



# Hornsea Project Four: Consultation Report

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**APFP Regulation s37(3)&(7) PA 2008**

## **Volume B1, Annex 1.4 – Applicant Regard to Section 42 Consultation Responses**

**Prepared** Counter Context, September 2021  
**Checked** Humphrey Laidlaw, Ørsted, September 2021  
**Accepted** Hannah Towner-Roethe, Ørsted, September 2021  
**Approved** Julian Carolan, Ørsted, September 2021  
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## Acronyms

Acronym	Definition
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
ERYC	East Riding of Yorkshire Council
EIA	Environmental Impact Assessment
ES	Environmental Statement
FAQs	Frequently Asked Questions
JNCC	Joint Nature Conservation Committee
LIEs	Local Information Events
MMO	MMO
NE	Natural England
NER	Natural England Recommendation
NSIP	Nationally Significant Infrastructure Project
OnSS	Onshore Substation
PEIR	Preliminary Environmental Information Report
PEIR NTS	Preliminary Environmental Information Report Non-Technical Summary
PINS	Planning Inspectorate
SoCC	Statement of Community Consultation
SoS	Secretary of State
TCE	The Crown Estate

**Table 1: Applicant regard to Section 42 Consultation Responses by EIA topic area**

<b>EIA topic area: Planning and Policy Context</b>					
<b>Comment ID (consultation _ response ID_subsection number)</b>	<b>Respondent</b>	<b>Comment</b>	<b>Project change (Y/N/I or N/A)<sup>1</sup></b>	<b>Project commitment (1o/Change/ New or N/A)<sup>2</sup></b>	<b>Applicant Response</b>
S42_015_001 -	Cherry Burton Parish Council	Since Hornsea 1-4 are all in close proximity, a sudden loss of wind would potentially result in a sudden need for about 6 GW from elsewhere in the grid to balance demand. How will the National Grid be able to cope with such huge variation of input, when demonstrably it cannot do so at present?	N	N/A	The Applicant notes this comment. Like other generators in GB, Hornsea Four and other offshore wind projects are required to inform National Grid of expected output ahead of time. This then enables National Grid to balance the system to ensure that supply meets demand. As part of our site selection criteria, we have chosen to develop the Hornsea zone due to its favourable wind conditions, and in order to operate across this area, we are able to forecast incoming weather fronts in good time.

<sup>1</sup> N/A = Comment is not requesting a project change to be made; Y = Amendments made to the project design as a result of feedback from consultation; N = The applicant has had regard to the comment but determined that a change is not appropriate / justified in the circumstances; I = The applicant has had regard to the comment and incorporated into or considered when producing the assessment

<sup>2</sup> 1o = primary Commitment relevant to this response; Change = any change to the existing Commitment as a consequence of the feedback; New = any new commitment resulting from the comment,

## EIA topic area: Site Selection and Consideration of Alternatives

Comment ID (consultation _ response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0052_1.67	Natural England	<p>Although Route 3 does not have a direct interaction with SACs, MCZ, SPAs, cabling over Smithic Sands, and the installation of cable protection at the crossing points with DBCB has the potential to significantly affect multiple designates sites.</p> <p>Natural England would welcome further discussions regarding the southern-most route (Route 4) on the basis that this appears to avoid Smithic Sands and the need for a cable crossing. Whilst it is acknowledged that this would directly overlap with the Northern-most tip of the Greater Wash SPA, it is possible/likely that impacts could be mitigated.</p> <p><i>Natural England Recommendation (NER): To note and discuss further in Technical Panel Meetings</i></p>	I	N/A	The Applicant notes this comment. Route 3 and 4 are presented and assessed in <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a> .
S42_0052_1.68	Natural England	Natural England welcome the project's efforts to reduce the developable area in order to reduce the potential impacts on birds	N/A	N/A	The Applicant notes this comment and is pleased that Natural England welcome the material reduction in the developable area. The reduction of the Developable Area has removed the highest areas of bird usage from the scope of the scheme, and the further reduction in the array area adopted for the Environmental Statement and DCO application has further removed a high area of bird usage from the scope of the scheme.
S42_0052_1.69	Natural England	Whilst aspects of the Onshore Infrastructure refinement have been presented in Evidence Plan meetings and the project team have described their decision making process, the technical group/steering group have not been asked to evaluate these options in any detail and decisions have been primarily driven by the project.	N/A	N/A	

					<p>Hornsea Four adopted a major site reduction from the array area presented at Scoping (846 km<sup>2</sup>) to the Preliminary Environmental Information Report (PEIR) boundary (600 km<sup>2</sup>), with a further reduction adopted for the Environmental Statement (ES) and DCO application (492 km<sup>2</sup>) due to the results of the PEIR, technical considerations and stakeholder feedback. The evolution of the array area is detailed in <a href="#">Volume A1, Chapter 3: Site Selection and Consideration of Alternatives</a> and <a href="#">Volume A4, Annex 3.2: Selection and Refinement of the Offshore Infrastructure</a>.</p>
S42_0052_1.70	Natural England	<p>Natural England notes that there has been a tendency to consider direct impacts on 'Nature Conservation' in refining the cable route and substation location. If it not clear how potential impacts arising as a result of additional requirements such as access roads have been considered (or if they have been considered).</p> <p>It is not immediately clear how version 2 in Figure 3 was refined down to version 3, and how far this decision factored in the consideration of designated sites and ancient woodland. Based on the information available, Natural England believe that the alternative 'eastern' route would have a lesser impact in this regard.</p> <p><i>NER: To note and discuss further in Technical Panel Meetings</i></p>	N/A	N/A	<p>The Applicant notes this comment. Cable route options are presented and assessed in <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a>.</p>
S42_0052_10.35	Natural England	<p>Final assessment of impacts on Humber Estuary SAC/SSSI is in the Hornsea Four RIAA.</p>	N/A	N/A	<p>The Applicant is in consultation with Natural England on these topics, and</p>

		<p><i>NER: Include a summary of the RIAA assessment.</i></p>			<p>subsequent meetings have been held through the Evidence Plan process, as captured in <a href="#">annex 1 of Volume B1: Consultation Report</a></p>
S42_0052_10.36	Natural England	<p>The assessment has failed to assess all of the impacts to designated receptors:</p> <ul style="list-style-type: none"> <li>• There is no assessment of dust from construction to receptors within 200m (note that Natural England disagrees with the IAQM thresholds for the assessment of air quality on SSSIs);</li> <li>• There is no assessment of impacts from NOx (traffic) to receptors;</li> <li>• It is unclear how many AADT movements will be made along the haul road and whether this requires assessment (<a href="#">Volume A3, Chapter 7: Traffic and Transport</a>) also does not contain this information);</li> <li>• The in-combination assessment only includes traffic growth, it does not include other sources (farming/industry etc.).</li> </ul> <p><i>NER: Update the air pollution assessment with all potential impacts.</i></p>	N/A	N/A	<p>As both routes, A2 and B2, contained SSSIs, they are both considered to be amber, and therefore in respect of 'Environmental' constraints, one route was not considered more favourable than the other. Please see <a href="#">Volume A4, Annex 3.3</a> for further details.</p>
S42_0052_10.37	Natural England	<p>Table is incorrect as both routes intersect a SSSI (Leven Canal and River Hull Headwaters) and therefore both should be coloured black.</p>	N	N/A	
S42_0052_10.38	Natural England	<p>The route selection only considers the proximity to nature conservation sites, it is not coupled with the frequency nor the likelihood of impacts. For example, the Leven Canal SSSI is a manmade feature where the impacts to hydro-geomorphology are very limited, whereas the River Hull Headwaters SSSI is a natural system that has hydro-geomorphology considerations. Therefore, the River Hull Headwaters SSSI is more likely to be impacted compared to the Leven Canal. The alternative route is potentially more sustainable than the chosen route.</p> <p><i>NER: Update route selection to accurately take</i></p>	N	N/A	<p>The onshore Export Cable Corridor (ECC) route planning site selection process is a strategic process, by which the most optimal onshore ECC is chosen, prior to more detailed assessment of potential impacts being made.</p> <p>Onshore ECC route B2 was rendered unviable due to the constraints identified at the Woodmansey Road, and therefore it was not possible to take this option any further in the route planning and site selection process. Please see <a href="#">Volume A4,</a></p>

		<i>account of the impacts to nature conservation and identify the most sustainable route.</i>			<a href="#">Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a> , for further details.
S42_0052_10.38	Natural England	<p>The route selection does not take into account BMV soils, therefore the scheme does not comply with para 170 of the NPPF and cannot be demonstrated to be the most sustainable route.</p> <p><i>NER: Update route selection to accurately take account of the impacts to BMV soils and help identify the most sustainable route.</i></p>	N	N/A	Subsequent updates on this position and complete impact assessments on potential impacts have been provided in <a href="#">Volume A3, Chapter 6: Land Use and Agriculture</a> of the Environmental Statement.
S42_0068_012	RSPB	<p>Question 2 – Commitment Register Are the Commitments proposed: A. Sufficient to support “Scoping Out” of impacts? B. Are they adequately secured (see Step 3)? Do you have any additions or amendments to the Commitments at PEIR?</p>	N/A	N/A	The Applicant notes this comment and welcomes RSPB’s observation that the reduction of the Developable Area has removed the highest areas of bird usage from the scope of the scheme, and notes that the further reduction in the array area adopted for the Environmental Statement (ES) and DCO application has further removed a high area of bird usage from the scope of the scheme. See <a href="#">Volume A1, Chapter 3: Site Selection and Consideration of Alternatives</a> and <a href="#">Volume A4, Annex 3.2: Selection and Refinement of the Offshore Infrastructure</a> for full details of the evolution of the array area.
S42_0068_013	RSPB	<p>The RSPB has restricted its consideration to Commitments 86 (that the offshore export cable route will avoid the Greater Wash SPA, Flamborough and Filey Coast SPA and the Flamborough Head SAC), 87 (reduction of the proposed developable area), 88 (construction and operational maintenance vessels will avoid high concentrations of red-throated diver), and 138 (minimum lower air draft of wind turbines will be a minimum of 35m above Mean Sea Level). We answer both points for each commitment below.</p> <p>Commitment 86: A: We consider that this is sufficient to scope out the direct impacts of the construction of the cable route upon these sites. B: We consider that its inclusion in the DCO will ensure that it is adequately secured.</p> <p>Commitment 87: A: Whilst we welcome the reduction in the developable area we are concerned that important areas for birds still remain within the</p>	N/A	N/A	<p>The Applicant is pleased that the RSPB welcomes Commitment 138 and notes this has been further updated between PEIR and DCO application to increase the lower air draught of wind turbines further to be a minimum of 40 m above Mean Sea Level (MSL) 42.43 m above Lowest Astronomical Tide (LAT)).</p>



		<p>revised developable areas, particularly adjacent to the areas that have now been excluded. Consequently we do not consider that it is sufficient to scope out potential impacts.</p> <p>B: We consider that its inclusion in the DCO will ensure that it is adequately secured.</p> <p>Commitment 88:</p> <p>A: Whilst we welcome this commitment we consider that it is likely to be difficult to operate in practice as the distances at which red-throated diver are sensitive to disturbance are such that it is likely to be difficult for construction, operation and maintenance vessels to spot high concentrations of rafting red-throated diver before they are disturbed.</p> <p>B: We consider that its inclusion in the deemed marine licences through the requirement for a Construction Method Statement will ensure that it is adequately secured.</p> <p>Commitment 138:</p> <p>A: Whilst we welcome this commitment (which adopts an approach similar to that for Hornsea Two and Hornsea Three) we consider that despite this measure the impacts are likely to be too severe for it to be possible for the scheme to avoid an adverse effect on the integrity on the Flamborough and Filey Coast SPA.</p> <p>B: We consider that its inclusion in the DCO will ensure that it is adequately secured.</p>			
S42_0068_014	RSPB	<p>Question 3 – Application Register</p> <p>Are the relevant documents presented for consultation to secure the commitments and “Scoping Out” of impacts/effects of LSE?</p> <p>The RSPB notes that the breeding bird survey has yet to report. On this basis it is not possible to comment for that feature.</p> <p>We have highlighted our concerns with the commitments in response to question 2 above.</p> <p>Due to the concerns that we have raised in</p>	N/A	N/A	The Applicant notes this comment. A Breeding bird survey report was concluded and is available as part of the DCO Application ( <a href="#">Volume A6, annex 3.4: Breeding Bird Survey Report</a> ).

		relation to offshore ornithology we do not consider it is possible to scope out ornithological impacts.			
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## EIA topic area: Project Description

Comment ID (consultation _ response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/ New or N/A)	Applicant Response
S42_0033_001	Health and Safety Executive	<p><b><u>Will the development fall within any of HSE's consultation distances?</u></b></p> <p>According to HSE's records there are five major accident hazard pipelines within the proposed scoping boundary of Hornsea Project Four Offshore Wind Farm, as illustrated in, for example page 21 of 42 of, <a href="https://orstedcdn.azureedge.net/-/media/WWW/Docs/Corp/UK/Hornsea-Project-Four/O1-Formal-Consultation/PIER/Volume-1/PEIR-Volume-1-Chapter-3-Site-Selection-and-Alternatives.ashx?la=en&amp;rev=54500d9b42c24507b463a889326d5f59&amp;hash=D4E6C9FDC5D9DFB235B00A683A15B191">https://orstedcdn.azureedge.net/-/media/WWW/Docs/Corp/UK/Hornsea-Project-Four/O1-Formal-Consultation/PIER/Volume-1/PEIR-Volume-1-Chapter-3-Site-Selection-and-Alternatives.ashx?la=en&amp;rev=54500d9b42c24507b463a889326d5f59&amp;hash=D4E6C9FDC5D9DFB235B00A683A15B191</a> .</p> <p>These pipelines are:</p> <ol style="list-style-type: none"> <li>1) HSE ref 7727, operated by National Grid PLC; 6 feeder Burton Agnes / Pavill</li> <li>2) HSE ref 8422, operated by Northern Gas Networks; Wawne / Elloughton</li> <li>3) HSE ref 14134, operated by National Grid PLC; 29 feeder Ganstead to Asset by pipeline</li> <li>4) HSE ref 7719, operated by Northern Gas Networks; Burton Agnes (west) / Wawne</li> <li>5) HSE ref 9669, operated by Ineos manufacturing (Hull) Ltd; Teesside to Saltend ethylene pipeline</li> </ol> <p>According to the descriptions provided in</p>	N	N/A	The Applicant notes this comment and has consulted with the relevant pipeline operators.

		<p>section 4.11.3 of <a href="https://orstedcdn.azureedge.net/-/media/WWW/Docs/Corp/UK/Hornsea-Project-Four/01-Formal-Consultation/PIER/Volume-1/PEIR-Volume-1-Chapter-4-Proiect-Description.ashx?la=en&amp;rev=b52418cb5fc64a9aab7454584d66428e&amp;hash=5367DE71714C65F19795CA89236CB1CD">https://orstedcdn.azureedge.net/-/media/WWW/Docs/Corp/UK/Hornsea-Project-Four/01-Formal-Consultation/PIER/Volume-1/PEIR-Volume-1-Chapter-4-Proiect-Description.ashx?la=en&amp;rev=b52418cb5fc64a9aab7454584d66428e&amp;hash=5367DE71714C65F19795CA89236CB1CD</a> there will be minimal populations visiting substations onshore for maintenance work. Based on this information, HSE would not advise against this proposal. However, we recommend that the applicant liaises with the pipeline operators listed above to get the exact locations of their pipelines as they may need to consider these when positioning cables and substations etc.</p>			
S42_0033_002	Health and Safety Executive	<p><b>Hazardous Substance Consent</b></p> <p>The presence of hazardous substances on, over or under land at or above set threshold quantities (Controlled Quantities) will probably require Hazardous Substances Consent (HSC) under the Planning (Hazardous Substances) Act 1990 as amended. The substances, alone or when aggregated with others for which HSC is required, and the associated Controlled Quantities, are set out in The Planning (Hazardous Substances) Regulations 2015.</p> <p>Hazardous Substances Consent would be required to store or use any of the Named Hazardous Substances or Categories of Substances at or above the controlled quantities set out in schedule 1 of these Regulations.</p> <p>Further information on HSC should be sought</p>	N	N/A	The Applicant notes this comment and does not believe HSC is required.

		from the relevant Hazardous Substances Authority.			
S42_0033_003	Health and Safety Executive	<p><b><u>Explosives sites</u></b></p> <p>HSE has no comment to make in this regard as the nearest licensed explosive site boundary is approximately 650m from the closest point on the substation search area. As the separation distances for the site are contained within the site boundary, we cannot see any reason why this would be a problem.</p> <p><b><u>Electrical Safety</u></b></p> <p>No comment from a planning perspective.</p> <p>Please note that any further electronic communication on this project can be sent directly to the HSE designated e- mail account for NSIP applications the details of which can be found at the top of this letter (NSIP.applications@hse.gov.uk) or hard copy correspondence should be sent to:</p> <p>Mr Dave Adams (MHPD) NSIP Consultations 1.2 Redgrave Court Merton Road, Bootle Merseyside, L20 7HS</p>	N	N/A	The Applicant notes this comment.
S42_0052_IN T1.1	Natural England	<p><b><u>Summary of main points</u></b></p> <p>1) Baseline data and approach to the overall assessment</p> <p>We note that for a number of topics it is currently not possible to assess the full range of impacts of the proposed development on the natural environment and on designated sites due to incomplete baseline data. Natural England is concerned that due to timescales of the project there may be insufficient time for the missing data to be collected and for a thorough impact assessment to be carried out.</p>	N/A	N/A	<p>At the point of Application, baseline survey data for the entire area within the Hornsea Four Order Limits has been obtained. The findings of which have been used to inform the impact assessment presented in the Environmental Statement and submitted as part of the Application.</p> <p>Agreements have been reached with stakeholders (including Natural England) on the impacts that have been scoped in or out of the impact</p>

	<ul style="list-style-type: none"> <li>• Project parameters</li> </ul> <p>Natural England recognises the need to use a Rochdale Envelope approach to allow flexibility in the design to ensure that changes in available technologies and project economics can be taken into account post consent. However, Natural England note that flexibility in the project design is increasingly being sought due to uncertainty in ground conditions and are concerned that the Rochdale Envelope approach is being used in order to avoid the collection of robust baseline information to inform both project design and assessment of impacts.</p> <p>The lack of understanding of the ground conditions results in maximum design scenarios (MDSs) that are conservative enough to allow for all eventualities which in turn translates into a vast number of variables making it difficult to identify and assess the worst case scenario for each of the relevant receptors with certainty.</p> <p>In order to address this, it is increasingly common for applicants to propose that measures will be developed in various plans which are signed off by the regulator prior to construction, when ground conditions have been established and refined plans are in place. In Natural England's experience this approach simply 'stores up problems' which then become more difficult to resolve within the constraints of the consent, often leading to delays, increased costs and a large workload for all involved. (N.B This approach also presents an additional challenge in relation to Habitats Regulations Assessment which, in order to be lawful, needs to be thorough, based on the best available evidence, with no lacunae, and that there needs to be certainty</p>		<p>assessment presented in the Onshore Ecology Chapter of the Environmental Statement submitted as part of the Application.</p> <p>The Applicant confirms that flexibility in the project design is not being sought due to uncertainty in ground conditions but due to Rochdale Envelope approach flexibility in the design to ensure that changes in available technologies and project economics can be taken into account post consent.</p>
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		<p>beyond reasonable scientific doubt in its conclusions. We will provide further comment on this in our response to the RIAA.)</p> <p>As well as having clear implications for the project under consideration, establishing conservative project parameters due to a lack of understanding of ground conditions, can also have a significant bearing on the future plans and projects that will be required to take account of its impacts on a cumulative and in-combination basis.</p> <p>Whilst we acknowledge that there will always be an element of uncertainty in ground conditions, Natural England considers it vital that they are assessed as fully as possible, and that this evidence is used to inform both project design and the development of Worst Case Scenarios (WCSs).</p>			
S42_0052_1.2	Natural England	<p>Natural England query why site preparation works have been omitted from the programme. These works can have implications for various receptors it is important to understand where this work is programmed (onshore and offshore), anticipated timescales etc.</p> <p>Within paragraph 4.7.1.1 it states that "The earliest possible date that Onshore construction could commence is August 2023. The maximum total construction duration is four years and six months (54 months)."</p> <p>Given the point above, Natural England would like to clarify whether site preparations works could foreseeably commence prior to August 2023, and if the overall 'construction duration' includes the site preparation time.</p> <p><i>NE Recommendations: Please update and</i></p>	I	N/A	<p>The Applicant notes this comment. Clarification is provided within <a href="#">Section 4.7 and Figure 4.4 of Volume A1, Chapter 4: Project Description</a> in relation to the timing of site preparation works. All pre-construction activities and site preparation works are included within the 54-month construction period.</p>

		<i>include information timings and duration of site preparation works.</i>			
S42_0052_1.3	Natural England	<p>Natural England would like to understand what factors would influence the decision as to whether 6 small or 3 large substations will be used.</p> <p><i>NE Recommendations: Clarification needed</i></p>	N	N/A	<p>There are a number of factors that would influence the decision on whether to opt for 6 small or 3 large substations:</p> <ol style="list-style-type: none"> <li><b>1. Fabrication Supply</b> Supply costs for a smaller number of large platforms is typically less than a larger number of small platforms.</li> <li><b>2. Transport &amp; Installation (T&amp;I)</b> T&amp;I costs for a larger number of small platforms may be higher than a small number of large platforms. Whilst it may be possible to contract a smaller and cheaper HLV to install a jacket/topside, OSS will require the vessel for significantly longer to install at more positions, leading to higher overall installation cost.</li> <li><b>3. Offshore Hook-up &amp; Commissioning</b> Additional time and resources needed offshore for commissioning purposes, in addition to increased offshore logistics for the offshore hook-up and commissioning phase (E.g. Additional jack-up vessel, or CTV's for transit between more offshore assets).</li> </ol> <p>In summary, it is typically more cost effective to construct and install larger capacity platforms than a larger number of smaller capacity assets.</p>

