1.2 The conclusions of the transboundary screening for each offshore human environment topic are presented, together with additional justification, in the following sections.

5.2.2 Commercial Fisheries

5.2.2.1 Commercial fishing operates in the Hornsea Four commercial fisheries study area as outlined in full in [Volume 2, Chapter 7: Commercial Fisheries](#) of the PEIR and includes a number of fleets from EEA States.

5.2.2.2 Due to the highly mobile nature of both commercial fish species and fishing fleets and the proximity of the Hornsea Four array area to Dutch, German and Danish waters, and the presence of Belgian, Dutch, Danish, French and German fishing vessels with the Hornsea Four area, there is the potential for transboundary impacts upon commercial fisheries to arise from two sources:

- Effects on commercial fishing fleets as a result of impacts from Hornsea Four on commercial fish stocks in the waters of other EEA States, from the biological effects on fish stocks themselves; and
- Effects on commercial fishing fleets from all EEA countries as a result of constraints on foreign commercial fishing activities operating in Hornsea Four, including demersal trawling, beam trawling, demersal seining and other gears. These effects may include reduction in access to fishing grounds and potential displacement of fishing effort from Hornsea Four to alternative fishing grounds in other EEA States, which will have direct implications to that fishing ground.

5.2.2.3 As described in [Volume 2, Chapter 7: Commercial Fisheries](#) of the PEIR, effects on biological resources could occur over a range of 10s of kilometres from Hornsea Four and could therefore interact with the following EEA states: the Netherlands. Based on the minor to negligible significance of disruption to commercial species during all phases of the project in UK waters, it is expected that the impact on stocks in the Dutch EEZ is negligible. Therefore, the potential transboundary impact of effects on commercial fish stocks in the waters of other EEA States on commercial fisheries was concluded to be of negligible significance and is therefore considered to be non-significant in EIA terms.

5.2.2.4 Effects on commercial fishing fleets could occur over a range of 100s of kilometres from Hornsea Four and could therefore interact with the following EEA states: the Netherlands, Germany, Belgium, Denmark, Norway, France and Ireland. Effects on these foreign commercial fishing fleets from EEA states, in terms of reduction in access to grounds within Hornsea Four and displacement into alternative grounds including other EEZs were found to be minor for all non-UK EEA states. Therefore, the potential transboundary impact of constraints on foreign commercial fishing activities is concluded to be of minor significance and is therefore considered to be non-significant in EIA terms.

5.2.2.5 No significant transboundary impacts on commercial fisheries receptors were predicted.

5.2.3 Shipping and Navigation

5.2.3.1 Hornsea Four is situated in the Southern North Sea in an area where several international shipping routes pass between the UK and other European countries. The shipping and navigation baseline for the Hornsea Four array area and the offshore ECC are outlined in full in [Volume 2, Chapter 8: Shipping and Navigation](#) of the PEIR.

5.2.3.2 It was identified that transboundary issues could arise from Hornsea Four on commercial shipping routes transiting between the UK and other EEA ports. This could also include impacts upon international ports, shipping routes and/or routes affected by other international offshore renewable energy developments. The potentially affected areas include ports within the Southern North Sea (as per [Section 10.7](#) of [Volume 5, Annex 8.1: Navigational Risk Assessment](#) of the PEIR). The development of Hornsea Four could affect routes operating between the UK and ports located in the Netherlands, Denmark, Belgium and Germany. The results of the vessel deviation assessments in the draft NRA identified some deviations for routes; some deviations identified were found to be significant at this stage, and require further consultation as parts of the post Section 42 Consultation process.

5.2.3.3 All EEA states that are likely to be significantly affected by Hornsea Four ([Table 1](#)) have been and will continue to be consulted as part of the formal phases of consultation. Dialogue with these authorities will continue to take place throughout the development of Hornsea Four in relation to potential transboundary impacts. Consultation is also ongoing with specific shipping operators, notably DFDS Seaways, who operate ferry services which cross the Hornsea Four boundary.

5.2.4 Aviation and Radar

5.2.4.1 Aviation and radar baseline for the Hornsea Four array area and the offshore ECC are outlined in full in [Volume 2, Chapter 9: Aviation and Radar](#) of the PEIR.