S42_0052_1.4	Natural England	<p>Inset B presents an aerial plan view of the maximum design scenario for temporary disturbance and permanent seabed take, for all electrical infrastructure foundation types. This shows a maximum foundation footprint of 85m diameter; however, box type base gravity foundations are 150m x 150m and pontoon gravity base is 170m x 35m. It may be that this figure (4.9) is intended to represent turbine foundations alone, but this is not clear.</p> <p><i>NE Recommendations : Please clarify or label figure accordingly</i></p>	I	N/A	<p>The Applicant notes this comment. Clarification is provided within <a href="#">Section 4.9 of Volume A1, Chapter 4: Project Description</a> has been updated to present the Maximum Design Scenario for all foundation's types proposed at Hornsea Four.</p>
S42_0052_1.5	Natural England	<p>For gravity foundations it says if structures designed to be buoyant are used then these will be towed to site using tugs, however on the vessel section it says 0 tug vessels will be used.</p> <p><i>NER: Please clarify and update table accordingly</i></p>	N/A	N/A	<p>The Applicant notes this comment. Clarification is provided within <a href="#">Table 4.15 of Volume A1, Chapter 4: Project Description</a>.</p>
S42_0052_1.6	Natural England	<p>Natural England understands the need for flexibility in scour protection, however it is not clear how the different MDSs have been calculated based on specific parameters for the different foundation types. Natural England request that specific parameters for different foundation types regarding scour protection are defined and calculations are made clear so we can easily understand the MDSs presented in this and other chapters. Not knowing the parameters used also means we cannot crosscheck calculations. We have come across instances where MDSs have been miscalculated (e.g. POINT 3.9).</p> <p>Further to this, total volumes and area for scour protection will have to be defined for the DCO and dMLs and Natural England will need</p>	I	N/A	<p>The Applicant has developed further supporting information, which is provided as <a href="#">Annex 4.9 to Volume A1, Chapter 4: Project Description</a>. This information provides further clarity on how the Maximum Design Scenario (MDS) has been calculated for a variety of parameters and provides transparency to the total numbers included within the draft DCO.</p>



		<p>to understand what these represent. It is difficult to assess if several million of m3 of scour protection is a reasonable amount but we might be able to assess each component of it, if the amount attributed to each foundation type is reasonable for instance. This applies not only to scour protection but several of the totals presented on tables 4.15 to 4.17 (but not exclusively). It is important to understand these overall totals since these will be used for overall calculations of specific MDSs in other chapters.</p> <p><i>NER: Specify the parameter used to calculate the maximum design scenarios It is important</i></p>			
S42_0052_1.9	Natural England	<p>Paragraph 4.8.4.29 is predominately a repeat of 4.8.4.24</p> <p><i>NE Recommendations: Review paragraphs to remove duplication</i></p>	I	N/A	This comment is noted by the Applicant and the duplication has been removed from the <a href="#">Volume A1, Chapter 4: Project Description</a> .
S42_0052_1.10	Natural England	<p>Natural England notes the presentation of a most likely scenario, but stresses that the assessment within the ES should be based on the Worst Case Scenario (WCS).</p> <p>Further we note that a maximum hammer energy of 5,000kJ has been included in the draft DCO/dML. Should the project be granted consent with this condition as it stands then the applicant would be permitted a maximum hammer energy of 5,000kJ for each pile. Consequently this should be considered the WCS.</p> <p>Should the applicant wish to make an assessment based on an alternative WCS, supporting evidence would need to be provided and this would need to be reflected appropriately in the DCO/dML conditions.</p>	N/A	N/A	The Applicant notes this comment and confirm that the relevant assessments are based on a Maximum Design Scenario of 5,000kj. The relevant assessment chapters have been updated to provide the necessary clarification.

		<i>NERs: The assessment should be based on the WCS</i>			
S42_0052_1.11	Natural England	<p>Whilst Natural England notes that flexibility is required around the final project design, we would highlight that that the outputs of the geoscience survey campaigns would facilitate a greater understanding of ground conditions, potentially leading to a more refined MDS and WCS against which impacts can be assessed.</p> <p><i>NER: Outputs from the geoscience survey should be considered and incorporated.</i></p>	I	N/A	Hornsea Four have undertaken further geophysical surveys during 2019 and 2020. The outputs of these surveys have been incorporated within the relevant assessment chapters and have helped improve understanding of baseline conditions.
S42_0052_1.12	Natural England	<p>This paragraph suggests that four piling vessels may be on site and piling simultaneously. This appears to be inconsistent with Co85 which states that no more than two foundations to be piled simultaneously.</p> <p>It should be noted that this would have significant implications and may impact the HRA conclusions on adverse effect.</p> <p><i>NERs: Clarification required on the WCS for simultaneous piling.</i></p>	I	N/A	The Applicant confirms that only two piles will be piled simultaneously as stated with the Commitments Register. Clarificatory text has been added to <a href="#">Section 8.4 of Volume A1, Chapter 4: Project Description</a> .
S42_0052_1.13	Natural England	<p>Further noise modelling and assessment would be required if either vibro-piling or electro-piling is used, in order to demonstrate that the methods remain within the EIA envelope.</p> <p><i>NE Recommendations: Requirement to be captured</i></p>	N/A	N/A	The Applicant has assessed the Maximum Design Scenario (MDS) in relation to noise impacts which is set out within the <a href="#">Impacts Register (Volume A4, Annex 5.1)</a> and relevant assessment chapters. Hornsea Four confirm that piled foundations represent the MDS for both the spatial and temporal aspects of assessment.
S42_0052_1.14	Natural England	Natural England queries if this table is showing the typical piling scenario using the maximum hammer energy (5000kJ) as opposed to the	I	N/A	Hornsea Four confirms that <a href="#">Table 4.20</a> represents the Maximum Design Scenario. Clarification has been

		<p>most likely design scenario as stated. The following table then presents the most likely hammer energy of 4000kj.</p> <p><i>NER: Amend accordingly if needed</i></p>			<p>added to <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>
S42_0052_1.15	Natural England	<p>Natural England queries why the cable burial risk assessment is not to be undertaken until the post consent phase.</p> <p>Whilst we appreciate the requirement for flexibility around the number of cables that will be installed (up to a maximum of six) to enable this to be determined post consent, it is possible to undertake survey work that would enable an understanding of the ground conditions and in turn the likely cable route of up to 6 cables, likely installation method and a refined understanding of the potential site preparation works, as well a refined understanding of the potential requirement for cable protection.</p> <p><i>NE Recommendations: CBRA to be produced prior to application to inform WCS.</i></p>			<p>The Cable Burial Risk Assessment (CBRA) is typically undertaken in the pre-construction phase when higher spatial resolution geophysical survey data is available. The purpose of the CBRA is to determine the routing, installation and protection requirements for the electrical export cables and not the number of cables, which is determined via a commercial analysis.</p>
S42_0052_1.16	Natural England	<p>Table 4.24 with maximum design parameters for cable installation, shows that the project assumes a 30m width corridor for boulder and sandwave clearance for the full length of the array, interconnector and export cables.</p> <p>Whilst the need for flexibility in design post consent is understood, Natural England is concerned that these maximum design parameters are particularly broad and are primarily driven by a lack of information on ground conditions. We would like to see geophysical survey information used to refine this MDS.</p>	N/A	N/A	<p>The project parameters are aligned with typical offshore wind farm development and not dependent upon the acquisition of geophysical data to refine the project envelope. The width is due to working practices and ground disturbance as set out in the <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>

		NER: Use geophysical survey information to refine this MDS further.			
S42_0052_1.17	Natural England	The parameters used for estimating the Sandwave Clearance Material Volumes (m <sup>3</sup> ) are unclear. This seems to be a function of the cable's total length and as such it would be necessary to know what the assumption was. The same was true for other parameters on this table. See POINT 1.1.	I	N/A	The Applicant has developed further supporting information which is provided as <a href="#">Annex A4.4.9 to Volume A1, Chapter 4: Project Description</a> . This information provides further clarity on how the Maximum Design Scenario (MDS) has been calculated.
S42_0052_1.18	Natural England	<p>Natural England queries the maximum design scenario for cable protection of 10% of the total cable length. It is stated in the text that this requirement is due to tool failure and unforeseen ground conditions. Whilst NE accept that there will always be an element of uncertainty in ground conditions, we would argue that this uncertainty can be significantly reduced through the acquisition of data to establish baseline ground conditions.</p> <p>Again, Natural England is concerned that the design envelope is being stretched in order to accommodate a lack of data acquisition prior to application. As the deployment of cable protection represents a long term/permanent impact on the seabed, so it is particularly important that the WCS is fully captured and assessed.</p> <p>Natural England also has concerns around the way in which the MDS is captured in the DCO/dML. Although the figure is based on a requirement of cable protection over 10% of the total cable length (i.e. 6 cables) there is currently no mechanism within the DCO/dML by which the overall cable protection 'allowance' will reduce should fewer cables be installed. This means that if, for example only 3 cables are installed, the 'allowance' would</p>	N	N/A	The Applicant notes the concerns and confirms that the Maximum Design Scenario (MDS) has been captured and fully assessed within the Environmental Statement. 10% rock protection is industry standard value that is based on experience from other offshore wind farm developments as being adequate to minimise repeat <i>ad hoc</i> Marine Licence applications for rock protection.

		<p>equate to 20% of the total cable length, if two cables are installed it would equate to 30% etc.</p> <p>Additionally, this approach presents a range of potential scenarios as to how the cable protection might be deployed. In theory, even if six cables are installed, the full allowance could be deployed along a single cable.</p> <p>The combination of these factors makes a worst case scenario incredibly difficult to determine.</p> <p>The combination of all of these factors means that:</p> <ul style="list-style-type: none"> <li>• It will be difficult to say with certainty that the WCS has been captured and fully assessed.</li> <li>• The WCS considered are likely to be precautionary and unrealistic due to the lack of understanding of ground conditions.</li> </ul> <p><i>NER: Provide evidence on ground conditions to support a more refined assessment of the likely cable protection requirement. Explore a better means of presenting the overall cable protection requirement to enable the WCS to be defined.</i></p>			
S42_0052_1.19	Natural England	<p>"The rock berms will be inspected at regular intervals and may need to be replenished with further rock placement dependent on their condition. This operational rock placement would not exceed 25% of the estimated rock volume and would occur in areas already disturbed by rock placement (i.e. no new areas of disturbance above what is assessed in the 10% of ECC area)".</p> <p>Please make clear what is meant by this statement, if rock replenishment will occur</p>	I	N/A	<p>Hornsea Four confirms that the replenishment of rock protection will occur exclusively where cable protection has already been placed and no new areas of the seabed will be affected. Clarificatory text has been added to the Project Description (<a href="#">Volume A1, Chapter 4: Project Description</a>).</p> <p>Furthermore, the definition of 'maintain' within the draft DCO has</p>

		<p>exclusively where cable protection is already in place and no new areas of the seabed will be affected or if new areas of the seabed might be affected but the total area impacted by cable protection will not exceed the 10% of cable length.</p> <p>Please also consider and respond to the comments above regarding the presentation of this figure in the DCO/dML and how this will affect the identification of WCS.</p> <p><i>NER: Please Clarify</i> It is stated that "Larger rocks may be necessary if protection from larger anchors is required (e.g. up to 500mm in shipping corridors). In such cases the berm width would be 20.2 m (10.4 m in all other cases)". However, Table 4.25 (Maximum design parameters for cable protection) show as maximum post-lay rock berm width 10.4m. This does not include the need for a 20.2m berm width so the need for this type of rock protection has not been incorporated in the maximum design scenario for cable protection since these total values have been the ones used to calculate the several MDSs in the different chapters.</p> <p><i>NER: Amend maximum design parameters for cable protection as necessary.</i></p>			<p>been updated to clarify that any maintenance relates to the replenishment of cable protection only and therefore does not provide for the placement of additional rock protection beyond that which was installed during construction. The wording within Article 4 of Schedule 11 and 12 of the draft DCO has also been clarified. We propose to add the definition of 'replenishment within the draft DCO and the draft DML.</p>
S42_0052_1.20	Natural England	<p>It is stated that "Larger rocks may be necessary if protection from larger anchors is required (e.g. up to 500mm in shipping corridors). In such cases the berm width would be 20.2 m (10.4 m in all other cases)". However, Table 4.25 (Maximum design parameters for cable protection) show as maximum post-lay rock berm width 10.4m. This does not include the need for a 20.2m</p>	I	N/A	<p>The Applicant notes the concerns and confirms that the Maximum Design Scenario (MDS) has been captured and fully assessed within the Environmental Statement.</p> <p><b>Volume A1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and</p>

		<p>berm width so the need for this type of rock protection has not been incorporated in the maximum design scenario for cable protection since these total values have been the ones used to calculate the several MDSs in the different chapters.</p> <p><i>NE Recommendations: Amend maximum design parameters for cable protection as necessary.</i></p>			<p>calculations behind the project's maximum design scenario parameters. Further detail on rock protection is provided in <a href="#">Volume 4, Annex 4.9: Pro-rata Annex</a>.</p>
S42_0052_1.21	Natural England	<p>Rock protection area has been calculated using post-lay width of rock berm at seabed of 10.4m over 10% of cable length, which matches the total rock protection area for the array cables (600km long) and the interconnector cables (90km long). However, for the export cables this was not the case. These are described to be 654km long in total for the six cables (table 4.3) and cable protection on 10% of that totals c. 680,000m<sup>2</sup> and not 792,000m<sup>2</sup> as presented. The same is true for rock protection volume, that although it is again not clear how it was calculated, if the volume of rock protection is compared to the total area, this proportion is similar for the array and interconnector cables but disproportionately high for the export cables and again it is not clear why.</p> <p>This is another example of when a better specification of the parameters used would have been helpful.</p> <p>Again these values will be the ones that will be used to establish the MDSs which in turn will be assessed in the different chapters.</p> <p><i>NER: Clarify parameters used to quantify maximum rock protection area and volume.</i></p>	I	N/A	<p><a href="#">Volume A1, Chapter 4: Project Description</a> is updated to provide further detail on the assumptions and calculations behind the project's maximum design scenario parameters. Further detail on rock protection is provided in <a href="#">Volume 4, Annex 4.9: Pro-rata Annex</a>.</p>

S42_0052_1.22	Natural England	Again it is not clear how the total area of Cable/pipe crossings: pre- and post-lay rock berm area was calculated for the estimated crossings and how 15 crossings of the export cables require a rock berm area of 293,000m <sup>2</sup> while 40 crossings in the array and interconnector cables only needs 255,000m <sup>2</sup> . The same is true for the rock volume, 15 crossings will require 326,000m <sup>3</sup> of rock while 40 crossings only 283,000m <sup>3</sup>	I	N/A	The Applicant has developed further supporting information which is provided as <a href="#">Annex A4.4.9 to the Project Description</a> . This information provides further clarity on how the Maximum Design Scenario (MDS) has been calculated.
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## EIA topic area: Environmental Impact Assessment Methodology

Comment ID (consultation _ response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0052_IN T1.20	Natural England	<p>Full consideration of realistic worst-case scenarios</p> <p>The MDSs have been established for each topic or receptor group, to be the one that would cause the greatest impact, these have not always been translated into a WCS relative to a particular receptor. In some cases, the MDS represents the WCS for a given receptor, but in other cases the MDS needs to be translated into a WCS for the receptor. For example, the MDS for cable protection may be a volume and area equivalent to 10% of the total cable length, but the WCS for "nearshore sediment flow" might be that all of this cable protection is located in the nearshore area.</p> <p>With this in mind, realistic WCSs should be assessed for all receptors. In some cases, this may mean that more than one design option might need to be assessed.</p> <p>There are also occasions throughout the PEIR</p>	N/A	N/A	<p>The Applicant notes the comments and can confirm we have assessed the Maximum Design Scenario (MDS) for all impacts and receptors at the point of application. At the point of PEIR, the Applicant used the terms MDS / WCS interchangeably however, on review and consistent with our intentions we now refer to the MDS only.</p> <p>The exception to the MDS assessment relates only to a more realistic assessment of piling durations and the impact on Marine Mammals as requested by WDC, TWT and NE.</p>



		<p>where more focus is given to the 'most likely' scenario than the WCS. It is important to stress that the WCS is the only option that needs to be assessed in all circumstances and if the most likely scenario is to be provided it should be clear that it is for context.</p> <p>Additionally, Natural England has come across a number of miscalculations or inconsistencies with the project description when determining and calculating the MDSs on the different chapters. We would advise a thorough check of all values to ensure this is not the case for the ES.</p>			
S42_0052_IN T1.3	Natural England	<ul style="list-style-type: none"> <li>• Significance of impacts and use of the matrices</li> </ul> <p>Matrices are used throughout the PEIR to support the assessment of the magnitude and significance of impacts on key ecological receptors and where applied correctly they can be a useful screening tool. However, Natural England notes numerous instances where significance has been presented as a range (i.e. minor or moderate) and it is the lower value that has been taken forward. In the absence of evidence to support the use of the lower value in a range, Natural England's view is that the higher value should always be assessed in order to ensure that impacts on features are not incorrectly screened out of further assessment. This is in line with the principles of the Rochdale Envelope approach.</p>	I	N/A	The Applicant can confirm that the relevant assessments of the Environmental Statement have been updated to either take forward the higher value of significance or to present the evidence for use of the lower value.
S42_0052_IN T1.4		<ul style="list-style-type: none"> <li>• Cumulative impact assessment</li> </ul> <p>Throughout the annexes to this response we have provided comments on the projects scoped into each cumulative assessment, highlighting projects that have been missed</p>	I	N/A	The Applicant has considered the comments made by Natural England and have updated the cumulative assessment within the relevant chapters of the Environmental Statement where appropriate. The

		and areas of inconsistency in the application of projects to different tiers. This will need to be revisited and updated prior to the submission of a final ES to take into account of any developments in other projects and any additional information that may therefore be available.			methodology of the offshore and onshore cumulative assessments is presented within <a href="#">Volume A4, Annex 5.3</a> and <a href="#">Volume A4, Annex 5.5</a> , respectively.
S42_0052_1.71	Natural England	The impacts and effect register, particularly the Excel version was a document very easy to navigate and very helpful.	N/A	N/A	The Applicant notes this comment.
S42_0052_1.72	Natural England	<p>For impacts scoped out, even if in agreement with PINS it would be helpful to include the justification to why these impacts have been scoped out.</p> <p>As highlighted in POINT 1.47 projects are often reliant on the ES post consent so it is important that the rationale for scoping out impacts is clear, particularly where mitigation has been proposed in order to support the scoping out of the interaction.</p> <p>For instance, accidental pollution events have been scoped out because a Marine Pollution Contingency Plan (MPCP) will be put in place. This type of information will be helpful as to assess the reason why some impacts have been scoped out.</p> <p>Whilst this request may not be pertinent to an application being granted consent, it will reduce the risk of delays in post consent/ construction phase.</p>	I	N/A	The <a href="#">Impacts Register (Volume A4, Annex 5.1)</a> has evolved from that published at PEIR and further information including rationale for scoping out of effects is now included.
S42_0052_10.12	Natural England	The EIA/PEIR is an unwieldy document that is difficult for decision makers. To assess the impacts of three designated sites and an ancient woodland, an adviser had to cross reference more than a dozen lengthy	N	New	The Applicant has engaged with Natural England in order to assist with the navigation and signposting within the ES, with aim of facilitating Natural England and decision makers.

		documents.  <i>NER: Papers on specific topics (e.g. individual SSSIs) would make the documentation more accessible to decision makers.</i>			However, it is the Applicant's view that standalone documents for this specific topic is not required.
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## EIA topic area: Consultation

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment(1o/Change/New or N/A)	Applicant Response
S42_0001_001	Woodmansey Parish Council	<p>I emailed yourselves after receipt of your consultation, with a request for a very short extension to the deadline, but I have had no reply.</p> <p>Woodmansey Parish Council doesn't meet now until the evening of 23rd September and it would be very difficult to get a response to you by the end of the 23rd.</p> <p>Even a 24-hour extension would be a huge help.</p> <p>I hope you can help, and I look forward to hearing from you.</p>	N/A	N/A	The Applicant did not formally extend the statutory deadline; however, Woodmansey Parish Council's comments have been taken into consideration as part of the consultation process.
S42_0001_001	Ireland, Department of Housing, Planning and Local Government	Can you please confirm the following: if Ireland was included in the Transboundary study area for Hornsea Four and whether the transboundary screening identified any likely significant effects on the environment in Ireland?	N	N/A	The Transboundary Screening Report issued to the Planning Inspectorate in October 2019 did not identify any significant effects on the receiving environment of Ireland. The final Transboundary Screening Report is provided at <a href="#">Volume A4 Annex 5.7: Transboundary Screening Report.</a>
S42_0014_001	National Farmers' Union (NFU)	Would it be possible to send me a hard copy of all the Hornsea Four Formal Consultation documents to the below address?	N/A	N/A	This comment is noted and responded to by the Applicant

S42_0009_00 1	South Holderness Internal Drainage Board (IDB)	Further to your e-mail of the 12 August 2019 – Thank you for your consultation however, this is outside our area.	N/A	N/A	The Applicant notes this comment.
S42_0013_00 1	York City Council	Thank you for consulting City of York Council in relation to the Hornsea Wind Farm Project EIA. We note the consultation and have no comments to make on the EIA at this time.	N	N/A	
S42_0035_00 1	Driffield Navigation Trust	Acknowledgement of receipt of information re drilling/cabbling for Hornsea Four, which it is appreciated will at some stage involve horizontal directional drilling under the Driffield Navigation - for which the Trust is responsible - at Brigham.  I have been asked to respond to you to say that members are happy to co-operate with your team on this project and look forward to hearing more in due course.	N/A	N/A	The Applicant will engage further with the Driffield Navigation Trust on the detailed design for crossing the Driffield Navigation Canal prior to, and during construction, as necessary.
S42_0037_00 1	Lockington Parish Council	Thank you for the update,  However, we, Lockington Parish Council have submitted our concerns and have received no official feedback in the terms of a reference number. Can you please provide some correspondence that you have received our note and are acting on it?	N/A	N/A	The Applicant has acknowledged this comment and taken into account feedback from Lockington Parish Council.
S42_0038_00 1	East Riding of Yorkshire Council	<b>Hornsea Project Four Offshore Wind Farm</b>  Statutory Consultation under Section 42 of the Planning Act 2008 and Regulation 13 of Infrastructure Planning (Environmental Impact Assessment) Regulations 2017  On behalf of the Economic Development department of the East Riding of Yorkshire	N	N/A	The Applicant welcomes the response from ERYC.

	<p>Council I would like to extend our full support to the Hornsea Four Offshore Wind Farm project.</p> <p>Offshore wind is recognised as critical in combatting climate change through the generation of low-carbon energy, and its development will be essential in meeting the Government’s target of the UK becoming carbon neutral by 2050.</p> <p>The Humber is perfectly situated to drive this goal forward, as it contributes to over a quarter of the UK’s energy, and is at the forefront of developing a world-leading offshore wind sector. East Riding of Yorkshire Council’s Economic Development team are fully committed to working with the developer in the Humber region in order to maximise its economic growth potential and to work towards the Humber becoming a zero-carbon industrial economy by 2040.</p> <p>The Humber was highlighted in the offshore wind sector deal announced in March 2019 as an exemplar LEP area for maximising opportunities within the sector with projects such as 'Aura' and 'ergo' led by the University of Hull and ERYC respectively, bringing together a coalition of public and private sector partners to sustain the region as a global leader in offshore wind.</p> <p>As a local authority we will continue to work with the Humber LEP who are investing in skills and business support to maximise opportunities in the offshore wind sector including supply chain and specialist skills job creation.</p> <p>The Council also particularly welcomes the</p>			
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		<p>commitments made by the developer to ensure that the project does not impact on sensitive marine and terrestrial ecological sites.</p> <p>Yours sincerely</p> <p>Paul Bell Head of Economic Development</p>			
S42_0038_002	ERYC	<p><b>General Comments</b></p> <p>The PEIR is considered a very comprehensive document and includes all the information that the Council would expect to be covered in an Environmental Impact Assessment. I would refer you back to the Council's general comments in our letter dated 22 January, 19 and I am pleased to see that you have taken on board our comments and the PEIR is a very clearly laid out and logical document that sets out a proportionate approach to addressing and mitigating likely environmental impacts. The regular consultation with your team is welcomed by ERYC and the meeting that took place at the Council offices on the 3 September with the Council and our respective disciplines was very useful in allowing you to highlight to the respective bodies how you had taken on any concerns they may have had. It is recognised that there are ongoing discussions with some of our departments, in particular highways, and this again is encouraged and is welcomed. I have set out below any comments that I have received to the PEIR. When departments have not responded they have indicated that they are happy with the PEIR.</p>	N	N/A	<p>The Applicant welcomes the response from ERYC and is happy to note that the PEIR and supporting documents issued for Section 42 consultation are comprehensive. The Applicant has undertaken regular liaison with ERYC and attended the council offices on 3 September 2019 to provide a 'drop in' service, allowing for any technical reviewers or interested parties to ask questions and be directed to documents of interest.</p> <p>It is noted that where no comments are received on a given PEIR topic area, ERYC has no comments regarding the baseline, methodology or assessment.</p>
S42_0052_IN TO.1	Natural England	<p><b>Evidence Plan process</b></p>	N/A	N/A	The Applicant notes this comment.

	<p>The development consent process for Nationally Significant Infrastructure Projects (NSIPs) is intended to be a front-loaded process, in which proposals are fully scoped and refined prior to application. Natural England therefore recognises the importance of the pre-application stage of the consenting regime and we welcome the opportunity to engage with the project through the Evidence Plan Process.</p> <p>In our role on the Steering Group, Natural England has highlighted concerns that the timescales set by the project will leave insufficient time in this pre- application phase to fully identify and address the key issues associated with the project, and that consequently this will leave a large number of issues to resolve in the examination (should the application be accepted).</p> <p>Natural England consider the PEIR consultation to be a significant milestone in the NSIP process. At this stage, we would expect to be in a position to agree the supporting information and methodologies and to highlight the key issues, enabling these to be fully considered, for additional information to be gathered where needed and potential avoidance/mitigation measures to be fully scoped out in the remainder of the evidence plan process. However, due to the lack of evidence provided at this stage, this is not possible on a number of the key issues. Whilst we acknowledge that some additional data will be forthcoming and presented in the Environmental Statement (ES), we remain concerned that under the current timescales there will be insufficient time for the implications of this information to be considered and addressed prior to application.</p>			
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		<p>Normally when undertaking a review of a PEIR and/or application it is considered 'agreed' where no comment is provided. However, in the case of this particular PEIR, given the data gaps, we reserve the right to provide further nature conservation advice once all of the survey data have been included within the ES.</p> <p>Natural England has been engaging in a number of topic-specific Technical Panel meetings and contributing via the Steering Group since 2018 and are pleased to note that a number of agreements have been reached as a result of pre-application discussions. However, we note that some of the narrative within the PEIR suggest that the Technical Panels/Steering group have had a greater influence over project design than we feel is our experience. The key decisions around project design have been taken by the project team and then presented to the technical panels for feedback and as such, the steering/technical groups have not been involved in establishing the criteria used to inform the site/route selection or in the assessment made against them (although we acknowledge that the feedback we have given may have informed some of the decisions made by the project).</p> <p>We have reviewed the information provided in the PEIR as fully as possible (hence the lengthy tables appended to this letter) and mindful of the time pressure associated with Hornsea Four's anticipated timescales, we have provided as much advice as we are able at this stage. We recognise that the further work required on the PEIR to address its deficiencies will place significant pressures the project and</p>			
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		the NSIP timescales and we are aware how big a challenge this will be.			
S42_0055_00 1	North Lincolnshire Council	I can confirm that North Lincolnshire Council has no comments to make with respect to the Hornsea Four Project. It is unlikely, without prejudice, that this authority would wish to become an interested party once the DCO application is made.	N/A	N/A	The Applicant notes this comment.
S42_0058_00 1	Hull City Council	The Council is very supportive of the development of the Hornsea Project Four Offshore Wind Farms. A key element of the Local Industrial Strategy being prepared by the Humber Local Economic Partnership (LEP), which the Council is partner to, is for clean growth which includes the renewables sector, and offshore wind energy. The Council also declared a Climate Emergency in March 2019, which while setting targets for the city, reflects the city's key ambitions for sourcing energy in the future. A key company within the city is Siemens who have built and are extending a wind turbine blade factory at Alexander Dock, with the site also being a key hub for shipping out of components for final assembly off shore.  It is understood that existing sections of the Hornsea windfarm make land connections to the National Grid at various points in the UK. This is the first to be made within this area. Clearly the physical impact of the scheme to make landfall of undersea cabling and construction and installation of necessary infrastructure and routing through to the Creyke Beck Sub Station near Cottingham, will impact within the East Riding. The Council have previously made clear that the scheme will not have physical / visual impact on the city. However, the Council is keen to make	N/A	N/A	The Applicant notes this comment.

		clear its support for this necessary source of energy generation, and support for the proposed Development Consent Order subject of this consultation.			
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## EIA topic area: Geology and Ground Conditions

Comment ID (consultation _ response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0052_1.10	Natural England	<p>Natural England notes that the quote from NPS EN3 (para 2.6.42) does not include a reference to 'uncertainty in ground conditions. Similarly, the PINS guidance note does not make reference to uncertainty in ground conditions. Presumably this is because it is possible to determine ground conditions prior to application.</p> <p>Natural England therefore query whether it is appropriate that flexibility in the design envelope is sought on this basis.</p> <p>For example, the completion of offshore geophysical and geotechnical, and complete onshore surveys would enable refinement of the project design and a better understanding of the WCS in relation to a number of receptors across a number of chapters (Marine Process, Benthic Ecology, Marine Mammals etc).</p>	N	N/A	<p>Hornsea Four have determined ground conditions via geophysical and geotechnical survey (see <a href="#">Table 6 of Volume F2, Annex 4</a>) to suitable resolution to inform the Environmental Impact Assessment for all phases of the project development. Flexibility on Design Envelope is not being specifically sought by the Applicant due to unforeseen ground conditions.</p> <p>NPS EN-3 (paragraph 2.6.42) recognises that: "Owing to the complex nature of offshore wind farm development, many of the details of a proposed scheme may be unknown to the Applicant at the time of the application, possibly including:</p> <ul style="list-style-type: none"> <li>• Precise location and configuration of turbines and associated development;</li> <li>• Foundation type;</li> <li>• Exact turbine tip height;</li> <li>• Cable type and cable route; and</li> <li>• Exact locations of offshore and/or onshore substations."</li> </ul> <p>Hornsea Four has assessed a</p>

					Maximum Design Scenario (MDS) for all impacts upon all receptors as set out in the respective Environmental Statement chapters.
S42_0052_10 .4	Natural England	<p>Works mostly involve laying cables in open trenches. Certainty is needed that good pollution control measures are in place to prevent impacts to SSSIs. Soils will need to be stored correctly to prevent losses to Best and Most Versatile (BMV) soils.</p> <p><i>NER: More information would need to be captured in the Code of Construction Practice, specifically pertaining to those issues.</i></p>	N/A	N/A	The Applicant has undertaken further consultation with Natural England in relation to BMV soils. Subsequent updates on this position and complete impact assessments on potential impacts have been provided in <b>Volume A3, Chapter 6: Land Use and Agriculture</b> of the Environmental Statement. An updated Outline Code of Construction Practice can be found at <b>Volume F2.2</b> .
S42_0052_10 .9	Natural England	<p>Agricultural Land Classification (ALC) soil surveys should be available as part of the route selection and this should include an assessment of the impact to Best and Most Versatile (BMV) soils. Surveys are required prior to application to determine the sustainability of the project.</p> <p>Re-instatement should allow ensure no loss to BMV soils. There are questions about if the imported backfill material will prevent workings/drainage of BMV soils and if the same soil profile will be maintained to allow normal working of ALC soils.</p> <p>Target burial depth of 1.2m is probably reasonable for re-instatement but it is only a target. Depths less than this may impact on BMV soils.</p> <p><i>NER: Carry out ALC soil surveys prior to application to provided certainty that the route is the most sustainable option.</i></p>	N/A	N/A	The Applicant has undertaken further consultation with Natural England in relation to BMV soils. Subsequent updates on this position are summarised in <b>Volume A3, Chapter 6: Land Use and Agriculture</b> of the ES.

		<p>Ensure the re-instatement of soils will not lead to any loss of BMV soils.</p> <p>Confirm depth of burial in relation to BMV soils.</p>			
S42_0052_10.28	Natural England	<p>An ALC soil survey has not been carried out and this does not comply with para 170 of the NPPF. Natural England clearly stated that a detailed survey of ALC soils should be carried out where other data is not already available. Without an ALC survey it is impossible to show whether the route sustainable for BMV soils. As shown by the phase 1 survey, around 373 ha of arable land will be affected by the project, which is well in excess of the 20ha standard for assessment of BMV soils.</p> <p><i>NER: Carry out a detailed ALC soil survey.</i></p>	N/A	N/A	<p>The Applicant has undertaken further consultation with Natural England in relation to ALC and BMV soils. Subsequent updates on this position are summarised in <a href="#">Volume A3, Chapter 6: Land Use and Agriculture</a> of the ES.</p>
S42_0052_1.23	Natural England	<p>It is not clear how the total number of crossings has been estimated or even if it is an estimation or an already established total number of crossings. This is particularly relevant for the nearshore region where Hornsea Four cables might be crossing Creyke Beck A and B cables over Smithic sands sand bank. Large amount of cable protection might need to be put in place on top of this sand bank if that is where both corridors will cross. Considering some of the locations of the crossings are already known, as presented on <a href="#">Volume 4, Annex 4.1 Offshore Crossing Schedule</a>, these should either be presented or referred to the Annex. How the total number of crossings relate to those presented in the Annex should be clarified since the total number does not match the number of crossings listed in the Annex.</p>	I	New	<p>The Applicant has made further commitments with regard to the crossing of Dogger Bank cables in relation to Smithic Bank and the amount of cable protection in the nearshore and the location of the Creyke Beck cable crossing. These commitments are included within an updated <a href="#">Commitment Register (Volume A4, Annex 5.2)</a>.</p>

		<p><i>NE Recommendations: Please clarify how the number of crossings has been established / estimated and where these are expected to occur, at least for those for which the location is already known can be done through refereeing to Volume 4, Annex 4.1).</i></p>			
S42_0052_1.24	Natural England	<p>"The acquisition of further geophysical and geotechnical data is not anticipated to conclude until the post-Consent and pre-Construction phase. At this point sandwave clearance volumes and boulder and UXO clearance numbers and assessment will be updated."</p> <p>Again, Natural England query why this information cannot be provided up front to inform our understanding of the Maximum Design Scenario and Worst Case Scenario.</p> <p><i>NE Recommendations: Provision of geophysical and geotechnical information prior to application.</i></p>	N	N/A	Hornsea Four have provided a Maximum Design Scenario (MDS) for sandwave clearance based on an available project specific geophysical data acquisition. Due to the survey specification required to identify individual UXO and boulders, and the associated costs and time required for its acquisition and processing, this data shall be acquired at pre-construction and the MDS and any assessments updated.
S42_0052_1.25	Natural England	<p>Total clearance impact area does not match exactly (but closely) what has been presented in table 4.24 for total area of seabed impacted by boulder clearance (this might only be due to rounding up totals). Also comparison with Table 4.24 is not easy because the values are broken down differently so it is only possible to compare the absolute total for the whole project (see POINT 1.27).</p> <p><i>NE Recommendations: Please double check numbers and when theses do not match please either amend or justify the difference.</i></p>	I	N/A	All Tables and cross-references have been checked and updated. Please see <a href="#">Volume A1, Chapter 4 Project Description</a> .
S42_0052_1.26	Natural England	<p>It is stated that "Because surveys have not yet been undertaken for Hornsea Four at the point of PEIR, calculations performed on the adjacent Hornsea Two and Hornsea Three sites have been used to determine the maximum design parameters for sandwave</p>	N	N/A	<p>The current estimate of Sandwaves, which has not changed since PEIR, is based on:</p> <ul style="list-style-type: none"> <li>• 100% of the cable route assumed to be cleared.</li> <li>• 40m width</li> </ul>

		<p>clearance.” However in Hornsea Four sandwave clearance has been assumed to occur on the full length of all cables for a 30m wide corridor, so it is not clear how these calculations were influenced by those on Hornsea Project Two and Three except if the whole of cable length will be undergoing sandwave clearance for these two projects as well. Please see our comment on Natural England’s view on the MDS for sandwave clearance in POINT 1.16.</p> <p><i>NE Recommendations: Clarify how Hornsea Four sandwave clearance for the full length of all 1344km of cables was based on calculations for Hornsea Projects Two and Three.</i></p>			<ul style="list-style-type: none"> <li>• 0.043m used as Average Sand Surface Height (average height across affected area, i.e. this is not the same as the average sandwave crest height) within the Cable Corridor.</li> </ul> <p>The average sandwave height is derived from previous project experience on Hornsea One and Hornsea Two.</p> <p>Please refer to <a href="#">Table 4.30, Volume A1, Chapter 4 Project Description</a>.</p>
S42_0052_1.27	Natural England	<p>It would be helpful to always use similar system for presenting data e.g. sometimes to calculate maximum parameter designs for cables these have been broken down into Array cables, Offshore interconnector cables and Offshore export cables (e.g. table 4.24) while other times it has been broken down into cables within array area (including array cables, interconnector cables and part of the export cables) and cables within export cable corridor include the remainder of the export cables, without being clear how much of the export cable this corresponds to (e.g. table 4.28 and 4.29).</p> <p><i>NE Recommendations: Present data in a systematic way to facilitate comparison across tables and documents.</i></p>	I	N/A	<p><a href="#">Volume A1, Chapter 4: Project Description</a> is updated to provide further detail on the assumptions and calculations behind the project’s maximum design scenario parameters. Further detail on rock protection is provided in <a href="#">Volume 4, Annex 4.9: Pro-rata Annex</a>.</p>
S42_0052_1.28	Natural England	<p>Natural England would like to understand where the transition jointing bays will be located. Given the coastline is rapidly eroding it will be important to establish this.</p>	N/A	N/A	<p>The Transition Joint Bays will be located a short distance ( around 10m) landward of the HDD Drill Entry pit locations at the Landfall. The Transition Joint Bays are preliminary assessed to be located</p>

		NE Recommendations: Further clarification required			<p>around 200m to 250m landward from the cliff edge. This takes into consideration the distance required for the HDD drill to reach the maximum anticipated drill depth of between 10m to 15m below ground level at a distance of 80m from the cliff, which is assessed to be a cumulative 50 year erosion distance based upon an annual erosion rate of 1.6m /yr. The precise location of the transition joints would be subject to final detailed design, agreement with the landowner and other technical or consenting considerations. Clarification text has been added to <a href="#">Section 4.9.1.5 of the Project Description Volume A1, Chapter 4</a>. In this way, we would not expect either the cables or the transition joint bays to be affected by cliff erosion within the expected lifetime of the windfarm and that the Landfall HDD works will have minimal impact on cliff erosion.</p>
S42_0052_1.29	Natural England	<p>Natural England notes that surveys undertaken over Summer 2019 will be used to determine if HDD/trenching is preferred, however, given the eroding coastline and the importance of sediment transport along this coastline in supporting a number of designated sites, NE do not consider trenching is suitable at this location and request that this option is ruled out of any further consideration.</p> <p>This request is in line with Ørsted's commitment to avoid sensitive areas through the use of HDD (Co1).</p>	Y	New	<p>The Applicant notes this comment and confirm that a commitment has been made to use HDD or other trenchless techniques at the landfall. This commitment is included as Co187 within the Commitments Register (<a href="#">Volume A4, Annex 5.2</a>) and clarified within <a href="#">Section 4.9 of the Project Description</a>.</p>

		<i>NE Recommendations: Trenching is removed as a potential option at the landfall location.</i>			
S42_0052_1.30	Natural England	<p>Natural England notes that the detailed landfall construction methodology will be defined once detailed surveys and feasibility studies are complete.</p> <p>Given the sensitivity of this area and the potential implications for a number of designated sites, we request that this information is provided in advance of the application being submitted.</p> <p><i>NE Recommendation: Detailed landfall construction methodology to be completed and discussed with Technical Panel prior to application.</i></p>	Y	New	
S42_0052_1.31	Natural England	<p>It is stated that "Following HDD: Some additional material (e.g. rocks) may be necessary to make up for any loss, or in case the onward plough cannot bury the cable within the exit pit." Natural England queries why rocks might be used to infill HDD pits or other depression resulting from HDD process, when these are expected to occur in soft sediment. HDD pits should be infilled with similar sediment type from a local source.</p> <p><i>NE Recommendation: Please clarify if rocks will be used to infill areas that would previously be soft sediment.</i></p>	N/A	N/A	Rock protection would not be expected to be used at the offshore HDD exit pits. Depending on the final HDD duct depth and seabed composition at the exit location it may be necessary to install concrete mattresses or similar above the HDD ducts to eliminate the effects of buoyancy on the duct. The HDD exit pits below the duct would be infilled with similar sediment type as that removed.
S42_0052_1.32	Natural England	<p>Regarding this table Natural England would like to see clarified:</p> <ul style="list-style-type: none"> <li>• The difference between the area of the HDD entry pit (125m<sup>2</sup>) and the HDD exit pit area (900m<sup>2</sup>).</li> <li>• The total areas for HDD entry / exit, if these are per pit or for the total number of pits.</li> <li>• The number of entry pits since the number of exit pits has been specified as 8 but not</li> </ul>	N/A	N/A	An updated description of the HDD pits is set out in full in <a href="#">Section 4.9: Landfall of Volume A1, Chapter 4: Project Description</a>



		<p>the entry pits.</p> <ul style="list-style-type: none"> <li>• The HDD exit pit excavated material volume (2,500m<sup>3</sup>), since considering that the HDD exit pit area is 900m<sup>2</sup> and maximum depth 5m, then the HDD exit pit excavated material volume should be to a maximum of 4,500m<sup>3</sup>.</li> <li>• The duration of 6 months (1 month per circuit) only includes the installation of 6 circuits.</li> </ul> <p><i>NE Recommendations: Clarify or justify the values presented on the table.</i></p>			
S42_0052_1.33	Natural England	<p>Natural England seek clarity as to why 8 HDD pits are required in order to install 6 cables.</p> <p>Please explain under what circumstances the extra contingency may be required, the likely works that may be needed to ascertain if additional pits are required and any remedial works that may be required.</p> <p><i>NE Recommendations: Further clarification required</i></p>	N/A	N/A	The requirement for 8 HDD pits is to allow for potential failure of a maximum of 2 HDDs due to unforeseen ground conditions and/or technical issues. The requirement for 8 HDD pits is set out in full in <a href="#">Section 4.9: Landfall of Volume A1, Chapter 4: Project Description</a>
S42_0052_1.34	Natural England	<p>There is a reference to the need for beach access but there is no information provided in relation to this.</p> <p>Consideration should also be given to beach access requirements during the O&amp;M phase in order for this to be fully assessed.</p> <p><i>NE Recommendations: Information on beach access to be provided.</i></p>	N/A	N/A	Beach access requirements at landfall during the construction phase are set out in <a href="#">Section 4.9: Landfall of Volume A1, Chapter 4: Project Description</a> during the construction phase. The Applicant confirms that beach access is not anticipated to be required during the O&M phase.
S42_0052_1.35	Natural England	<p>Maximum design scenario for O&amp;M. These include about 7 turbine visits per day (2580 per year) + about two turbine foundation visits per day (780 per year). Please provide further detail as to what a "turbine visit" and a "foundation visit" would entail and provide further information to support this as a</p>	N/A	N/A	The Applicant notes this comment. There is no material difference in what a turbine visit and foundation visit will entail. There is no need for a mechanism to reduce turbine or foundation visits in accordance with the number of turbines