5.2.4.2 There is the potential for transboundary impacts to arise from the presence of the wind turbines during the operation and maintenance phase disrupting civil and military radar coverage from The Netherlands. The probability of impact (due to radar detectability of the Hornsea Four wind turbines) is low due to the range of applicable Netherlands radar systems from the Hornsea Four array area, although the extent cannot be determined at this stage. Applicable Netherlands radar systems are operated by the Dutch Ministerie Van Defensie (Netherlands MOD) and Luchtverkeersleiding Nederland (LVNL) (the Netherlands equivalent of UK NATS); both agencies will be consulted to establish if Hornsea Four will impact Netherlands radar and infrastructure.

5.2.4.3 No significant transboundary impacts on aviation and radar receptors were predicted.

5.2.5 Marine Archaeology

5.2.5.1 The marine archaeology baseline for the Hornsea Four array area and the offshore ECC are outlined in full in paragraphs in [Volume 2, Chapter 10: Marine Archaeology](#) of the PEIR.

5.2.5.2 The extent of any predicted impacts upon marine archaeology receptors are likely to be limited in extent to the:

- Hornsea Four offshore footprint (i.e. the Hornsea Four array area and offshore ECC) for impacts associated with direct physical seabed disturbance; and
- One tidal excursion for impacts associated with sediment deposition on the seabed.

5.2.5.3 Therefore, no potential transboundary impacts upon marine archaeology are anticipated and were scoped out of further assessment at the Scoping stage.

5.2.6 Seascape and Visual Resources

5.2.6.1 The seascape and visual resources baselines for the Hornsea Four array area and the offshore ECC corridor are outlined in full [Volume 2, Chapter 11: Seascape and Visual Resources](#) of the PEIR.

5.2.6.2 The only impact which has been screened into the assessment is the introduction of new/uncharacteristic elements/features and potential effects on the existing Historic Seascape Characteristic (HSC). The extent of any predicted impacts upon the HSC is therefore likely to be largely focused on the Hornsea Four offshore footprint (i.e. the Hornsea Four array area and the offshore ECC).

5.2.6.3 Therefore, no potential transboundary impacts upon seascape and visual resources were anticipated and were scoped out of the EIA process.

5.2.7 Infrastructure and Other Users

5.2.7.1 The baseline for infrastructure and other users for the Hornsea Four array area and the offshore ECC are outlined in full in [Volume 2, Chapter 12: Infrastructure and Other Users](#) of the PEIR.

5.2.7.2 Potential impacts upon infrastructure and other users from other EEA States are limited to activities surrounding oil and gas operations. There is the potential for transboundary impacts to arise from the piling of the wind turbine and substation foundations during the construction phase, which may interfere with seismic survey operations in the Dutch EEZ.

5.2.7.3 The probability of impacts occurring during the construction phase as a result of the piling, and its extent, cannot be determined at this stage. This will be determined through consultation with the relevant oil and gas operators in the Dutch sector of the Southern North Sea and the final project description and will therefore be subject to assessment in the EIA. Any impacts would be short term and would be reversible after construction activities are complete.

5.2.7.4 There is the potential for transboundary impacts to also arise during the operation and maintenance phase from the presence of the Hornsea Four wind turbines causing interference with the performance of Radar Early Warning Systems (REWS) located on gas platforms in the Dutch sector of the Southern North Sea. The probability of impacts occurring during the operation and maintenance phase as a result of the presence of the

offshore infrastructure associated with Hornsea Four is likely to be high, although the extent cannot be determined at this stage. This will be determined once the project description has been further refined and through consultation with the applicable oil and gas operators and will therefore be subject to assessment in the EIA. Although such impacts would be long term, they would be reversible after decommissioning, as it is anticipated that all structure above the seabed will be completely removed.

5.2.7.5 Transboundary impacts on infrastructure and other users were scoped out of further assessment.

Table 3: Offshore transboundary screening matrix for Hornsea Four – human environment.