		<p>realistic worst case.</p> <p>Additionally, we note that these visits are calculated per turbine. We would therefore welcome further discussion with the Marine Management Organisation(MMO) to establish how to present this in the DCO/dML in order that the maximum number of visits would be scaled down accordingly if fewer turbines are constructed.</p>			<p>actually constructed. The environmental impact assessment has been undertaken on a Rochdale envelope basis; therefore, the maximum design parameters were assessed, including the O&amp;M visits figure, on the basis that these represent the greatest potential environmental impact. Therefore, if the Secretary of State grants development consent on the basis of the assessment of the worst case scenario, any reduction to any such parameters which occurs in reality is not required to be secured in the DCO or dMLs as such reduction would simply represent an improvement on the position accepted and assessed as the worst case. This is the same approach taken by other consents on this issue.</p>
S42_0052_1.36	Natural England	<p>If Ørsted wish to rely on the ES for O&amp;M monitoring activities post consent, further details of the seabed surveys should be provided so that they can be fully assessed.</p> <p><i>NE Recommendations: Further clarification required</i></p>	N	N/A	<p>The Applicant has provided a Maximum Design Scenario (MDS) for seabed surveys in <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>
S42_0052_1.37	Natural England	<p>Cable burial remediation maximum parameter is 42km. If 2km is the maximum cable length per event this corresponds to 21 cable remediation events in total which again correspond to three events every 5 years. Natural England would like to see these assumptions clarified.</p> <p><i>NE Recommendations: Clarify specification of maximum design parameters.</i></p>	I	N/A	<p>This comment is noted by the Applicant. Clarification of the Maximum Design Parameters (MDS) has been provided throughout the Project Description (<a href="#">Volume A1, Chapter 4: Project Description</a>)</p>

<p>S42_0052_1.38</p>	<p>Natural England</p>	<p>For array cables (page 104) and offshore cables (page 106) it is stated that the maximum width of disturbance is the higher of 10m or 2x water depth while this might need to be 100m or 2x water depth as per interconnector cables (page 107). This would explain the maximum footprint of seabed disturbance for cable remediation of 200,00m<sup>2</sup> per event. Also it is not clear why 2x the water depth and within Hornsea Four there are several areas where depth exceeds 50m (Figure 2.1 from Gardline, 2019 report in Volume 5 Annex 21 Benthic and Intertidal Ecology Technical Report) so 200,000m<sup>2</sup> might be underestimating.</p> <p><i>NE Recommendations: Amend where necessary and clarify specification of maximum design parameters.</i></p>		<p>Clarification of the Maximum Design Parameters (MDS) has been provided throughout the Project Description (<a href="#">Volume A1, Chapter 4: Project Description</a>)</p>
<p>S42_0052_1.39</p>	<p>Natural England</p>	<p>Some of these O&amp;M activities likely to involve the use of a jack up vessel have a footprint of seabed disturbance per event of 300m<sup>2</sup>. However, in page 25 (4.8.1.5) it is stated that "JUVs are assumed to have up to six legs with an average spud can area of 170 m<sup>2</sup> per Foot". This would have a maximum total footprint of 1,020m<sup>2</sup> per JUV so it is not clear the origin of the 300m<sup>2</sup> figure.</p> <p><i>NE Recommendations: Clarify specification of maximum design parameters.</i></p>	<p>I</p>	<p>N/A</p> <p>Clarification of the Maximum Design Parameters (MDS) has been provided throughout the Project Description (<a href="#">Volume A1, Chapter 4: Project Description</a>)</p>
<p>S42_0052_1.40</p>	<p>Natural England</p>	<p>For all types of cables, array cable repairs (pages 104/5), offshore cable repairs (please note these have also been called array cable repairs; pages 106/7) and interconnector cable repairs (again named array cable repairs; pages 107/8), the maximum cable trench width is 10m and length is 200m, while maximum footprint of seabed disturbance per event is 20,000m<sup>2</sup></p>	<p>I</p>	<p>N/A</p> <p>The Applicant notes the inconsistency and has updated the relevant part of <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>

		<p>when it should be 2,000m<sup>2</sup> as per maximum width and length.</p> <p><i>NE Recommendations: Amend where necessary</i></p>			
S42_0052_1.41	Natural England	<p>Again, for all types of cables, rock berm area and volume has been specified but it has not been mentioned in which circumstances or the assumptions behind these numbers. Since the values are the same for all types of cable this leads to the conclusion that these values are per event, but it has not been specified.</p> <p><i>NE Recommendations: Clarify specification of maximum design parameters.</i></p>	N	N/A	The values provided are Maximum Design scenario (MDS) values to facilitate an assessment. It is likely that individual events will differ from these averages. In all cases actual values per event are envisaged to be less than the MDS provided in <a href="#">Table 4.45 of the Project Description</a> .
S42_0052_1.42	Natural England	<p>The number of cable repair or total length of cable burial remediation for the three different categories of cables (array, export, and interconnector) are not in the same proportions to the total length of cable of 600km, 654km and 90km, respectively. Export and interconnector cables will need about three times more repairs than array cables (per km of cable), while array and interconnector cables will need about three times more cable burial remediation than export cables. The reason for this is not clear.</p> <p><i>NE Recommendations: Clarify specification of maximum design parameters.</i></p>	N/A	N/A	Clarification of the Maximum Design Parameters (MDS) has been provided throughout the Project Description ( <a href="#">Volume A1, Chapter 4: Project Description</a> )
S42_0052_1.43	Natural England	<p>O&amp;M activities for landfall have not been specified and have therefore not been assessed.</p> <p><i>NE Recommendations: Clarify if O&amp;M activities are not anticipated for landfall.</i></p>	N	N/A	Corrective and preventative operation and maintenance activities are set out in <a href="#">Section 4.11 of Volume A1: Chapter 4: Project Description</a> and assessed in the relevant Environmental Statement Chapter(s).
S42_0052_1.44	Natural England	<p>Although it is expected that most array and export cables will be left in situ, for the</p>	N/A	N/A	The Applicant notes this comment. In relation to decommissioning, the

		<p>purposes of this application for Development Consent it has been assumed that all cables will be removed during decommissioning, though any cable protection installed will be left in situ. The impact of the cable protection remaining in situ beyond the operation lifetime of the project therefore needs to be assessed.</p> <p><i>NE Recommendations: Further assessment required</i></p>			<p>removal of rock protection is considered the MDS in relation to temporary habitat disturbance and loss of introduced habitat (see Volume A2, Chapter 2: Benthic and Intertidal Ecology), however the necessity to remove cables and rock protection will be reviewed at the time of decommissioning.</p>
S42_0052_1.45	Natural England	<p>Operational lighting offshore does not appear to have been captured at all.</p> <p><i>NE Recommendations: Update to include operational lighting</i></p>	I	N/A	<p>The mitigation of landscape and visual effects has been considered Volume A2, Chapter 10 Seascape, Landscape and Visual Resources. Lighting requirements are detailed in the <b>F2.17: HVAC Booster Station Lighting Plan</b> and secured through Co200 (see <b>Volume A4, Annex 5.2: Commitments Register</b>) and Condition 22 (Schedule 12) of the Transmission Assets deemed Marine Licence of the draft Development Consent Order (DCO) (see <b>C1.1: Draft DCO including Draft DML</b>).</p>
S42_0052_1.46	Natural England	<p>Natural England is concerned that the design envelope of Offshore Windfarm Developments is becoming increasingly large. The implication of this is that the number of possible scenarios associated with each project is so large that identifying and assessing Worst Case Scenarios in any meaningful way is increasingly difficult.</p> <p>Whilst there is a need for flexibility to enable elements of the design to be finalised post consent to make the most of the best available technologies and take account of economics etc, Natural England notes that</p>	N	N/A	<p>The Impacts Register sets out the Maximum Design Scenario (MDS) for each potential impact that has been considered as part of the EIA process. Each MDS presents the relevant numerical parameters considered to represent the most adverse for each discrete impact that could arise. The MDS for each of the impacts assessed in the ES are additionally set out in a table within each technical chapter along with justification for the MDS. The MDS concept works within the</p>

		<p>flexibility is also being built into the design envelope to accommodate “uncertainty in ground conditions” on the basis that the surveys that will provide this information will not be undertaken until after the application has been submitted.</p> <p>Our comments on the project description chapter provide a number of examples of where this lack of information is problematic.</p> <p>It should also be noted that the implication of a large development envelope is that all potential issues are ‘stored up’ to be resolved post consent, when there is less flexibility and greater time pressure.</p> <p><i>NER: Further refinement of the design envelope supported by baseline evidence.</i></p>			<p>overall design scenario approach which is recognised by PINS (see Advice Note Nine) and others as being an acceptable for complex development.</p> <p>Where there are a number of differing scenarios in relation to potential foundation types the MDS includes the most adverse numerical parameter from across all types under consideration. Recognising that this does not allow the reader to view the worst-case parameter for each discrete foundation type, the project description (<a href="#">Volume A1, Chapter 4 Project Description</a>) sets out a number of foundation scenarios to assist consultees understand the possible permutations and key variable for this vital part of scheme infrastructure which cannot be defined further at this pre-DCO stage. In addition to recently acquired geophysical data this will provide further clarity on the variables associated with each foundation type allowing a better understanding of the development envelope.</p>
S42_0052_1.47	Natural England	<p>Natural England welcome Ørsted’s desire to produce a proportionate EIA and have found the impacts register and commitments register that links to the DCO/dML to be helpful tools.</p> <p>However, we would highlight that a key factor driving the increasing complexity of environmental statements (particularly in relation to OWF developments) is the increasing scope of the design envelope. As</p>	N/A	N/A	The Applicant notes this comment.

		<p>the project parameters have become broader, the number of variables has increased, making the assessment of impacts more complex particularly where baseline/ ground conditions is limited.</p> <p>Refinement of the project envelope (i.e. through the collection of data on ground conditions) would greatly aid the project in ensuring that the ES is proportionate.</p> <p><i>NER: Further refinement of the design envelope.</i></p>			
S42_0052_1.48	Natural England	<p>Whilst a number of impacts were scoped out at the scoping stage, it is important to note that the scoping document itself was very detailed (c 800 pages). Taking the PEIR as a stand-alone document, it is not clear why some of the impacts have been scoped out other than that this was 'agreed at EIA scoping'.</p> <p>As projects are often reliant on the ES post consent, we request that these sections of the impacts register are updated to briefly capture the rationale for scoping out, signposting back to the detail of the scoping report as necessary.</p> <p>This is particularly important where mitigation has been proposed in order to support the scoping out of the interaction.</p> <p><i>NER: Update the impacts register to include this information.</i></p>	I	N/A	<b>The Impacts Register (Volume A4, Annex 5.1)</b> has evolved from that submitted at PEIR and further information including rationale for scoping out of effects is now included.
S42_0052_1.49	Natural England	<p>As we (and others) have highlighted within the evidence plan process, whilst it is useful to draw on data from other sources, including previous Hornsea projects, it is important to establish their applicability to Hornsea Four area. Given the Applicant is located closer to shore than Hornsea One,</p>	N/A	N/A	Each of the technical assessments presented in the ES identifies a study area. Within this area all relevant receptors will be identified using a wide range of data. We agree that using data from other Hornsea offshore wind farm

		<p>Two and Three there are additional receptors which require consideration. This may result in additional data requirements.</p> <p>NER: Consideration of all receptors</p>			<p>projects can be useful, providing context, assisting to identify some receptors, and identifying knowledge gaps where further identification and characterisation is required. None of the technical assessments have been progressed on the basis of a reliance on data collected for the Former Hornsea Zone or other Hornsea projects alone.</p>
S42_0052_1.50	Natural England	<p>Within these paragraphs it is implied that aspects have been agreed during the EP process e.g. the adequacy of the data used (5.5.4.3) the appropriate study areas (5.6.2.3). Whilst these matters have been discussed in the EP meetings, and Natural England (and others) have offered thoughts/advice to the project team, it would be a misrepresentation to say that everything had been agreed.</p> <p><i>NER: Wording should be changed to reflect this point. (N.B Areas of agreement/disagreement will be captured through the SoCG).</i></p>	N/A	N/A	<p>The Evidence Panel (EP) meetings have been extremely useful in identifying areas where baseline information, data collection and assessment methodologies are acceptable (or otherwise) for key stakeholders. In many cases the EP minutes confirm that agreement on such matters has been made. However, we do recognise that not everything has been agreed and conversations at such meetings include advice and thoughts from stakeholders. We have updated these paragraphs in the ES to reflect this point.</p>
S42_0052_1.51	Natural England	<p>There appears to be an assumption here that because certain mitigation measures have been applied a number of times on a number offshore windfarms, they are effective. This is not necessarily the case. As there is often a significant time lag between consent, construction and operation, it has been quite common for mitigation measures to be incorporated in a number of projects before they have actually been implemented in practice and demonstrated to be effective.</p>	N/A	N/A	<p>The Applicant agrees that mitigation for offshore wind development is, in some areas, an evolving discipline with lessons emerging from pre-existing projects. The mitigation set out in the ES and Commitment Register will have been discussed with key consultees for acceptability and potential for incorporation in to the DCO, deemed Marine Licence, associated construction management plans etc. <a href="#">The Commitments Register (Volume</a></p>



		Consequently, is important to also consider lessons learnt.			<a href="#">A4, Annex 5.2</a> ) has been updated since PEIR in response to specific comments and we seek to agree effective mitigation through the EIA and DCO processes appropriately.
S42_0052_1.52	Natural England	As previously highlighted, it is not clear from the impacts register why individual impacts have been scoped out. Natural England requests that a simple/short narrative is provided to ensure they audit trail is clear and can be easily accessed and understood throughout all stages of the project.	I	N/A	<a href="#">The Impacts Register (Volume A4, Annex 5.1)</a> has evolved from that submitted at PEIR and further information including rationale for scoping out of effects is now included.
S42_0052_1.53	Natural England	Natural England would like to understand what would happen in the event that a simple assessment identifies evidence gaps and/or a need for more detailed consideration.	N/A	N/A	If a 'simple' assessment were to identify a shortfall in baseline data (i.e. evidence), a more complex situation than previously assumed or the potential for significant effects that requires further investigation then this assessment would be updated to a 'detailed' assessment. <a href="#">The Impacts Register (Volume A4, Annex 5.1)</a> includes information of the assessment approach at PEIR and also at ES.
S42_0052_1.54	Natural England	As the project team/specialist has made the ultimate call in this regard, if it not true to state that study areas have all been 'agreed' by the consultees. Natural England considers it more appropriate to state that the consultees have provided advice – which may or may not have been taken on board.  <i>NER: Please correct</i>	N/A	N/A	The Applicant notes this comment.
S42_0052_1.55	Natural England	It is not clear from the project description whether site preparation activities are included in the construction period. If necessary, this text should be updated.	I	N/A	The Applicant notes this comment. Clarification is provided within <a href="#">Section 4.7 and Figure 4.4 of Volume A1, Chapter 4 Project Description</a> in relation to the timing of site preparation works.

S42_0052_1. 56	Natural England	Please provide more information on how the importance and/or value of a receptor has been considered.	N/A	N/A	The value, importance or sensitivity of a receptor is included in the generic significance matrix that is applied across all technical disciplines (with several exceptions), as per <a href="#">Figure 5.3</a> . Rather than being prescriptive, and in recognition of the wide range of environmental variables considered with the ES, each technical discipline applies appropriate definitions to each receptor with such definitions supplied in each technical chapter. For example, the benthic ecology assessment uses the Marine Life Information Network (MarLIN) on the Marine Evidence based Sensitivity Assessment (MarESA) four-point scale (high – medium – low – not sensitive). The scale takes account of the resistance and recoverability of a species or biotope in response to a stressor. In relation to the landscape assessment (as another example) the sensitivity of landscape receptors is assessed in terms of the susceptibility of the receptor to the type of change proposed, and the value attached to the resource. The reader is therefore directed to each specific chapter for details of how the importance/value or significance of the receptor is considered.
S42_0052_1. 57	Natural England	Please provide more detail as to how the project determines the significance of an impact where it is presented as a range – i.e. minor to moderate. The judgement of minor or moderate has a significant bearing on whether the impact is considered further.	N/A	N/A	It should be noted that the significance matrix set out in the PEIR is updated with the latest version from the recently updated DMRB methodology. Judgement on whether a potential impact falls

		<p>Natural England's advice in these circumstances would be that unless evidence can be provided to support a conclusion of minor, then moderate should be the default assumption, and avoidance/mitigation considered.</p> <p><i>NER: Please provide further details</i></p>			<p>in to a minor or moderate category (where the matrix allows for both) is applied by the lead technical assessor. The rationale for selection of the significance of the impact is set out on an individual impact basis in the relevant chapter.</p>
S42_0052_1.58	Natural England	<p>As per the comment above, we would like to understand how the project determines the importance or value of a receptor.</p>	N/A	N/A	<p>This paragraph and associated bullet points confirms the use of impact magnitude and receptor importance/value to determine if the impact is considered to be significant (or not) in line with widely used EIA methodology. Appropriate updates have been made to confirm that definitions of both magnitude and receptor importance/value are specific to each technical topic considered and are presented in the relevant technical chapter.</p>
S42_0052_1.59	Natural England	<p>It is often mentioned that potential impacts can be resolved through mitigation / commitments but this is not necessarily the case if these commitments are vague or not secured in a meaningful way in the DCO / dML (please see our comments on the commitments register).</p>	I	N/A	<p>The Applicant notes this comment and confirms that a review of the commitments register has been undertaken to refine the wording of commitments wherever possible. The commitments register provides clear signposting to the DCO to ensure each of the commitments are adequately secured.</p>
S42_0052_1.60	Natural England	<p>Not much information has been provided on the cumulative environmental assessment, for instance which projects will be considered (not necessarily the projects themselves but which types of projects, at which stages of consent, development). Reading some of the chapters a tiered approach has been used for the CEA, this should be specified in the methodology chapter as well.</p>	N	N/A	<p>The CEA text in the EIA Methodology is not intended to provide details on the specific methodologies used for cumulative effects assessment, only a summary. The reader is guided towards the specific annexes where further detail is provided on the CEA methodologies applied for both the offshore and onshore</p>

		<i>NER: Clarify the CEA methodology</i>			components of Hornsea Four: see: <a href="#">Volume A4, Annex 5.3 (offshore)</a> and <a href="#">Volume A4, Annex 5.5 (onshore)</a> .
S42_0052_1.61	Natural England	Natural England was not present on the Marine mammal's technical panel meeting 1 (13/09/2018)  <i>NER: Please update accordingly</i>	I	N/A	The Applicant notes this comment and has corrected the text.
S42_0052_1.62	Natural England	Natural England has not been involved in the landfall working group and has had limited influence the project design in this regard.  Whilst landfall options have been presented in Evidence Plan meetings, and the project team have described their decision making process, the technical groups/steering groups have not been asked to evaluate these options in any detail.	N/A	N/A	The Applicant notes this comment.
S42_0052_1.63	Natural England	Whilst the project teams' willingness to avoid direct impacts to the MCZs are welcomed, it appears that not all of the key ecological receptors have been identified and avoided.  Smithic Sands for example, has been identified by JNCC as potential Annex 1 sandbank in its own right, but it also vitally important in the maintenance of sediment transport along the Holderness coast which is in turn important to the maintenance of features of designated sites, including Holderness Inshore MCZ, the Humber Estuary SPA, SAC, SSSI and Ramsar, and beyond.  (N.B. Although it is recognised that DBCB landfall is located in a similar area, their cables route around Smithic sands and their consent includes a number of conditions designed to mitigate impacts on nearshore coastal processed).	N/A	N/A	The importance of Smithic Sands is recognised. Offshore export cable crossings adjacent to Smithic Sands are described in <a href="#">Volume 1, Chapter 4: Project Description</a> which details the assumptions and calculations behind the project's maximum design scenario parameters.  The Applicant has committed (Co188 and Co189) to ensure offshore export cable crossings remain clear of Smithic Sands as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .  The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> . Therefore, monitoring of

		<i>NER: To note and discuss further in Technical Panel Meetings</i>			Smithic Sands is not proposed necessary.
S42_0052_1.64	Natural England	Natural England would like further information as to how the erosion rate has been calculated. Given the nature of this coastline it is not considered appropriate to rely on average erosion rates, but to consider a maximum.	N/A	N/A	The Applicant acknowledges this comment and confirm updated wave modelling is presented in the review of measured waves passing through Hornsea One in <a href="#">Appendix C of Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0052_1.65	Natural England	For all locations along the Holderness Coast, potential impacts on the Humber Estuary and Holderness Inshore MCZ should be considered in the context of marine physical processes under 'Nature Conservation'  The implication of cable crossings with DBCB should also be considered in terms of potential Ecological Impact (Marine Processes)	N/A	N/A	The Applicant notes this comment. Marine processes are effects and not ecological receptors. The impact of marine process changes upon ecological receptors are assessed in the relevant ecological chapter of the Environmental Statement (ES).
S42_0052_1.66	Natural England	Whilst aspects of the Offshore Infrastructure refinement have been presented in Evidence Plan meetings and the project team have described their decision making process, the technical group/steering group have not been asked to evaluate these options in any detail and decisions have been primarily driven by the project.	N/A	N/A	The Applicant notes this comment.
S42_0052_9.5	Natural England	Assuming that on the table the header "Offshore and Intertidal Ecology" is in fact "Offshore and Intertidal Ornithology", otherwise ornithology has not been considered.  <i>NER: Amend if necessary</i>	N/A	N/A	The Applicant notes this typographic error and has corrected it in <a href="#">Volume A4 Annex 5.3: Offshore Cumulative Effects</a> .
S42_0052_9.6	Natural England	Dogger Bank OWFs have been already consented  <i>NER: Amend accordingly</i>	N/A	N/A	The Applicant notes this comment and has corrected <a href="#">Volume A4 Annex 5.3: Offshore Cumulative Effects</a> .

S42_0052_9.7	Natural England	<p>Assuming that on the table the header “Offshore and Intertidal Ecology” is in fact “Offshore and Intertidal Ornithology”, otherwise ornithology has not been considered.</p> <p><i>NER: Amend if necessary</i></p>	N/A	N/A	The Applicant notes this typographic error and has corrected it in <a href="#">Volume A4 Annex 5.3: Offshore Cumulative Effects</a> .
S42_0052_1.1.2	Natural England	<p>Natural England notes the inclusion of an arbitration provision which may apply to the deemed marine licences (Schedules 11 and 12). Natural England reiterates the arguments put forward on Hornsea 3, Vanguard and Thanet OWF applications.</p> <p><i>NER: Amend the arbitration provision to the one used on the Tilbury 2 DCO. This is the only DCO where this issue has been considered and a determination made by the Secretary of State.</i></p>	N/A	N/A	The Applicant proposes to follow the precedent set out by Hornsea Three, as detailed at Article 37 and Schedule 13 of the Hornsea Three DCO. For the avoidance of doubt, it is acknowledged that the arbitration provisions will not apply to any consent or approval of the SoS or the MMO.
S42_0052_1.1.3	Natural England	<p>Natural England notes the inclusion of an appeals process. In the Hornsea 3, Vanguard and Thanet extension applications Natural England supported MMO’s position on the inclusion of this appeals mechanism.</p> <p><i>NER: Review comments made by MMO and natural England on Hornsea 3, Vanguard and Thanet Ext regarding the appeals process and remove this requirement.</i></p>	N/A	N/A	The Applicant intends to seek a right of appeal in line with Article 38 of the Hornsea Three Offshore Wind Farm Order 2020. It is acknowledged that the right of appeal for non determination will not extend to the dML
S42_0052_1.1.11	Natural England	<p>As stated above Natural England does not agree that deemed marine licence decisions should be captured under arbitration.</p> <p><i>NER: Suggest removal.</i></p>	N/A	N/A	The Applicant proposes to follow the precedent set out by Hornsea Three, as detailed at Article 37 and Schedule 13 of the Hornsea Three DCO. The arbitration provisions won’t apply to the decisions of the MMO.
S42_0052_1.1.15	Natural England	<p>As per comment on article 36.</p>	I	N/A	The Applicant proposes to include a schedule of documents which will list all plans to be certified pursuant to article 36.

# Hornsea 4



S42_0052_1 1.16	Natural England	Natural England notes the archaeological protocol must be provided 6 months prior to construction.	I	N/A	The Applicant agrees to the 6-month archaeological protocol.
S42_0052_1 1.18	Natural England	This condition requires submission of pre-construction documentation 4 months prior to commencement. Natural England requests that documentation be supplied 6 months prior to construction. Round 3 projects are several orders of magnitude bigger and more complex than the round 1 projects that created the 4-month protocol. The documents to review are also significantly greater in size and complexity. A period of 6 months is insufficient to approve such documentation. See written representations of Hornsea 3, Vanguard and Thanet Extension.  <i>NER: Amend to 6 months prior to construction.</i>	N/A	N/A	The Applicant proposes to follow the 4-month precedent set out by Hornsea Three.
S42_0052_1 1.19	Natural England	As per our comments above on arbitration and appeals this condition should be removed.  <i>NER: Remove condition.</i>	N/A	N/A	The Applicant proposes to follow the precedent set out by Hornsea Three.
S42_0052_1 1.20	Natural England	The monitoring conditions only provide for benthic preconstruction and noise and traffic during construction. Post construction surveys only consider archaeological factors. Natural England notes that due to the concerns and impacts of the project monitoring of both marine mammals and ornithological receptors will be required.  <i>NER: Amend to include requirement to monitor marine mammals and ornithology.</i>	I	N/A	The Applicant has included marine mammals in the Outline Marine Monitoring Plan and is including a separate Ornithological Monitoring Plan within the dML.
S42_0052_1 1.21	Natural England	Natural England requires that this wording be amended to include a requirement to stop piling should the monitoring work show that the works are significantly in excess of	N/A	N/A	Should the MMO require additional monitoring to be undertaken, The Applicant will discuss this with the

		<p>the impacts assessed. Given the concerns relating to the Harbour Porpoise of the Southern North Sea SAC if the noise impacts are significantly in excess then there is a need to stop piling.</p> <p><i>NER: Suggest include the wording agreed on the within the Vanguard DCO/DML.</i></p> <p><i>The assessment of this report by the MMO will determine whether any further noise monitoring is required. If, in the opinion of the MMO in consultation with Natural England, the assessment shows significantly different impacts to those assessed in the environmental statement or failures in mitigation, all piling activity must cease until an update to the marine mammal mitigation protocol and forth</i></p>		<p>MMO but the Outline Marine Monitoring Plan will detail the contingencies that will be applied in the event that the Noise Monitoring outcomes are significantly greater or lesser than that assessed. It is the Applicant's position that the MMO already has significant legislative powers to stop piling if they consider there to be significant risk of harm.</p>
<p>S42_0052_1 1.24</p>	<p>Natural England</p>	<p>Natural England's response to the Hornsea Four PEIR consultation has been structured in two distinct sections:</p> <ol style="list-style-type: none"> <li>1) Response letter main body</li> <li>2) Specific and detailed comments for the different chapters compiled in Annexes</li> </ol> <p>In the main body of the response letter we highlight the overarching and topic specific main concerns. For the impacts on the natural environment the titles have been colour coded to represent the level of concern and associated risk for each topic. The same colour code has been used throughout the documents and can be found in ANNEX 12.</p> <p>Within each subject specific Annex there is on most occasions a summary table with the major concerns specific for hat topic and a second more extensive table with all the</p>		<p>The Applicant notes this comment and thanks Natural England for their continued engagement in Hornsea Four.</p>



detailed comments. The detailed comments have also been colour coded using the same colour code specified in ANNEX 12. There are specific topics, such as seascape and landscape where this format has not been used.

Natural England would like to highlight that at this stage all comments highlighted as yellow, amber or red need to be addressed with the potential for these issues to become more significant if not resolved at application.

Table 12.1 - Structure/Framework of/for Natural England advice in relation to attributing risk and potential to resolve PRE APPLICATION

**RED**

NE considers these issues to be show stopper that an adverse effect on integrity; significant impacts (MCZ) significant adverse effect on landscape/seascape; and/or significant EIA issue can't be ruled out. Resolving this issue is likely to require (but is not limited to):

- Significant design changes

N.B. Discussions on Compensation/MEEB may be required if changes are not made.

**AMBER**

Natural England considers this issue to be significant and unless it is resolved, we advise that AEOL, significant impacts on landscape/seascape of significant EIA impacts cannot be ruled out. Resolving this issue is likely to require (but is not limited to):

- Additional baseline data; and/or
- Design changes; and/or

		<ul style="list-style-type: none"> <li>• Mitigation; and/or</li> <li>• Significant changes to assessment.</li> </ul> <p>If these issues are not resolved prior to application, they are likely to become show stoppers.</p> <p><b>YELLOW</b> Natural England does not agree with the Applicants assessment/position/approach. At this stage it is not anticipated that this would result in a showstopper for this particular project, but it has the potential to become a significant issue in examination if it is not addressed prior to application.</p> <p><b>GREEN</b> NE support for something the Applicant has done and we would possibly encourage others to do similar.</p> <p><b>GREY</b> Flagging issues that are outside of NE remit and/or NE has no further comment on unless further evidence is presented</p>			
S42_0052_9.8	Natural England	<p><b>Project Parameters</b></p> <p><u>Project Definition</u></p> <p>It is not clear if the route presented is final or if the route includes a variation of up to 50m.</p> <p><i>NER: If there is a variation of up to 50m then all of the onshore documents need to be updated to reflect this.</i></p> <p><u>Worst Case Scenario (WCS)</u></p> <p>The WCS is not evident in the impacts register nor the methodology of the various chapters. For example:</p> <ul style="list-style-type: none"> <li>• Without sufficient evidence and a baseline, it is very difficult to determine the WCS;</li> </ul>	N/A	N/A	<p><u>Project Description</u></p> <p>The Extended Phase 1 Habitat Survey Report includes a 50 m survey buffer in order to give an understanding of the ecological surroundings of the Hornsea Four Order Limits. The Hornsea Four pre-DCO boundary (published at PEIR) has been refined between PEIR and DCO. Where relevant changes have been described and explained in the technical reports and/ or Chapters which form the Environmental Statement submitted at DCO submission.</p>

- The impacts register scopes out a large number of impacts. But under a WCS these impacts should be scoped into the project;
- Volume 3, Chapter 3: Ecology and Nature Conservation sets a 50m buffer either side of the route for the phase 1 survey. But it is not clear as to the purpose of this buffer and the figures presented may not represent the actual the WCS within the Maximum Design Scenario.

*NER: Provide sufficient evidence and a baseline to allow the WCS to be determined. Consider WCS when scoping impacts in the impacts register.*

#### NE position on WCS

Natural England does not agree with the WCS for the reasons presented above

*NER: As above*

#### **Baseline Characterisation**

##### Data suitability and baseline characterisation

The lack of adequate evidence and surveys to inform the baseline is the most problematic issue. Without adequate evidence it is not possible to identify all of the impacts and required mitigation. It makes it very difficult for us to assess the proposals.

It appears the only onsite survey is a phase 1 habitat survey. There are no additional surveys for SSSIs, soils nor ancient woodland. Onshore ecology:

- The phase 1 survey took place during February, which means that habitats may have been misidentified and means that no

#### Worst Case Scenario (WCS)

At the point at which the PEIR was submitted, Hornsea Four provided the parameters which constitute the Maximum Design Scenario (MDS) and which are considered to be the worst case construction, operation and/or decommissioning parameters used to inform the assessment. These were provided in [Table 3.13 of PEIR Volume 3: Ecology and Nature Conservation](#), for all potential impacts identified through the Scoping and PEIR processes. The baseline data was incomplete at the point at which the PEIR was submitted, as discussed with Natural England through the onshore Ecology Evidence Plan Technical Panel meetings held on 8th April and 9th July 2019. In these meetings, it was agreed that where sufficient baseline was available, the baseline technical reports would be provided at PEIR, but that no assessments were to be provided. As such, baseline technical reports were provided for the Extended phase 1 habitat survey, onshore ornithology - wintering and migratory bird survey, great crested newt survey, and the badger survey (available on request). Any updates to the MDS and full assessment of potential impacts have been provided in [Volume A3, Chapter 3: Ecology and Nature Conservation](#)

additional surveys were identified for terrestrial habitats;

- Only 50% of the land received a phase 1 survey, the rest was completed by aerial photography, including parts of a SSSI. This is not appropriate. If the phase survey had been completed during a reasonable time of the year, an ecological model would be more appropriate for those areas that weren't accessible;
- A SSSI river was identified as a 'wide ditch' by the survey;
- Most survey data is yet to be submitted;
- Apart from a GCN survey, there is no protected species survey data.

Hydrology (and ground conditions):

- No surveys have been carried out for the two SSSIs that may suffer hydrological impacts.

Land Use:

- No surveys have been carried out for Best and Most Versatile (BMV) Soils and existing data is insufficient.

Air Quality:

- Pathways and receptors are missing from the survey (or at the very least, it is not explained why they are missing from the assessment).

*NER: Provide adequate surveys and evidence to inform the baseline*

#### Data gaps

Ecology, hydrology, BMV soils and air quality data are all required.

*NER: Provide adequate surveys and evidence to inform the baseline.*

#### Data analysis

#### Data suitability and baseline characterisation

The baseline data was incomplete at the point that the PEIR was submitted, as discussed with Natural England through the Evidence Plan Technical Panel meetings held on 8th April and 9th July. In these meetings, it was agreed that where sufficient baseline was available, the baseline technical reports would be provided at PEIR, but that no assessments were to be provided. As such, baseline technical reports were provided for the Extended phase 1 habitat survey, onshore ornithology - wintering and migratory bird survey, great crested newt survey, and the badger survey (available on request).

Since the publication of the PEIR, ongoing consultation with landowners has been undertaken by the Applicant and access to the previously inaccessible areas has since been obtained. Therefore, at the time of the Application, baseline data for the entire area within the Hornsea Four Order Limits has been obtained. The findings of which have been used to inform the impact assessment presented in [Volume A3, Chapter 3: Ecology and Nature Conservation](#).

Analysis is only conducted at the project scale. No consideration is given to designated sites, ancient woodland or other sites, even though these may have greater sensitivities to impacts

*NER: Analyse the impacts to designated sites, ancient woodland etc. once adequate survey information is available.*

### **Environmental Impact Assessment** Identified Impacts

Many impacts have been scoped out of assessment even though there are clear pathways and impacts arising from the project. Standard mitigation alone is not enough to scope these impacts out, onsite detailed investigations are required.

Impacts to SSSIs that are not fully considered include:

- Decommissioning;
- Hydrology/ground conditions;
- Eco-hydrology;
- Water quality;
- Hydro-geomorphology;
- Dust
- Air quality;
- Breeding birds;
- Invasive non-native species.

*There has no attempt to assess the impacts to an ancient woodland.*

*NER: Scope in all of the impacts to SSSIs and the ancient woodland and assess the impact.*

### Methodology

In the ecology chapter, there are no definitions for sensitivity and magnitude.

Also, the sensitivity of SSSIs is only considered to be medium. SSSIs should have a very high sensitivity.  
In ground conditions chapter, the sensitivity of SSSIs is only considered to be high. Although there is a difference in the legislative requirements of a European Site compared to a SSSI only, Natural England treats the importance and sensitivity of such habitats equally. It would be more appropriate if SSSIs were considered to be very high.

In the land use chapter, there is at least one instance where the assessment does not follow the defined matrix and the magnitude is lowered.

*NER: Ensure a consistent methodology with the assessment of sensitivity/magnitude. Recognise that SSSIs have very high sensitivity to potential impacts.*

#### Cumulative Effect Assessment (CEA)

The cumulative assessment focuses on projects but does not consider plans. Cumulative assessment should include allocations (and policies) from east riding local plan, waste and minerals plan, transport plan etc. No EA permits have considered for inclusion within the assessment.

NER: Include all of the potential cumulative impacts.

#### Assessment

This has not been completed and it is required.

		<p><i>NER: Complete the assessment.</i></p> <p><u>Assessment Conclusion</u></p> <p>The documentation does not:</p> <ul style="list-style-type: none"> <li>• Have enough evidence to determine the baseline and impacts;</li> <li>• Identify all of the impacts;</li> <li>• Follow the methodology consistently;</li> <li>• Demonstrate why the chosen route is the most sustainable;</li> <li>• Recognise the importance of SSSIs and Ancient Woodland;</li> <li>• Sufficiently recognise the need for biodiversity enhancements and/or net gain to meet para 170 of the NPPF.</li> </ul> <p>Without this it is impossible to arrive at a reasonable and fair conclusion.</p> <p><i>NER: ADDRESS ALL BULLET POINTS</i></p>			
S42_0057_1.1.1	Marine Management Organisation (MMO)	<p><b>1.1 Project Description (PD)</b></p> <p>1.1.1 Table 4.8 – the maximum number of piles is incorrect. The remaining parameters in the table should be clarified to confirm values are per monopile.</p>			The Applicant notes this comment. Clarification is provided on the number of piles in <a href="#">Volume A1, Chapter 4 Project Description</a>
S42_0057_1.1.2	MMO	Table 4.9 – the maximum number of piles per foundation listed for the Small substation appears to be incorrect and should be clarified. Please also clarify whether the number of piles per leg for the large substation is correct.			
S42_0057_1.1.3	MMO	Section 4.8.4.32 – this paragraph ends “...sea surface”, please clarify whether this should state “seabed surface”.			The Applicant notes this comment and confirms that it should state seabed surface. Clarification is provided in <a href="#">Volume A1, Chapter 4: Project Description</a>

S42_0057_1.1.4	MMO	Section 4.8.5.10 (onwards) – commentary should be provided on how rock protection design has been considered in regard to decommissioning works.		Rock protection design has been designed to provide the best protection to the electrical cables for the lifetime of the Project. Consideration in regard to decommissioning works is incorporated within the design (size of rocks and use of a filter layer) should the removal of the materials be required at a later date.
S42_0057_1.1.5	MMO	Section 4.8.7.6 – clarification should be provided on whether a guard vessel will be deployed to secure the safety zone, and if so, for how long.		The requirement for safety zones are set out in 4.8.7.6 of <a href="#">Volume A1, Chapter 4: Project Description</a> . At the time of writing the method of implementation has not been confirmed and will be confirmed pre-construction via Volume F1, Annex 2: Safety Zone Statement.
S42_0057_1.1.6	MMO	Section 4.8.8.3 – the design scenario has considered recent publicly available information on Unexploded Ordnance (UXO) and experience from Hornsea Project One. It would be pertinent to also examine Hornsea Project Two which located a 4000 lb Blockbuster bomb in 2019 in the Southern North Sea, more than double the largest UXO located to date. Please note that it may be possible to undertake surveys to identify prospective occurrences and UXO type via the self-service marine licensing process, as opposed to submitting a Marine Licence Application.		Hornsea Four will utilise all available data from Hornsea Zone projects to inform their experience on UXO, as and when it becomes available. The Applicant notes the comments from the MMO on licensing.
S42_0057_1.1.7	MMO	Section 4.8.8.4 – Hornsea Project Two applied for a maximum of 5 UXO detonations per 24 hours in a Marine Licence Application for their UXO campaign. This was later revised to a lower maximum number of detonations per 24 hours to meet the current conservation objectives for the Southern North Sea SAC. Ørsted should		It is not proposed to licence UXO clearance as part of the Hornsea Four DCO application. A number of assessments have been updated to include the most relevant and up to date numbers for UXO clearance works. The exact numbers and considerations will be agreed with



		consider whether the worst-case scenario (of one per 24 hours) currently presented for Hornsea Project Four is realistic.			the regulator at the relevant time of licensing.
S42_0057_1.1.8	MMO	Table 4.29 – please provide the maximum parameter for anticipated impact area from sandwave clearance.			<b>Volume 1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and calculations behind the project's Maximum Design Scenario (MDS) parameters, including sandwave clearance volumes. Further detail is provided in <b>Volume 4, Annex 4.9: Pro-rata Annex</b> .
S42_0057_1.1.9	MMO	Table 4.44 – For array cable repairs, do the proposed parameters for rock berm area and volume indicate that new rock cable protection would be included post-repair? This has not been stipulated within the activities in the rationale column. If so, please note the MMO considers that the currency of impacted benthic area data should be considered, together with consultation of potentially affected sea users to ensure that new cable protection post-construction is properly assessed and consented separately by the MMO in consultation with relevant stakeholders prior to installation.			The Applicant notes this comment and confirms that new rock cable protection would be included post-repair up to 25% of the volume as per <b>Table 4.45 in Volume A1, Chapter 4 Project Description</b> . No new areas of protection are considered, only replenishment of pre-laid rock protection.
S42_0057_2.1.1	MMO	2. Comments on the Draft Development Consent Order (dDCOs)  NB: where relevant, please consider comments with reference to both deemed Marine Licences in Schedules 11 and 12 respectively. Part 1 – Preliminary, Article 2 – Interpretation  2.1.1 “Cable crossings” – please clarify why	I	N/A	The Applicant notes this comment and confirm that the definition of 'cable crossings' within the draft DCO has been updated to include cable protection.

		material used for cable crossings is excluded from this definition.			
S42_0057_2.1.2	MMO	Definition of “maintain”. Please note that the MMO does not consider the definition of “maintain” allows the addition of new elements as part of maintenance works. Please clarify Ørsted’s understanding on the scope of works possible under the current interpretation of “maintain”. Rock protection is one such example whereby the current definition of “maintain” does not allow for the placement of new rock protection (whether assessed or otherwise) as a maintenance activity. Any new rock protection required beyond construction would be subject to a Marine Licence Application and impact assessment accordingly.	I	N/A	The definition of 'maintain' within the draft DCO has been updated to clarify that any maintenance relates to the replenishment of cable protection only and therefore does not provide for the placement of additional rock protection beyond that which was installed during construction. Furthermore, wording has been clarified within <a href="#">Article 4 of Schedule 11 and 12 of the draft DCO</a> .
S42_0057_2.1.3	MMO	Definition of “Jacket foundation” – please clarify why it is necessary for this definition and other to include scour protection as part of the structure, given scour protection is defined and assessed as a separate element.	I	N/A	The Applicant notes this comment and confirm that the DCO has been updated to remove scour protection from the definition of "jacket foundation".
S42_0057_2.1.4	MMO	“transition joint bay” – typographical error in “Work No. 5”.	I	N/A	This comment is noted by the Applicant and the typographical error has been updated.