Screening Criteria	Commercial fisheries	Shipping and navigation	Aviation and radar	Marine archaeology	Seascape and visual resources	Infrastructure and other users
Characteristics of development (for a detailed description, see Volume 1, Chapter 4: Project Description)	See Table 2 for details.					
Geographical area	See Table 2 for details.					
Location of development (including existing use)	See Table 2 for details.					
Cumulative impacts	See Volume 2, Chapter 7.	See Volume 2, Chapter 8.	See Volume 2, Chapter 9.	See Volume 2, Chapter 10.	See Volume 2, Chapter 11.	See Volume 2, Chapter 12.
Carrier	See Section 5.2.2.	See Section 5.2.3.	See Section 5.2.3.2.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	See Section 5.2.7.
Environmental importance					See Section 5.2.6.	
Extent						
Magnitude	The magnitude of the impacts will be subject to the assessment to be undertaken for the EIA and have, therefore, not been determined here.					
Probability	See Section 5.2.2.	See Section 5.2.3.	See Section 5.2.3.2.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.
Duration						
Frequency						
Reversibility						

5.3 Onshore Transboundary Impacts

5.3.1.1 Hornsea Four have completed a transboundary screening matrix for onshore transboundary effects, in line with the suggested format set out in Annex 1 of PINS Advice Note 12. This screening matrix is set out in [Table 4](#) below.

5.3.1.2 The conclusion of the transboundary screening for each onshore topic are presented, together with additional justification, in the following sections.

5.3.2 Geology and Ground Conditions

5.3.2.1 Any impacts on geology and ground conditions arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area within the footprint of the Hornsea Four onshore ECC. There is no pathway by which direct or indirect effects arising from the Hornsea Four could significantly affect the geology or ground conditions of another member state.

5.3.2.2 As described in [Volume 3, Chapter 1: Geology and Ground Conditions](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.3 Hydrology and Flood Risk

5.3.3.1 Any impacts on hydrology and flood risk arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area with the footprint of the Hornsea Four onshore ECC. There is no pathway by which direct or indirect effects from arising from Hornsea Four could significantly affect the hydrology and flood risk of another member state.

5.3.3.2 As described in [Volume 3, Chapter 2: Hydrology and Flood Risk](#) of the PEIR all transboundary impacts were therefore scoped out of further assessment.

5.3.4 Ecology and Nature Conservation

5.3.4.1 Any impacts on onshore ecology and nature conservation arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area within the footprint of the Hornsea Four onshore ECC corridor. There is no pathway by which direct and indirect effects arising from Hornsea Four could significantly affect the onshore ecology and nature conservation of another member state including those that are listed as qualifying features of European Sites in other EEA states.

5.3.4.2 As described in [Volume 3, Chapter 3: Ecology and Nature Conservation](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.5 Traffic and Transport

5.3.5.1 Any impacts on the traffic and transport arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area of

the UK road infrastructure. There is no pathway by which direct or indirect effects arising from Hornsea Four could significantly affect traffic and transport in another member state.

5.3.5.2 As described in [Volume 3, Chapter 7: Traffic and Transport](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.6 Historic Environment

5.3.6.1 Any impacts on the onshore historic environment arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area within the direct or indirect effects arising from Hornsea Four could significantly affect the onshore historic environment of another member state.

5.3.6.2 As described in [Volume 3, Chapter 5: Historic Environment](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.7 Landscape and Visual Resources

5.3.7.1 Any impacts on landscape and visual resources arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area in the vicinity of the Hornsea Four onshore ECC. There is no pathway by which direct or indirect effects arising from Hornsea Four could significantly the landscape and visual resources of another member state.

5.3.7.2 As described in [Volume 3, Chapter 4: Landscape and Visual Resources](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.8 Land Use, Agriculture and Recreation

5.3.8.1 Any impacts on land use, agriculture and recreation arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area within the footprint of the Hornsea Four onshore ECC. There is no pathway by which direct or indirect effects arising from Hornsea Four could significantly affect the land use, agriculture and recreation of another member state.