S42_0057_2. 1.5	MMO	<p>Part 7 – Miscellaneous and General</p> <p>Article 37, Arbitration – it is not appropriate for the MMO’s decisions and determinations to be subject to arbitration. The article should be removed, or a saving provision included to exclude the MMO. The judicial review process is the established mechanism to challenge any public law decision the MMO may take, or fail to take, in determining whether to discharge any PA2008 conditions under the DMLs.</p>	N/A	N/A	<p>The Applicant proposes to follow the precedent set out by Hornsea Three, as detailed at Article 37 and Schedule 13 of the Hornsea Three DCO. For the avoidance of doubt, it is acknowledged that the arbitration provisions will not apply to any consent or approval of the SoS or the MMO.</p>
S42_0057_2. 1.6	MMO	<p>As a public body, the MMO has a number of specific statutory powers and duties, and a responsibility to act in the public’s interest. The MMO is therefore rightly subject to public scrutiny on the decisions it makes which often fall to be taken only after public consultation. Article 37 in the decor applies to ‘differences’ which arise under the provisions in the Order. The MMO position is that such an approval is a regulatory decision, it is not ‘agreeing’ or ‘disagreeing’ with the applicant so that a divergence of views can properly be characterised as a ‘difference’. When discharging a condition, the MMO is making a decision as a public body in response to an application, taking account of the broad sweep of its statutory responsibilities.</p>	N/A	N/A	
S42_0057_2. 1.7	MMO	<p>The MMO recognises the intention of the arbitration provision to resolve disputes between the applicant and third parties, however this provision should not be used to remove the decision making powers from the MMO (as the regulator delegated by Parliament to take such decisions) and place this in the hands of an independent arbiter.</p>	N/A	N/A	

# Hornsea 4



<p>S42_0057_2.1.8</p>	<p>MMO</p>	<p>Please note the MMO has argued extensively against the inclusion of modified arbitration articles in recent DCOs with respect to Hornsea Project Three (HOW3), Thanet Extension and Norfolk Vanguard offshore wind farms. With respect to HOW3, the Examining Authority's (ExA) schedule of changes and subsequent recommendation found in favour of the MMO, proposing the following provision:</p> <p>"Any matter for which the consent or approval of the Secretary of State or the MMO is required under any provision of this Order shall not be subject to arbitration."</p>	<p>N/A</p>	<p>N/A</p>
<p>S42_0057_2.1.9</p>	<p>MMO</p>	<p>Similarly, in the case of Tilbury2 port facility the ExA's Recommendation Report to the Secretary of State found in favour of the MMO for reasons stated in its submissions, noting:</p> <p>"The MMO stated that it strongly opposed the inclusion of such a provision, based on its statutory role in enforcing the DML. According to the MMO, the intention of the PA2008 was for DMLs granted as part of a DCO in effect to operate as a marine licence granted under the MCCA2009. There was nothing to suggest that after having obtained a licence it should be treated any differently from any other marine licence granted by the MMO (as the body delegated to do so by the SoS under the MACAA).</p> <p>"Having considered the arguments of the Applicant and the MMO, the Panel finds in favour of the MMO in this matter for the reasons stated in the paragraph above.</p> <p>"Accordingly, the Panel recommends that</p>	<p>N/A</p>	<p>N/A</p>

		paragraph 27 is deleted from the DML at Schedule 9 of the draft DCO.”			
S42_0057_2.1.10	MMO	The MMO recommend that Ørsted should thoroughly consider its position with regard to arbitration prior to formal submission of the DCO to PINS. The MMO recognises that further decisions of the Secretary of State regarding determination of offshore wind farm applications due in Q4 2019 are likely to influence this debate.	N/A	N/A	
S42_0057_2.1.11	MMO	Saving provisions for Trinity House – Article 40 and Crown right – Article 41 - the MMO questions why the integrity of Trinity House and Crown Estate’s functions are provided for respectively by these Articles, whereas the MMO is not.	N/A	N/A	The Applicant notes this comment.
S42_0057_2.1.12	MMO	Article 38, Requirements, appeals, etc. (4) and (5) – the inclusion of a bespoke appeals process based on the Marine Licensing (Licence Application Appeals) Regulations 2011 is without precedent and should be removed. As noted above with respect to arbitration, a licence holder may challenge MMO decisions via the judicial review process. The MMO is not aware of an occasion whereby any dispute which has arisen in relation to the discharge of a condition under a DML has failed to be resolved satisfactorily between the MMO and the licence holder, without any recourse to an ‘appeal’ mechanism. The MMO recognises that there may be circumstances where a licence holder submits documents/plans to the MMO for approval and the MMO will decline to approve the documents/plans as submitted. Disputes arising in relation to this have to date been resolved by discussion between the MMO and the licence holder and in the highly unlikely event where agreement cannot be reached, the applicant can seek to	N/A	N/A	The Applicant intends to seek a right of appeal in line with Article 38 of the Hornsea Three Offshore Wind Farm Order 2020. It is acknowledged that the right of appeal for non determination will not extend to the Dml.

		challenge this using the established public law process of judicial review.			
S42_0057_2.1.13	MMO	Notwithstanding the comments above, the provisions outlined are incompatible with the MMO's role as a regulatory body delegated by Parliament to make decisions regarding the discharge of conditions. Sub-paragraph 5(c) for example provides for a situation of 'deemed approval' of licence conditions to arise regardless of rationale for such refusals or non-determinations.	N/A	N/A	
S42_0057_2.1.14	MMO	The MMO would further highlight again in the case of HOW3 the ExA recommended for the removal of a similar appeals process in their recommendation to the SoS. The MMO emphasise that Ørsted should thoroughly consider its position with regard to Article 38 prior to formal submission of the DCO to PINS.	N/A	N/A	
S42_0057_2.1.15	MMO	Finally, the MMO would advise if the intention of Ørsted is to streamline the application process, inclusion of the above clauses will only serve to hinder progress, as has proven to be the case in the past.	N/A	N/A	The Applicant notes this comment.
S42_0057_2.1.17	MMO	Article 1, Work No. 2(f) provides for up to eight temporary HDD pits. This appears to be duplicated in Work No. 5(c).	N	N/A	The Applicant confirms that this is not a duplication with the draft DCO as eight pits are required for entry of the HDD and 8 pits are required for exit of the HDD.
S42_0057_2.1.16	MMO	<b>Schedule 1 – Authorised Project Part 1 – Authorised Development</b>	I	N/A	The Applicant confirms that the term 'jacket foundations' relates to either foundations which are attached to the seabed by suction

		2.1.16 Article 1, Work No. 1(a) and (b) – three foundation types a provided for, namely monopole foundation, mono suction bucket foundation or jacket foundation. It appears the fourth foundation type, 'Suction bucket jacket' as outlined in the PD should also be included. Similarly, with regard to (b) 'Suction bucket jacket' is missing as is 'Box-type gravity base. Note there are multiple instances of this occurrence throughout the DCO where foundation types are provided for, this should be clarified or addressed.			bucket or piles as per the definition of 'jacket' which is included in the draft DCO. The draft DCO has been updated where required to clarify the requirements for foundation types.
S42_0057_2.1.18	MMO	Article 1, Work No. 10(c) should stipulate maximum parameters for disposal from seabed levelling, boulder clearance and drill arisings, respectively.	I	N/A	The Applicant notes this comment and has included the maximum parameters for boulder clearance seabed levelling and drill arisings within the Pro Rata Annex ( <a href="#">Volume AF, Annex 4.8</a> )
S42_0057_2.1.19	MMO	<b>Part 2 – Ancillary Works</b>  Article 1 (a) – the elements provided for would usually be subject to a separate Marine Licence Application. Please clarify why they have been included in the DCO.	N/A	N/A	The Works Provided for are Ancillary Works and have been included within the draft DCO to ensure the deliverability of the project. This matter was discussed at a workshop with the MMO on 4th December 2019 where it was agreed that these works should remain within the draft DCO.
S42_0057_2.1.20	MMO	<b>Part 3 – Requirements</b> <b>Detailed offshore design parameters</b>  Article 2 (2)(c) states each wind turbine generator be less than 35 metres from Mean Sea Level (MSL). The PD uses Lowest Astronomical Tide (LAT) as the reference range for this element. It is suggested LAT is used for consistency.	I	N/A	The Applicant notes this error and confirm that the DCO has been updated to state 'Lowest Astronomical Tide (LAT)'
S42_0057_2.1.21	MMO	Article 3 (4) provides for the dimensions of any offshore HVAC booster station. The dimensions do not appear to feature in the maximum parameters in the PD. Please clarify if/where they are provided in the PD.	N	N/A	As stated in <a href="#">Paragraph 4.8.2.15 of Volume 1, Chapter 4: Project Description</a> , the dimensions of the offshore HVAC booster station are the same as offshore transformer

					substations. The Maximum Design Scenario (MDS) is set out in <a href="#">Table 4.5</a> .
S42_0057_2.1.22	MMO	Article 3 (5) references to type 1 and type 2 HVDC converter substations do not feature in the PD, however respective dimensions are provided for on the dDCOs. Please clarify if/where the types and dimensions are provided in the PD.	I	N/A	The Applicant confirms that 'type 1' and 'type 2' referred to the small and large substations respectively described within the Project Description. The draft DCO has been updated to refer to 'small' and 'large' substations for consistency with the Project Description.
S42_0057_2.1.23	MMO	Article 3 (12) provides values for the total seabed footprint area for electrical installation foundations. These figures do not appear to be presented in the PD, please clarify if/where they are provided.	I	N/A	The Applicant notes this comment. Broken down figures are presented within <a href="#">Volume A1, Annex 4.9: Pro-rata Annex</a> .
S42_0057_2.1.24	MMO	Article 5 (4) – The MMO recommends inclusion of the volume and area of cable protection assessed for cable crossings.	I	N/A	The Applicant notes this comment and confirms the details have been updated within the draft DCO.
S42_0057_2.1.25	MMO	Article 5 (4) – The MMO recommends inclusion of the total volume of cable protection assessed.	I	N/A	The Applicant notes this comment and confirms the draft DCO has been updated to include the total volume of cable protection.
S42_0057_2.1.26	MMO	<b>Part 7 – Miscellaneous and General</b>  Certification of plans and documents etc., Article 36 (1) should also include an outline Operations and Maintenance plan.	I	N/A	The Applicant confirms that an outline Offshore Operations and Maintenance Plan has been included within Article 36(1) of the draft DCO.
S42_0057_2.1.27	MMO	<b>Schedule 11 – DML for Generation Assets</b> <b>Part 1 – Licensed Marine Activities</b>  Article 1 (4)(b) includes a place-marker for the MMO local office. The following details can be used: 'MMO (local office), Lakefield Road, Lowestoft, Suffolk, NR33 OHT'	I	N/A	This comment is noted by the Applicant who confirms the details have been updated within the draft DCO.
S42_0057_2.1.29	MMO	<b>Part 2 – Conditions</b>  Design Parameters, Article 1 – maximum parameters for cable length, cable	I	N/A	The Applicant confirms that the requested parameters have been added to <a href="#">Article 3 of Schedule 11, Part 1 of the draft DCO</a> .



		protection volume and maximum number of cable crossings should be included.			
S42_0057_2.1.30	MMO	Design Parameters, Article 1 (7) contains a figure for the total volume of scour protection. This is inconsistent when compared to the PD.	I	N/A	The Applicant notes this comment and has concluded a consistency check with <a href="#">Volume A1, Chapter 4 Project Description</a> .
S42_0057_2.1.31	MMO	Design Parameters, Article 2 (5) contains values for the total seabed footprint area for offshore accommodation platform foundations. These figures do not match the main body of the dDCOs, please clarify.	I	N/A	This comment is noted by the Applicant who confirms the details have been updated within the draft DCO.
S42_0057_2.1.32	MMO	Maintenance of the authorised development, Article 3 (1) includes cable repairs. Please note the current definition of “maintain” does not provide for the placement of additional rock protection beyond that which has been installed in the construction phase of the development.	I	N/A	The definition of 'maintain' within the draft DCO has been updated to clarify that any maintenance relates to the replenishment of cable protection only and therefore does not provide for the placement of additional rock protection beyond that which was installed during construction. Furthermore, wording has been clarified within <a href="#">Article 4 of Schedule 11 and 12</a> of the draft DCO.
S42_0057_2.1.33	MMO	Notifications and inspections, Article 6 (8) – Please clarify the wording to stipulate whether “within five days” is in regard to issue of the notice or the commencement of the licensed activities.	I	N/A	The Applicant confirms that the wording relates to the time period following the issue of the notice. Wording has been added to the draft DCO to clarify.
S42_0057_2.1.34	MMO	Pre-construction plans and documentation, Article 12 (2) contains a typographical error prior to the start of the paragraph.	N/A	N/A	The Applicant notes this comment.
S42_0057_2.1.37	MMO	Construction monitoring, Article 17 (3) – the MMO suggest that this provision is amended to add the following clause recommended for recent OWF dDCOs:  “(3) The results of the initial noise measurements monitored in accordance with sub-paragraph (1) must be provided to the MMO within six weeks of the installation	I	N/A	The Applicant notes this comment and has drafted a condition which ensures consultation with the MMO and Natural England should the noise monitoring results demonstrate a significant increase than in the assessment within the ES but recognises the importance of the Applicant being able to

		of the first four piled foundations of each piled foundation type. The assessment of this report by the MMO will determine whether any further noise monitoring is required. The MMO may request that further monitoring is undertaken, unless otherwise agreed in writing with the undertaker. If, in the opinion of the MMO in consultation with Natural England, the assessment shows a significantly different impact to those assessed in the environmental statement or failures in mitigation, all piling activity must cease until an update to the MMMP and further monitoring requirements have been agreed."			apply any contingencies before a requirement to cease piling activity.
S42_0057_2.1.38	MMO	<p><b>Schedule 12 – DML for Transmission Assets Part 2 – Conditions</b></p> <p>Article 3 (2) – note that the current definition of "maintain" does not include installation of new cable protection beyond the period of construction. Please also see comments at 2.1.2.</p>	I	N/A	The definition of 'maintain' within the draft DCO has been updated to clarify that any maintenance relates to the replenishment of cable protection only and therefore does not provide for the placement of additional rock protection beyond that which was installed during construction. Furthermore, wording has been clarified within <a href="#">Article 4 of Schedule 11 and 12 of the draft DCO</a> .
S42_0057_2.1.39	MMO	Chemicals, drilling and debris, Article 10 (1) – The MMO advise that the Hazard & Risk Assessments that underpin the registration for chemicals for the oil and gas industry are specific to their application in oil and gas exploration and production activities. This differs significantly to how chemicals are used in the renewable energy sector.	N/A	N/A	The Applicant notes this comment.
S42_0057_2.1.40	MMO	Pre-construction plans and documentation, Article 12 (1)(h)(iv) - provides for detail on monitoring offshore cables including cable protection. Please note comments at 2.1.2 and 2.1.32.	I	N/A	The definition of 'maintain' within the draft DCO has been updated to clarify that any maintenance relates to the replenishment of cable protection only and

					therefore does not provide for the placement of additional rock protection beyond that which was installed during construction. Furthermore, wording has been clarified within <a href="#">Article 4 of Schedule 11 and 12</a> of the draft DCO.
S42_0057_2.1.41	MMO	Pre-construction plans and documentation, Article 13 (3) – The MMO recommend that “determined” is replaced with “approved”.	I	N/A	The Applicant notes this comment and have updated the wording within the draft DCO.
S42_0057_2.1.42	MMO	Pre-construction plans and documentation, Article 13 (5) – The MMO consider this provision to be unnecessary, inappropriate, and incompatible with the MMO’s role as a regulatory body. Please note comments regarding the arbitration and appeals articles at 2.1.5 and 2.1.12 respectively.	NA		The Applicant notes the MMO’s comments regarding arbitration and proposes to follow the precedent set out by Hornsea Three, as detailed at Article 37 and Schedule 13 of the Hornsea Three DCO. For the avoidance of doubt, it is acknowledged that the arbitration provisions will not apply to any consent or approval of the SoS or the MMO.
S42_0057_2.1.43	MMO	Pre-construction monitoring and surveys, Article 16 (2)(a) – The MMO recommends inclusion of pre-construction monitoring and surveys for marine mammals and ornithology given the potential impact of the project on these receptors.	I	N/A	The Applicant notes this comment and has updated the outline marine monitoring plan and outline ornithological monitoring plan within the draft DCO which will include pre-construction monitoring and surveys.
S42_0057_2.1.44	MMO	Post-construction monitoring, Article 18 (2)(a) – Please see comments above at 2.1.43.	I	N/A	The Applicant notes this comment and has updated the outline marine monitoring plan and outline ornithological monitoring plan within the draft DCO which will include post-construction monitoring and surveys.
S42_0052_1.1.6	Natural England	These mention a type 1 and type 2 HVDC converter substations which have not been mentioned on the project description	I	N/A	Hornsea Four confirms that 'type 1' and 'type 2' referred to the small and large substations respectively described within the Project Description. The draft DCO has

					been updated to refer to 'small' and 'large' substations for consistency with the Project Description.
S42_0052_1 1.7	Natural England	<p>Natural England notes the inclusion of the total area of seabed footprint. However, this should also include a maximum for the individual turbine/platform footprint. Additionally, scour and cable protection total areas should be provided in both volume and area.</p> <p><i>NER: Amend to include maximum individual footprint. Provide total area and volumes for cable and scour protection.</i></p>	I	N/A	<p><b>Volume 1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and calculations behind the project's Maximum Design Scenario (MDS) parameters, including seabed footprint. Further detail is provided in <b>Volume 4, Annex 4.9: Pro-rata Annex</b>.</p>
S42_0052_1 1.8	Natural England	<p>Natural England notes and welcomes the inclusion of the maximum number of cable crossings. We would request that the maximum volume of cable protection for crossing also be included. This is an important metric for the maximum footprint of the project.</p> <p><i>NER: Include maximum area of cable protection for cable crossings.</i></p>	I	N/A	
S42_0052_1 1.9	Natural England	<p>As stated above disposal volumes should be provided for the different disposal types.</p>	I	N/A	
S42_0052_1 1.10	Natural England	<p>(d) [the removal of sediment samples for the purposes of informing environmental monitoring under this licence during pre-construction, construction and operation]; This might need to be reworded to either include outside of designated sites or maybe a limit on what these samples can be. Limit maybe on volume since that is also already a criterion for marine licence exemption. Maybe we need to specify the parameter within which the activities are included.</p> <p><i>NER: This need to be assessed in the ES for the</i></p>	N/A	N/A	The Applicant notes that the project does not fall within any designated sites and as such consider the requested clarification or limitation on volume to be unnecessary.

		<i>relevant chapters to have these activities included in the current licence.</i>			
S42_0052_1 1.12	Natural England	<p>Natural England notes that there is no details provided at all on the length of cable to be used, the maximum number of cable crossings or the maximum volume or area of cable protection to be used. These are all important limits of the project and should be stated on the face of the licence.</p> <p><i>NER: Include the details of the inter array cables and any cable protection to be used.</i></p>	I	N/A	The Applicant confirms that the requested parameters have been added to Article 3 of <a href="#">Schedule 11, Part 1 of the draft DCO</a> .
S42_0052_1 1.13	Natural England	<p>Natural England notes that the maintenance listed here does not include any rock protection, or the replenishment of rock protection. Natural England does not support the inclusion of new areas of rock protection as maintenance. Ongoing discussions are underway with the MMO with regard to what is an acceptable term for a licence to deploy cable protection. Further comment may be made once these discussions have concluded.</p>	I	N/A	The definition of 'maintain' within the draft DCO has been updated to clarify that any maintenance relates to the replenishment of cable protection only and therefore does not provide for the placement of additional rock protection beyond that which was installed during construction. Furthermore, wording has been clarified within <a href="#">Article 4 of Schedule 11 and 12</a> of the draft DCO.
S42_0052_1 1.14	Natural England	<p>This condition cross references to condition 12(1)(f) however 12(1)(f) does not refer to any mitigation scheme. In fact, Natural England notes there is no proposed micro siting condition or requirement within this DML. Natural England requires that the preconstruction surveys identify potential areas of Annex I reef and that conditions are included requiring the micro siting of works around Annex I habitat.</p> <p><i>NER: Suggest inclusion of the standard micro-siting requirement within conditions 12(1) (a) (v), 12(1)(c) or 12 (1)(d).</i></p>	N	N/A	The Applicant notes this comment. The requirement to provide details of any micro siting including micro siting relating to any identified Annex I reefs is included within Conditions 14(1)(v) of <a href="#">Schedule 11 and 12 of the draft DCO</a> .
S42_0052_1 1.17	Natural England	<p>This condition is blank, suggest it may be a typographical error.</p>	N/A	N/A	The Applicant notes this comment.

S42_0052_1 1.22	Natural England	Schedule 12- Transmission assets. As much of this schedule is a repeat of Schedule 11 comments here are only addressed new issues and any issues raised on Schedule 11 should be considered to apply within schedule 12 where similar conditions are included.	N/A	N/A	
S42_0052_11.23	Natural England	This lists the maximum volume of cable protection as 927,000 cubic meters for the export cables. However, the ES project description table 4.25 lists 849,000 cubic meters for the export cables.  <i>NER: Please clarify which is the correct figure and updated the incorrect figure, if required.</i>	I	N/A	<b>Volume 1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and calculations behind the project's Maximum Design Scenario (MDS) parameters, including cable protection. Further detail is provided in <b>Volume 4, Annex 4.9: Pro-rata Annex.</b>
S42_005 2_10.30	Natural England	Shows that a large part of the project goes through some of the BMV soils in the area.  <i>NER: Carry out a detailed ALC soil survey and explain as to why this is the most sustainable option.</i>	N/A	N/A	The Applicant is in consultation with Natural England on this topic, and subsequent updates are summarised in <b>Chapter 13 of Volume B1, Chapter 1: Consultation Report.</b>
S42_005 2_10.31	Natural England	The table uses the division between Grades 3a and 3b for very high and high sensitivity. But this data is not available to make that assessment.  <i>NER: Carry out a detailed ALC soil survey.</i>	N/A	N/A	
S42_005 2_10.32	Natural England	This assessment is incorrect. It is clear that the sensitivity is very high, and the magnitude is at least minor. From the matrix in Table 6.16 this produces a Moderate to Major Significant effect. It cannot be said that the impact is localised (it goes through 373ha of arable land over a large LPA) and it has	N/A	N/A	

		<p>the potential to change workability/land use as a linear feature could impede the temporary working of the farm.</p> <p><i>NER: Revise the significance of the assessment.</i></p>			
S42_005 2_10.33	Natural England	<p>The assessment has not mentioned whether the imported backfill material (in section 4.10.1.27 of Volume 1, Chapter 4: Project Description) will affect any of the BMV soils after restoration. It is unclear if this will degrade any BMV soils.</p> <p><i>NER: Need to assess whether the proposed technique of reinstatement will damage BMV soils.</i></p>	N/A	N/A	
S42_005 2_10.34	Natural England	<p>Target burial depth of 1.2m is probably reasonable for re-instatement but it is only a target. Depths less than this may impact on BMV soils.</p> <p><i>NER: Confirm depth of burial in relation to BMV soils.</i></p>	N/A	N/A	
S42_005 2_10.14	Natural England	<p>Natural England cross referenced impacts with the mitigation in the commitments register. Mitigation relies on Co76 (provision of PPE) and Co77 (contaminated land and groundwater scheme) but it is unclear how this will be sufficient to mitigate any impacts. In all cases mitigation relies on future ground investigations to avoid impacts. However, it is unclear why these ground investigations are not part of the assessment at this stage and as part of route planning.</p> <p><i>NER: Carry out the required surveys to provide certainty that there are no</i></p>	N	N/A Co76, Co77, Co18	<p>In the case of Co76, The Applicant has committed to using relevant and up to date guidance, in relation to the Personal Protective Equipment (PPE), at the time of construction at the time of construction. It is considered that the latest industry guidance is sufficient for the purposes of construction.</p> <p>Co77 commits to land and groundwater scheme to be prepared for construction, in order to identify any contamination and remedial measure which may be required. Should any detailed ground investigations needed to inform this land and groundwater scheme, these will be</p>

		<p><i>impacts to the SSSIs and ancient woodland.</i></p>			<p>conducted prior to construction.</p> <p>In recognition of potentially more sensitive sites, including the River Hull Headwaters SSSI, The Applicant has committed to undertaking a pre-construction hydrogeological risk assessment, to inform a site specific crossing method statement which will also be agreed with the relevant stakeholders, including Natural England (Co18). As the detailed risk assessment and method statement for crossing the River Hull Headwaters SSSI will be agreed with stakeholders, including Natural England, prior to construction, ground investigations are not required at this stage.</p> <p>Between the submission of the PEIR and the ES, the permanent access track for the OnSS has been moved approximately 100 m away from the Birkhill Wood ancient woodland. This was discussed and met with the approval of Natural England in an onshore Ecology Evidence Plan Technical Panel meeting on 13th November 2019.</p>
S42_006 5_001	Historic England	<p><b>General Comments:</b></p> <p>Chapter 4 'Project Description' of the Preliminary Environmental Information Report (PEIR) states that currently a variety of different foundation types are being considered for the WTCs and offshore platforms, including; monopiles, mono suction buckets, piled jackets, suction bucket jackets, and gravity based. We note the maximum design scenario for proposed offshore construction works, inclusive of seabed preparation and cable protection that has been implemented into the impact assessment set out in Chapter 10 'Marine</p>	N/A	N/A	<p>The Applicant notes the comments. Care has been taken in the preparation of the final Application documents to ensure inconsistencies are removed and flexible use of terminology is clarified.</p>



Archaeology'.

Overall, we are pleased with the progress of the assessment and the project documents that have been prepared for the PEIR. In particular, we appreciate the further detail that has been provided with regards to the assessment methodology and the rationale behind impacts being 'scoped out' and the definition of this term with the project.

Furthermore, in general we are content that the methodology proposed for the archaeological assessment is sound, and that subsequently produced a good understanding of the marine archaeology baseline environment, within the noted limitations of the available data. This baseline assessment is suitable for the subsequent impact assessment, and we are satisfied that the predicted impacts and the proposed mitigation measures are reasonable given the available data.

However, care needs to be taken across all project documents as inconsistencies and flexible use of terminology that have been noticed between the Marine Archaeology chapter, Marine Archaeology Technical Report and the Marine Written Scheme of Investigations (WSI). This is particularly apparent in reference to the number of known wrecks and obstructions, and the subsequent use of the term 'heritage receptors'.

Additionally, the number of geophysical

		<p>contacts identified presented differs between documents (in particular the low and medium potential contacts within the PEIR boundary), and the majority of the documents do not make it clear whether the 24 magnetic only contacts is included within the 129 identified contacts, as these contacts are only listed in one table (Table 4 within the WSI). This needs to be amended to ensure clarity across all project documents and to facilitate understanding of identified receptors without the need to consult all project documents.</p>			
S42_006 5_008	Historic England	<p>Draft Development Consent Order:</p> <p>Within the DCO, we consider that the definition for the term 'commence' should include site preparation activities, as such activities also have the potential to impact archaeological receptors. Therefore, such activities should be mitigated through the production of project documents, such as the Marine Written Scheme of Investigations, prior to commencement.</p> <p>We note the Outline Marine WSI is listed as a certified document in Article 36. If it is the intention of the application to enter the Outline Marine WSI as a certified document, we wish to make it clear that Historic England will only accept this approach subject to our approval of a version submitted during the examination.</p> <p>With regards to arbitration matters a: set out in Article 37 and Part 1 Article 10 of</p>	I	N/A	<p>The Applicant notes Historic England position on the works 'commence'. Whilst this approach is not applied across the entirety of the draft DCO, Hornsea Four confirms that the draft DCO ensures that the relevant management plans will be approved prior to the commencement of the relevant site activities including site preparation works.</p> <p>The Applicant confirms that Historic England have been consulted on a draft Outline WSI prior to DCO Application.</p> <p>The Applicant notes Historic England position with regard to Arbitration.</p> <p>With regard to the definition of 'statutory historic body' and the address for Historic England, Hornsea Four confirms that the draft DCO has been updated as appropriate.</p> <p>The draft DCO has also been updated to include provision for post-construction</p>

		<p>Schedules 11 and 12, we defer this matter to the MMO.</p> <p>We note that within Schedule 12 there is an error in the definition of 'statutory historic body'. Further, the address for Historic England provided under Part 1 Article 1(4)(g) of Schedules 11 and 12 should be corrected to: 37 Tanner Row, York, YO1 6WP.</p> <p>We note that Condition 18 within Schedule 12 in relation to post-construction monitoring provides details of the requirements for archaeological monitoring, but that the equivalent condition in Schedule 11 does not. This must be addressed.</p>			archaeological monitoring within both Schedule 11 & 12.
S42_006 5_009	Historic England	<p>Annex 5.2: Commitment Register:</p> <p>We note from the Commitments Register that the following commitments relate to marine archaeology, and are secured through Part 2, Condition 12(2) of Schedules 11 and 12 within the Deemed Marine Licences (DMLs) attached to the DCO and that the Commitment Register itself will be a certified document.</p> <ul style="list-style-type: none"> <li>· Co46 - Primary: The offshore export cable corridor and the array will be routed to avoid any identified archaeological receptors pre construction, with buffers as detailed in the Marine Written Scheme of Investigation.</li> <li>· Co140 - Primary: Archaeological Exclusion Zones (AEZs) will be established in the Marine WSI in accordance with the outline Marine WSI to protect any known/identified marine archaeological</li> </ul>	N/A	N/A	The Applicant notes this comment. The updated Commitments Register can be found in <b>Volume A4, Annex 5.2: Commitment Register.</b>

		<p>receptors.</p> <ul style="list-style-type: none"> <li>· Co141 - Tertiary: A Marine Written Scheme of Archaeological Investigation (WSI) will be developed in accordance with the Outline Marine WSI. The Marine WSI will include the implementation of a protocol for Archaeological Discoveries in accordance with the 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (TCE, 2014).</li> <li>· Co166 - Secondary: A geophysical survey (including a UXO survey) will be undertaken prior to construction and will be subject to a full archaeological review in consultation with Historic England.</li> <li>· Co167 - Secondary: A geotechnical survey will be undertaken prior to construction, including a stage geoarchaeological assessment and analysis of geotechnical data inclusive of publication, in consultation with Historic England.</li> </ul>			
S42_006 5_010	Historic England	We suggest that reference made to Historic England is amended to read the 'Historic Buildings and Monuments Commission for England' in line with the definition for the 'statutory historic body' as given in the DMLs of the DCO.	I	N/A	The Applicant confirms that the draft DCO has been updated to reference the 'Historic Buildings and Monuments Commission for England'.

## EIA topic area: Hydrology and Flood Risk

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response

S42_0028_001	Beverley and North Holderness International Drainage Board (IDB)	<p>Part of the Inshore proposed cable route for the above project lies within the Drainage Boards area. There are numerous Board maintained and ordinary watercourses along the proposed route.</p> <p>The Board wishes to state that, where possible, the risk of flooding should be reduced and that as far as is practicable surface water arising from a developed site should be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development. This should be considered whether the surface water discharge arrangements from the site are to connect to a public or private sewer before outfalling into a watercourse or to outfall directly into a watercourse.</p> <p>No development shall be commenced until the Local Planning Authority in consultation with the Internal Drainage Board has approved a Scheme for the provision of surface water drainage works. Any such Scheme shall be implemented to the reasonable satisfaction of the Local Planning Authority before the development is brought into use.</p> <p>The following criteria should be considered:</p> <ul style="list-style-type: none"> <li>• Any proposal to discharge surface water to a watercourse from the redevelopment of a brownfield site should first establish the extent of any existing discharge to that watercourse.</li> <li>• Peak run-off from a brownfield site should be attenuated to 70% of any existing discharge rate</li> </ul>	I	1o Co19, Co1, Co18, Co64	<p>The Applicant has provided an Onshore Crossing Schedule which identifies the IDB maintained watercourses crossed by the Hornsea Four project.</p> <p>An Onshore Infrastructure Flood Risk Assessment (FRA) is provided which presents information on the likely flood risk impacts as a result of Hornsea Four. Along with the FRA, the Outline Onshore Infrastructure Drainage Strategy provides further information the drainage and discharge requirements of the scheme.</p> <p>The Applicant is engaging with the Environment Agency, ERYC and the IDB in relation to any greenfield run-off rates to be maintained. The Applicant has committed to restricting run-off rates at the OnSS to greenfield run-off rates (Co19) and will be including a 30% climate change allowance as prescribed by ERYC as the <a href="#">LLFA (F2.6)</a>. <a href="#">Volume F2, Chapter 6: Outline Onshore Infrastructure Drainage Strategy</a> states that tests will be undertaken prior to construction and in accordance with the BRE Digest 365 Guidelines to inform the detailed design of the surface water drainage system for the OnSS.</p> <p>The Applicant has committed to using HDD (or other trenchless technology) to cross all IDB maintained drains (Co1) and will located any entry and exit pits a minimum of 9 m away from all watercourses (Co18). The latter is in response to the IDBs request to maintain access, when practicable, for IDB machinery (i.e. tracked excavators) within 9 m of IDB maintain watercourses. This was expressed by the IDB at the Hornsea Four Water and Flood Risk Evidence Plan Technical Panel meetings on 5th April 27th June and 5th November 2019. The Applicant has noted that 2 months' notice will be required for any approvals related to any proposals to culvert, bailey bridge or discharge in to any IDB watercourses.</p> <p>As stated in Co64, where possible, stockpiling within the floodplain (defined as areas of Flood Zone 2 or 3 as identified on the Environment Agency Flood Map for Planning) or any EA Main River will be avoided.</p>
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(existing rate taken as 140litres/second/hectare or the established rate whichever is the lesser for the connected impermeable area).

- Discharge from “greenfield sites” taken as 1.4 litres/second/hectare (1:1year storm).
- Storage volume should accommodate a 1:30 year event with no surface flooding and no overland discharge off the site in a 1:100year event.
- A 30% allowance for climate change should be included in all calculations.
- A range of durations should be used to establish the worst-case scenario.
- The suitability of soakaways, as a means of surface water disposal, should be ascertained in accordance with BRE Digest 365 or other approved methodology.

**REASON:**

To ensure the development is provided with satisfactory means of drainage and to reduce the risk of flooding.

The Board would also like to make the applicant aware that the prior written consent of the Board (outside of the planning process) will also be required for any proposed works or structures in, under, over or within 9 metres of the top of the bank of any Board maintained watercourse, or any ordinary watercourse, in the Board’s district. Similarly, any proposals to culvert, bridge, fill in or make a discharge to any watercourse within the Boards area will also require the Board’s prior written consent approval. Please note that the Boards consent process can take up to two months to be considered

by the Board.

Any approved development should not adversely affect the surface water drainage of the area and amenity of adjacent properties. No development will be allowed until the Board is satisfied that surface water drainage has been adequately provided for, including adequate provision for any temporary works or groundwork dewatering works.

There shall be no storage of any materials including soil adjacent to the bank top of any watercourse during construction of the project. To ensure that there will be no risk of the watercourse becoming blocked by debris from the stockpiles or bank slipping due to increased loading on the bank top.

Machine access along the sides of the watercourses must be maintained at all times during the construction phase of the project for all future watercourse maintenance/ improvement work.

The Board requires that at every Board maintained watercourse, or any ordinary watercourse, in the Board's district that all cable crossing locations are directionally drilled under these relevant watercourses.

The Board's comments have been made following consideration of the information provided by Orsted. Should these details change the Board would wish to be reconsulted.

S42_0046_003	Public Health England	Culverts are also mentioned as potentially being required for up to 30 months (Impacts Register HFR-C-2) on up to 15 crossings. Main rivers are mentioned, but it is unclear which watercourses these refer to. Although provisions are made within the Impacts	N	Change	The Applicant notes this comment. Details on where culverts will be required is detailed in <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> . Co172 confirms that culverts will not be used on Main rivers. Furthermore, a Pollution Prevention Plan is included within the <a href="#">Outline Code of Construction Practice (Volume F2, Chapter 2)</a> .
S42_0047_001	Environment Agency	Paragraph 2.11.1.5 of this document describes the key types of consent required from the Environment Agency. There are 4 tiers of flood risk permits from the Environment Agency – exclusions, exemptions, Standard Rules and Bespoke. Details of the application process for each is explained online at: <a href="https://www.gov.uk/guidance/flood-risk-activities-environmental-permits">https://www.gov.uk/guidance/flood-risk-activities-environmental-permits</a>	N/A	N/A	The Onshore Infrastructure Flood Risk Assessment (FRA) has been updated to include the 4 tiers of Environment Agency flood risk permits (i.e. exclusions, exemptions, Standard Rules, and Bespoke).
S42_0047_002	Environment Agency	Paragraph 4.3.3.2 confirms that all onshore ECC logistics compounds are located within Flood zone 1. We support sequential approach to their location, but compounds should also be assessed for flood risk from other sources. The FRA makes reference to other sources of flooding, which may be relevant in the siting of infrastructure and equipment.	N/A	N/A	The Onshore Infrastructure FRA assesses the risk to, and as a result of the construction, operation, and decommissioning of all proposed onshore Hornsea Four infrastructure. The flood risks assessed include those from Main Rivers, IDB maintained watercourses, the sea, groundwater, surface water, sewers, reservoirs, canals, and other artificial sources. Where possible a sequential approach has been taken to the siting of the onshore infrastructure. The details of which can be found in <a href="#">Volume A3, Annex 2.2 Onshore Infrastructure Flood Risk Assessment, and Volume A4, Annex 3.3 Selection and Refinement of the Onshore Infrastructure</a> .
S42_0047_003	Environment Agency	Paragraph 7.5.4.1 talks about flood risk should full decommissioning be carried out. We would like to understand what is meant by the term 'baseline flood risk'. Flood risk is subject to change as new information and evidence becomes available. Whilst there may be changes to the understanding of flood risk as a result of climate change, it is also possible that	Y	Change Co127	Baseline flood risk' set out in Paragraph 7.5.4.1 of the FRA ( <a href="#">Volume A6, Annex 2.2</a> ) comprises the existing flood risk at the time of decommissioning based on the most up to date information and / or data available at the time. It would therefore inherently takes into account any changes that have occurred in the area around the development either as a result of climate change, or as a result in a change in land use during the lifetime of the development.



		<p>the understanding of flood risk may be updated with new model information. We would expect that the most up to date understanding of flood risk to be incorporated. Given the lack of robust and reliable flood risk modelling in this location, we would advise that the site should be restored to its pre-development condition (including ground levels), unless an up to date assessment of flood risk at the time of decommissioning demonstrates that an alternative use or decommissioning strategy is appropriate. Opportunities should also be considered if, at that time of decommissioning, the project could contribute to the overall reduction in flood risk - e.g. through provision of additional floodplain storage.</p>			<p>The Applicant notes the commitment to develop an Onshore Decommissioning Plan which will provide for the removal of all electrical infrastructure, and which will include details relevant to flood risk and pollution prevention. The Onshore Decommissioning Plan will be in line with the latest relevant available guidance (Co127). During decommissioning all above ground land will be reinstated.</p>
S42_0047_004	Environment Agency	<p>It would be useful to clarify if the statement made in paragraph 8.1.1.4 applies in any 'main river' locations. Commitment No01 in the register states that where crossings on 'ordinary watercourses' require open cut methods, the flow in the watercourse will be maintained. We have taken this to mean that 'main rivers' will not be "temporarily dammed and/or rerouted." This could be clarified.</p>	I	N/A Co1	<p>The Applicant has made a Commitment which states that no EA 'Main Rivers' will be temporarily dammed or re-routed (Co1). The Applicant has committed to using HDD (or other trenchless technology) to cross EA Main Rivers, and therefore they will not be crossed using open cut techniques.</p>
S42_0047_005	Environment Agency	<p>Paragraph 8.1.1.5 discusses reinstating watercourses to pre-construction depths. We would suggest the following additions/changes:</p> <p>"Post-construction, watercourses will be reinstated to pre-construction depths condition and dimensions to ensure flood risk is not affected (Co172 and Co175). There will be no loss of cross-sectional</p>	Y	Change Co172, Co175	<p>The Applicant has committed to reinstating the bed and banks of all watercourses, to their pre-construction conditions following the removal of any temporary structures (Co172). The Applicant is in consultation with the Environment Agency on further updates in relation to Co172 and Co175. The updated Commitments Register can also be found at <a href="#">Volume A4, Annex 5.2: Commitments Register</a>.</p>

		<p>area as a result of watercourse crossings.”</p> <p>This comment also applies to section 2.7.5.5 of the Hydrology and Flood Risk Report (Volume 3, Chapter 2).</p>			<p>The wording of commitments for those relevant to the Environment Agency has been provided and agreed with the Environment Agency through the Evidence Plan Meetings held to date and up to the point of Application.</p>
S42_0047_006	Environment Agency	<p>Section 2.2.1.1 refers to the need to maintain “greenfield runoff rates.” It would be useful to put this in the Commitment Register and in Table 1 of the Drainage Strategy. Within the Commitment Register, it would be useful to add a line to state that drainage rates will be restricted to the greenfield runoff rates. No change is required to the drainage strategy as Section 3.3 covers the principles. Where possible, opportunities should be taken to reduce overall flood risk.</p>	I	Change Co19	<p>The Onshore Infrastructure Drainage Strategy has been developed in accordance with the Outline Onshore Infrastructure Drainage Strategy and in consultation with the Environment Agency, the Lead Local Flood Authority (ERYC) and the Beverley and North Holderness Internal Drainage Board, as appropriate.</p> <p>The Applicant, in consultation and agreement with the Environment Agency, has agreed the wording of Co19 which includes reference to the measures to limit discharge rates and attenuate flows to maintain greenfield run-off rates at the Hornsea Four OnSS.</p> <p>The Hornsea Four Commitments Register submitted at point of Application is presented in <a href="#">Volume A4, Annex 5.2: Commitments Register</a>.</p>
S42_0047_007	Environment Agency	<p>Section 3.1.1.1 talks about the commitment to reinstate drainage outfalls or divert into secondary channels. Any diversions necessary that directly interact with main river will require the prior approval of the Environment Agency. We would prefer that this text, or the Commitment Register, ensures that this statement does not include changes to any ‘main river.’</p>	N/A	Change	<p><a href="#">Section 3.1.1.1 of the Outline Onshore Infrastructure Drainage Strategy (Volume A6, Chapter 2.2)</a> has been updated to state that prior approval must be sought from the EA where any watercourse diversions are to interact with an EA Main River.</p>
S42_0047_008	Environment Agency	<p>Section 3.2.1.3 discusses the surface water drainage scheme. It would be useful to clarify that any discharge direct to a main river should be restricted to the greenfield runoff rate. For brownfield sites, a minimum 30% reduction should be achieved where there is a functional</p>	Y	N/A	<p><a href="#">Section 3.2.1.3 of the Outline Onshore Infrastructure Drainage Strategy (Volume A6, Chapter 2.2)</a> has been updated to clarify that any surface water drainage scheme will maintain flows at pre-developed greenfield run-off rates.</p>

		drainage system in place. Where possible, overall flood risk should be reduced.			
S42_0047_009	Environment Agency	With regard to section 3.4.1.3, a number of flood alerts ("flooding is possible") are also available, in addition to the flood warnings ("flooding is expected"). We would recommend that the Flood Warning and Evacuation Plan (FWEP) considers how flood alerts may affect their operations. Large parts of the project are in rural undeveloped areas not covered by flood warnings. Flood warnings are generally issued in areas where registered property is likely to be affected. It is also worth noting that flood alerts / warnings are not issued in response to surface water flooding. We would recommend that the FWEP includes independent checks, e.g. weather and tides, alongside any alerts / warnings issued by the Environment Agency.	Y	N/A	<a href="#">Section 3.4 of the Outline Onshore Infrastructure Drainage Strategy (Volume A6, Chapter 2.2)</a> has been updated to state that the Flood Warning and Evacuation Plan will include measures and protocols on how flood warnings (such as those issued by the Environment Agency when 'flooding is possible' and when 'flooding is expected') may affect the operations of the onshore substation. Where necessary, and in addition to responding appropriately to any alerts and warnings issued by the Environment Agency, independent checks (for example, of the weather and tides) will be undertaken to inform flood risk at the onshore substation.
S42_0047_010	Environment Agency	We suggest the following changes to the text within section 3.4.1.6: "During construction, contractors and management should liaise sign up to receive Environment Agency flood alerts and flood warnings, and engage with the LLFA and the Environment Agency, so they are aware of any forecast related to heavy rainfall events.  A flood alert may be issued when flooding is possible, and a flood warning may be issued when flooding is expected. can then be issued when necessary to allow work to stop, An independent method for reviewing weather and tides will be considered, with an understanding that some working areas may be at risk from	Y	N/A	This comment is noted by the Applicant and the <a href="#">Outline Onshore Infrastructure Drainage Strategy (Volume F2, Chapter 6)</a> has been updated.

		failure of defences (e.g. breach) where a flood alert / warning may not be in place prior to onset of flooding. Contractors and management can then consider how this information will affect planned works, especially in areas in close proximity to key watercourses. The site cleared of all personnel in this instance.”			
S42_0047_011	Environment Agency	<p>It would be also be useful to include text within this document that clearly states that flood risk permits may be required for some of the work set out in the drainage strategy:</p> <p>The Environmental Permitting (England and Wales) Regulations 2016 require a permit or exemption to be obtained for any activities which will take place:</p> <ul style="list-style-type: none"> <li>• on or within 8 metres of a main river (16 metres if tidal)</li> <li>• on or within 8 metres of a flood defence structure or culverted main river (16 metres if tidal)</li> <li>• on or within 16 metres of a sea defence</li> <li>• involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert</li> <li>• in a floodplain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if it’s a tidal main river) and you don’t already have planning permission</li> </ul> <p>Further guidance can be found at</p>	Y	N/A	The Applicant notes this comment. As requested by the Environment Agency, the <a href="#">Outline Onshore Infrastructure Drainage Strategy (Volume A6, Chapter 2.2)</a> has been updated to clearly set out that flood risk permits may be required from the Environment Agency for elements of work referred to in the Outline Onshore Infrastructure Drainage Strategy. The Strategy also sets out the instances in which these permits may be required.