5.3.8.2 As described in [Volume 3, Chapter 6: Land Use and Agriculture](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.9 Noise and Vibration

5.3.9.1 Any noise and vibration impacts arising from the construction, operation and maintenance and decommissioning of Hornsea Four will be confined to a localised area in the vicinity of the Hornsea Four onshore ECC. There is no pathway by which direct or indirect effects arising

from Hornsea Four could result in significant noise and vibration effects in another member state.

5.3.9.2 As described in [Volume 3, Chapter 8: Noise and Vibration](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.10 Air Quality and Health

5.3.10.1 Potential transboundary impacts to air quality and health arising from the construction, operation and maintenance and decommissioning of Hornsea Four are anticipated to be minor and localised in extent and will be confined to the duration of the construction phase only. Any potential impacts to health related to air quality will also be localised and confined to the onshore construction phase. Potential transboundary health impacts due to the generation of an EMF around the onshore ECC will be confined to the immediate vicinity of the onshore ECC.

5.3.10.2 As described in [Volume 3, Chapter 9: Air Quality and Health](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

5.3.11 Socio-Economic Aspects

5.3.11.1 The socio-economic baseline for the Hornsea Four array area and the offshore ECC are outlined in full in [Volume 3, Chapter 10: Socioeconomics](#) of the PEIR.

5.3.11.2 There is the potential for transboundary impacts arising from interaction with the activities of commercial fisheries and shipping. These have been considered in [Volume 2, Chapter 7](#) and [Volume 2, Chapter 8](#) of the PEIR, respectively.

5.3.11.3 In addition, potential transboundary impacts upon the economies of other EEA states may arise through the purchase of project components, equipment and the sourcing of labour from companies based outside the UK. Under Regulation 32 part 6(a) of the 2017 Regulations, the Secretary of State must enter into consultation with any EEA State concerned regarding the potential significant effects of the development on the environment of that EEA State and the measures envisaged to reduce or eliminate such effects. However, the sourcing of materials and labour from other EEA states is assumed to provide beneficial effects in the economies of such states and so the consideration of "measures envisaged to reduce or eliminate such effects" is not relevant in the context of transboundary impacts.

5.3.11.4 As described in [Volume 3, Chapter 10: Socioeconomics](#) of the PEIR, all transboundary impacts were therefore scoped out of further assessment.

Table 4: Onshore transboundary screening matrix for Hornsea Four.

Screening Criteria	Geology and ground conditions	Hydrology and flood risk	Ecology and nature conservation	Traffic and transport	Historic environment	Landscape and visual resources	Land use and recreation	Noise and vibration	Air quality and health	Socio-economic characteristics
<p>Characteristics of development (for a detailed description, see Volume 1, Chapter 4: Project Description)</p>	<p>The offshore cables will be brought ashore and connected to the onshore cables in Transition Joint Bays (TJBs). From there, the onshore cables will be placed in up to six trenches to transfer the power generated across east Yorkshire to the onshore substation. The onshore substation will include Electrical Balancing Infrastructure (EBI) and 400 kV connection to Creyke Beck National Grid substation.</p> <p>The onshore infrastructure is described in full in Volume 1, Chapter 4: Project Description.</p>									
Geographical area	N/A – The Hornsea Four array area is located approximately 65 km east of the Yorkshire Coast and 84 km from the Dutch EEZ.									
Location of development (including existing use)	The offshore export cable will make landfall on the Yorkshire coast with the onshore cable route extending to the Creyke Beck substation located in Yorkshire.									
Cumulative impacts	No significant transboundary impacts are predicted.									
Carrier										
Environmental importance										
Extent										
Magnitude										
Probability										
Duration										
Frequency										
Reversibility										

6 Conclusions

- 6.1.1.1 This transboundary screening document has been prepared in accordance with PINS Advice Note 12. The primary purpose of this note is to provide a screening assessment of potential transboundary impacts which have the potential to affect other EEA States.
- 6.1.1.2 On the basis of the current information available, as detailed within the Hornsea Four PEIR, the proposed development is not considered likely to have a significant effect on the environment in other EEA States. Transboundary impacts were assessed in the relevant PEIR chapters and no significant transboundary impacts were concluded.

7 References

PINS (2015). PINS Advice Note 12. Transboundary Impacts and Process. March 2018. Version 5.