		<a href="https://www.gov.uk/guidance/flood-risk-activities-environmental-permits">https://www.gov.uk/guidance/flood-risk-activities-environmental-permits</a>			
S42_0047_012	Environment Agency	Section 5.3 discusses site security, screening, and fencing. We would like to see text here and/or the Commitment Register to ensure that access for the Environment Agency (and its contractors) is available throughout construction works and on completion of the works.	N	N/A	<p>During the construction of Hornsea Four, the entirety of the onshore export cable corridor will be subject to the Construction (Design and Management) Regulations 2015 (CDM Regulations 2015, available at <a href="https://www.hse.gov.uk/construction/cdm/2015/index.htm">https://www.hse.gov.uk/construction/cdm/2015/index.htm</a>), or other latest available guidance and associated relevant Health, Safety and Environment (HSE) legislation available at the time. As currently defined by the CDM Regulations, the entire works area will be under the control of the Principal Contractor, employed by the Applicant to undertake the cable installation works.</p> <p>Any required Environment Agency works, including access, within the Hornsea Four Order Limits during the construction period will be controlled by the Principal Contractor. As such the Environment Agency and its Contractors would be required to comply with the requirements of the CDM Regulations (or latest available guidance) in relation to its proposed works where and when access is required. Such requirements would include co-operation with the Principal Contractor and other Contractors in relation to HSE, compliance with the Construction Phase Plan and associated Principal Contractor, and Ørsted requirements in relation to HSE. Early planning and communication with Hornsea Four and the appointed Principal Contractor will ensure access is achieved in a timely and safe environment.</p>
S42_0047_013	Environment Agency	We recommend that section 6.3.1.1 should be changed to include flooding from any source, rather than surface water specifically.	Y	N/A	<b>Section 6.3.1.1 of the Outline CoCP</b> has been updated appropriately.
S42_0047_014	Environment Agency	Section 6.3.3.2 discusses the sizing of culverts. We have a general position against the installation of new culverts. It would be useful to understand where culverts are proposed, particularly if these	Y	N/A	The Applicant notes this comment and <b>Section 6.3.3.2 of the Outline CoCP</b> has been updated appropriately.

		<p>are on or near any 'main rivers.' The Impact Register (HFR-C-2) indicates that 15 temporary watercourse crossings are required, which would involve culverting watercourses for up to 30 months.</p> <p>We will expect to see that alternatives have been fully considered before accepting any culverts over 'main rivers.' This may include:</p> <ul style="list-style-type: none"> <li>• utilising alternative access routes that avoid the need to construct new crossing points.</li> <li>• Utilising alternative crossing structures other than culverts.</li> <li>• Minimising the scale and impact of any culverts through design. Where culverts are necessary on 'main rivers,' these will require a flood risk permit from the Environment Agency. There is currently insufficient information for us to accept the culverting of any 'main river' watercourse. Each location will need to be reviewed against flood risk and environmental concerns. These will need to be constructed to prevent obstructing flow.</li> </ul>			
S42_0047_015	Environment Agency	In relation Section 7 and the onshore works around the landfall, we recommend that the Coastal Protection Authority (East Riding of Yorkshire Council) are engaged to discuss beach crossing proposals and interaction with coastal erosion issues. In relation to commitments, we would strongly encourage an approach that minimises potential	Y	New	The Applicant will continue to engage with the Coastal Protection Authority (East Riding Yorkshire Council) in relation to the proposed works and erosion rates at landfall. The Applicant is committing to installing the offshore cable at landfall using HDD (or other trenchless technologies) (Co187) in order to mitigate an effects, including those on coastal erosion.

		impacts on the coastal environment, including any interactions with coastal erosion over the lifetime of the development.			
S42_0047_016	Environment Agency	<p>With regard to the landfall, there are likely to be additional risks if an open-cut technique is required, for example, those relating to coastal erosion and coastal processes.</p> <p>This chapter includes details of potential impacts as a result of an open-cut technique. Figure 1.10 of the report indicates a longshore drift divide within the landfall corridor.</p> <p>Our preference would be for HDD across the intertidal beach area. However, we would advise that this is also discussed with the Coastal Protection Authority. Reference should also be made to the Shoreline Management Plan and that the landfall sits in an area of "No Active Intervention." Infrastructure crossing the beach should be designed to avoid impacts on coastal processes. It may be necessary to ensure a monitoring / mitigation strategy is in place to ensure works do not impact on coastal processes. We are supportive of Table 1.23 that states that for "Changes to nearshore sediment pathways" that a "full assessment to be undertaken once project details have been further refined and will be provided within the final DCO Application."</p>	Y	New	Since the submission of the Hornsea Four Preliminary Environmental Information Report (PEIR) and having considered comments received during Section 42 consultation, The Applicant is committing to installing the offshore export cables at landfall using HDD (or other trenchless technologies) (Co187), or order to mitigate impacts, including those of coastal erosion.
S42_0047_017	Environment Agency	For Co18, we suggest the following changes and additional text, highlighted in italics:	Y	Change	The Applicant has engaged in further consultation with the Environment Agency and made further updates in relation

		<p>"HDD entry and exit points will be located at least 20m away from any 'main river' or surface watercourses and the onshore export cable will be installed at least 1.2 m beneath the bed of any watercourses. Where flood defences are present, the HDD entry and exit points will be 20m from the landward toe of the flood defences. Where flood defences are present, the minimum 1.2m vertical clearance below the hard bed of the watercourse applies between the landward toe of those flood defences. The optimal clearance depth beneath watercourses will be agreed with the relevant authorities prior to construction. Where Hornsea Four crosses sites of particular sensitivity (e.g. SSSIs or groundwater Inner Source Protection Zones (SPZs)) a hydrogeological risk assessment will be undertaken to inform a site-specific crossing method statement which will also be agreed with the relevant authorities prior to construction."</p>			<p>to Commitments (<a href="#">Volume A4, Annex 5.2: Commitments Register</a>).</p>
S42_0047_018	Environment Agency	<p>We support Co19, but suggest the following changes to the wording, which are highlighted in italics:  <i>"An Onshore Infrastructure Drainage Strategy will be developed for the permanent operational development along the onshore cable corridor and the onshore substation, and will include measures to ensure that existing land drainage is reinstated and maintained, and measures to limit discharge rates and attenuate flows such that pre-development greenfield run-off rates to surrounding land are retained. For pre-developed sites, the advice of the Lead Local Flood Authority will be obtained, and the measures in their drainage</i></p>	Y	Change	<p>The Applicant has engaged in further consultation with the Environment Agency and made further updates in relation to Commitments (<a href="#">Volume A4, Annex 5.2: Commitments Register</a>).</p>



		guidance note followed. The Onshore Infrastructure Drainage Strategy will be developed in consultation with the Environment Agency, Lead Local Flood Authority and relevant Internal Drainage Board as appropriate."			
S42_0047_019	Environment Agency	We support Co64, but have the following suggest edits, highlighted in italics: "Topsoil and subsoil will be stored in separate stockpiles in line with DEFRA 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites PB13298 or the latest relevant available guidance. Any suspected or confirmed contaminated soils will be appropriately separated, contained, and tested before removal (if required). No material will be stockpiled within the floodplain of any main river. The floodplain refers to areas of Flood Zone 3 or 2, identified on the Environment Agency Flood Map for Planning."	Y	Change	The Applicant has engaged in further consultation with the Environment Agency and made further updates in relation to Commitments ( <a href="#">Volume A4, Annex 5.2: Commitments Register</a> ).
S42_0047_020	Environment Agency	We support Co127 but have the following suggested additional text: "An Onshore Decommissioning Plan will be developed at least xx months prior to decommissioning. The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant available guidance."	Y	Change	
S42_0047_021	Environment Agency	We support Co157, but have the following suggest edits, highlighted in italics: "Fences, walls, ditches and drainage outfalls will be retained along the onshore export cable corridor and landfall, where	Y	Change	

		possible. Where it is not possible to retain them, any unavoidable damage will be repaired and reinstated to the satisfaction of the appropriate body as soon as reasonably practical. For 'main rivers' the Environment Agency must be notified if damage occurs to any watercourse or flood infrastructure."		
S42_0047_022	Environment Agency	For Co172, we suggest the following changes and additional text, highlighted in italics: <i>"The bed and banks of watercourses will be instated to their pre-construction condition following the removal of any temporary structures. There will be no loss of cross-sectional area.</i> Where these works are necessary, they may require a flood risk permit from the Environment Agency (if on a 'main river' or affecting flood defences), or consent from the Lead Local Flood Authority / Internal Drainage Board (if on an ordinary watercourse). Details of locations and work undertaken on any 'main river' or flood defences, including any reports or records, will be submitted to the Environment Agency."	Y	Change
S42_0047_023	Environment Agency	We support Co175, as we would like to see pre and post condition surveys for any 'main river' crossings, confirming that there has been no settlement or movement. This is particularly important where flood defences are present. We suggest the additional text, highlighted below in italics: <i>"A pre and post construction condition survey will be undertaken at each of the crossing location on primary and secondary watercourses where infrastructure (e.g. A Bailey bridge) is emplaced upon banks. A pre and post construction condition survey will be</i>	Y	Change

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		undertaken at each of the 'main river' crossings. This will include a survey of any flood defences crossed, and a distance to be agreed with the Environment Agency. On completion of the project, details of the surveys under each main river and flood defences will be submitted to the Environment Agency."		
S42_0047_024	Environment Agency	We support Co183, but have the following suggest edits, highlighted in italics: "Where possible the design of all temporary access tracks within the floodplain of main rivers (as shown on the Environment Agency Flood Map for Planning), areas at risk of surface water flooding (as shown on the Risk of Flooding from Surface Water maps), or in areas included on the historic flood map (from any source) will replicate or be as consistent with existing ground levels as possible, to limit any effects on future flood risk."	Y	Change
S42_0047_025	Environment Agency	We think that Co184 could be misinterpreted, as it seems to refer to both watercourse crossings and maintaining ground levels. We would suggest splitting this into two commitments, as follows: "Co184a. Where the permanent access track to the OnSS may be required to pass over an existing watercourse, the crossing will be appropriately designed to maintain existing ground elevations to ensure continued floodplain capacity and/or flow conveyance, where possible. This shall include an allowance for the predicted effects of climate change. Co184b. Where the permanent access track to the OnSS is within areas of flood risk (as shown on the Environment Agency Flood Map for Planning) may be required to pass over an existing watercourse, the	Y	New

		crossing it will be appropriately designed to maintain existing ground elevations to ensure continued floodplain capacity and/or flow conveyance, where possible.”			
S42_0047_026	Environment Agency	We support Commitment Co1 to use Horizontal Directional Drilling (HDD) technologies to cross all main rivers and Internal Drainage Board (IDB) maintained drains. The proposed pipeline corridor will cross a large number of water bodies. Where the pipeline crosses a main river, the applicant is likely to be required to secure a flood risk activity permit (FRAP). When determining a FRAP, we will consider the likely environmental risks and impacts of the proposed works. The use of trenchless (HDD) technologies is likely to be sufficient mitigation, as a way of avoiding the otherwise likely significant adverse geomorphological impacts on the water bodies proposed to be crossed.	N/A	N/A	The Applicant notes this comment. The Applicant has engaged with the Environment Agency in regard to the flood risk permits likely to be required by Hornsea Four, and the process by which these are to be obtained.
S42_0047_027	Environment Agency	We also support Commitment Co18 to ensure that HDD entry and exit points will be located at least 9m away from surface watercourses and the onshore export cable will be installed at least 1.2m beneath the bed of any watercourses. As this is a 'secondary commitment', we expect to be consulted on each of the site-specific hydrogeological risk assessments that are undertaken. Based on the hydrogeological risk assessments, we can then agree on the optimal clearance depth beneath water bodies due to be crossed. This is of particular relevance to protected sites e.g. River Hull Headwaters SSSI - a nationally important site notified under Section 28 of the Wildlife and Countryside Act, as the most northerly chalk stream system in Britain. The proposed hydrogeological risk assessments should include an assessment	I	N/A	The Environment Agency will be consulted on any hydrogeological risk assessments undertaken where Hornsea Four proposes to cross EA Main Rivers, including the River Hull Headwaters SSSI. The scope of any such hydrogeological risk assessments will be agreed in consultation with the EA prior to the commencement of the assessment, and the results will be used to agree a suitable burial depth beneath the SSSI.

		of the likely impacts to the dynamic hyporheic zone that lies below and lateral to the river channel and this should help inform the necessary clearance depth beneath the channel bed of crossed water bodies.			
S42_0047_028	Environment Agency	We support Commitment Co172, that the bed and banks of watercourses will be instated to their pre-construction condition following the removal of any temporary structures. This commitment is subject to the inclusion of Commitment Co175.	I	N/A	The Applicant notes this comment. As requested by the EA, Co175 has been updated ( <a href="#">Volume A4, Annex 5.2: Commitments Register</a> ).
S42_0047_029	Environment Agency	Section 2.2.2.7 of the onshore Water Framework Directive (WFD) assessment states that "A haul road will be constructed to provide vehicular access along the onshore ECC. The haul road will be installed at the start of construction in that locality. It will be typically 6m wide, will extend up to the full length of the Hornsea Four onshore ECC (except at gaps where The Applicant has committed to HDD only with no haul road crossing). Access across watercourses for as a part of the haul road may be required in the form of bailey bridges or culverts". As such, to protect sensitive water bodies, a qualifying statement, detailing that no permanent or temporary structures will be installed on water bodies that are due to be crossed by HDD techniques, should be added to Co172.	N	N/A	Locations where the Applicant proposes to take access across waterbodies being crossed by HDD (or other trenchless technologies) are detailed in <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> . Where access is proposed, the type of bridge (i.e. Bailey bridge and/or culvert bridge) is also detailed within Volume A4, Annex 4.2 Onshore Crossing Schedule. As such Hornsea Four does not propose to culvert any EA Main Rivers. The Schedule also provides information on where the Applicant does not propose to take access across more sensitive waterbodies, such as River Hull Headwater SSSI.
S42_0047_030	Environment Agency	We support Commitment Co175 that pre- and post-construction surveys will be carried out at crossing locations on primary and secondary watercourses. Where the bed and/or banks of watercourses are proposed to be altered, a pre-construction topographical survey should be undertaken to ensure that post-construction reinstatement works can be	N	Change	The Applicant notes this comment. The updated Commitments Register can be found at <a href="#">Volume A4, Annex 5.2: Commitments Register</a> .  Locations where the Applicant proposes to take access across waterbodies being crossed by HDD (or other trenchless technologies) are detailed in <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> . Where access is proposed, the type of bridge (i.e. Bailey bridge and/or

		<p>carried out accurately.</p> <p>Again, Section 2.2.2.7 of the onshore WFD assessment states that “A haul road will be constructed to provide vehicular access along the onshore ECC. The haul road will be installed at the start of construction in that locality. It will be typically 6 m wide, will extend up to the full length of the Hornsea Four onshore ECC (except at gaps where The Applicant has committed to HDD only with no haul road crossing). Access across watercourses for as a part of the haul road may be required in the form of bailey bridges or culverts”. As such, to protect sensitive water bodies, a qualifying statement detailing that no permanent or temporary structures will be installed on water bodies that are due to be crossed by HDD techniques should be added to Co175.</p>			<p>culvert bridge) is also detailed within <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a>. As such Hornsea Four does not propose to culvert any EA Main Rivers. The Schedule also provides information on where the Applicant does not propose to take access across more sensitive waterbodies, such as River Hull Headwater SSSI.</p>
S42_0047_031	Environment Agency	<p>We therefore support the inclusion of embedded mitigation in the form of the above commitments within Requirement 16 (Code of Construction Practice) of the Draft Development Consent Order (DCO). If the Code of Construction Practice document is updated, we should be made aware to ensure any changes are agreed upon.</p>	N	N/A	<p>The Applicant notes this comment. Where applicable, The Applicant is actively engaging and will continue to engage with the Environment Agency on any relevant changes that might be made to <a href="#">Volume F2.2 Outline Code of Construction Practice</a>.</p>
S42_0047_032	Environment Agency	<p>Section 6.3.3.2 of the Code of Construction Practice document states “It will be ensured that any culverts are adequately sized to avoid impounding flows and are installed below the active bed of the watercourse so that sediment continuity and the movement of fish and aquatic invertebrates can be maintained as in CIRIA’s Culvert design and operation guide (CIRIA 2010)”.</p>			<p>As discussed, and confirmed at the Water and Flood Risk Evidence Plan Technical Panel on 5 November 2019, the Applicant proposes to retain the option to use temporary culverts to cross Ordinary / riparian watercourses. The Applicant only proposes to use Bailey / clear span bridges to cross EA Main Rivers.</p>

		<p>The proposed culverting will require a FRAP), under the Environmental Permitting (England and Wales) Regulations 2016. We are unlikely to grant a permit for this. In determining the FRAP, we will consider how the proposed works affect water biodiversity and the wetland environment, in line with the relevant European and domestic law. We have a presumption against the culverting of watercourses, based on the adverse impacts to ecology, geomorphology and flood risk.</p> <p>Whilst the commitment to follow CIRIA's best practise for culvert installation will help to reduce the adverse impacts of culvert installation, we maintain that it would be more beneficial to use clear span bridge crossings to temporarily cross watercourses. As such, we propose that, for all proposed temporary crossings of main rivers, a commitment to use clear span bridges should be added to the Commitment Register and included within Requirement 16 of the DCO.</p>			
S42_0047_033	Environment Agency	<p>As described above, Co172 and Co175 should be added to and/or qualified with extra wording.</p> <p>The onshore WFD assessment submitted suggests that a haul road, including water body crossings, will extend the entire length of the onshore Export Cable Corridor (ECC) – except where HDD crossings are proposed. As such, a qualifying statement, detailing that no permanent or temporary structures will be installed on the bed and/or banks of the water bodies where Hornsea Project Four has committed to using HDD crossing techniques, must be added to both of</p>	N	N/A	Locations where Hornsea Four proposes to take access across waterbodies being crossed by HDD (or other trenchless technologies) are detailed in <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> . Where access is proposed, the type of bridge (i.e. Bailey bridge and/or culvert bridge) is also detailed within <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> . As such Hornsea Four does not propose to culvert any EA Main Rivers. The Schedule also provide information on where the Applicant does not propose to take access across more sensitive waterbodies, such as River Hull Headwater SSSI.

		these commitments with Requirement 16 of the DCO.			
S42_0047_034	Environment Agency	<p>We also propose that a commitment should be added to the Commitment Register to ensure that environmental / biodiversity net gains (enhancements) are delivered as part of the proposed development. The details of the proposed enhancement should be provided as the detailed design of the scheme is finalised and should be agreed with us prior to construction. See below for more detail. For a development of this size we would not only expect embedded mitigation to offset any adverse environmental impacts, but also a commitment to environmental enhancement that is commensurate to the scale of the scheme.</p> <p>Volume 3, Chapter 3 (Ecology &amp; Nature Conservation) of the PEIR states that “the Secretary of State should use requirements and/or planning obligations to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site’s biodiversity or geological interest”. However, in the documents submitted, there is no commitment or outline proposals of how enhancement (i.e. biodiversity net gain) will be achieved.</p> <p>Similarly, the onshore WFD assessment (Volume 6, Annex 23 of the PEIR) states that “[if] an opportunity may exist to contribute to improving status at a water body level, potential measures to avoid the effect or achieve improvement that can be reasonably delivered within the scope of the proposed project will be investigated”. At present, the WFD assessment does not do this. Many of the WFD water bodies due to be crossed are</p>	N/A	N	<p>Opportunities to improve, enhance and create biodiversity improvements have been considered throughout the development of Hornsea Four. The Applicant has adopted several commitments, and these are presented in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>The Applicant has submitted an Outline Enhancement Strategy (<a href="#">Volume F2, Chapter 14: Outline Enhancement Strategy</a>) and Outline Net Gain Strategy (<a href="#">Volume F2, Chapter 16: Outline Net Gain Strategy</a>) as part of its DCO Application. In addition, Co198 (Enhancement Strategy) Co199 (Net Gain) secures the implementation of these strategies.</p> <p>Specific WFD enhancements measures have not developed at the time of Application. These opportunities will be considered further post-consent.</p>



designated as Heavily Modified Water Bodies (HMWB). These water bodies have WFD mitigation measures associated to them, which are required to be put 'in place', in order to achieve the WFD objective by 2021. The WFD assessment should consider whether the scheme will deliver and/or prevent the delivery (run contrary to) any of the mitigation measures identified in the Humber River Basin Management Plan (RBMP). At present it does not do this.

In line with the Humber RBMP, we recommend that the proposed development is used as an opportunity to restore more natural processes to the watercourses that it crosses/impacts, via the delivery of enhancement measures. For HMWBs, the provision of biodiversity net gain (enhancement) would be best achieved through the delivery of WFD mitigation measures (we can supply these on request). This would offer a significant environmental gain.

The above points are supported by paragraphs 170 and 175 of the National Planning Policy Framework (NPPF) and Policy ENV4 of the East Riding of Yorkshire Council Local Plan, which recognise that the planning system should conserve and enhance the environment by minimising impacts on and providing net gains for biodiversity. It is also supported by paragraph 5.3.4 of the Overarching National Policy Statement for Energy (EN-1), which states that the applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity conservation interests.

S42_0047_035	Environment Agency	We are satisfied that the assessment of potential impacts to physical processes and morphology seems to be robust and adopts an appropriately precautionary approach. Where gaps are identified, plans seem to be in place to address them ahead of the more detailed Environmental Statement.	N/A	N/A	The Applicant notes this comment.
S42_0047_036	Environment Agency	No water is to be transferred between water courses and if water is taken from a watercourse, for example, for washing down machines and other purposes, it must be returned to the location from which it was taken. We would like to see this in the Commitment Register and secured through an appropriate requirement (e.g. Requirement 16). The transfer of water between catchments also relates to the point above regarding invasive species.	Y	N/A	The Applicant has committed to developing a Code of Construction Practice in accordance with the Outline CoCP (Co124). As such, <a href="#">Volume F2.2 Outline Code of Construction Practice</a> (secured through DCO Requirement 16) states that no water will be transferred between watercourses, and that if water is abstracted it will be returned to the watercourse from which it was abstracted. Accordingly, it follows that water will not be transferred between catchments.
S42_0047_037	Environment Agency	HDD spoil deposit sites must be determined in advance and the soil heaps covered to prevent run off caused by wind and rain. Soil storage sites should ideally not be closer than 25m to a watercourse. We would like to see this in the Commitment Register and secured through an appropriate requirement (e.g. Requirement 16).	I	Change	<p>The Applicant has committed to avoid stockpiling topsoil and subsoil within the floodplain of an EA Main River (defined as areas of Flood Zone 2 or 3 as identified on the Environment Agency Flood Map for Planning) (Co64). As stated in <a href="#">Volume F2.6 Outline Onshore Infrastructure Drainage Strategy</a> pre-construction and construction drainage will be installed the landfall and onshore ECC, and any run-off which is intercepted by the temporary drainage will pass through a silt interceptor being before being discharges back in to any watercourses.</p> <p>The Applicant has consulted with the Environment Agency in response to the request to cover soil heaps. Soil management measures can be found in <a href="#">Volume F2, Chapter: Outline Code of Construction Practice</a>.</p>
S42_0047_038	Environment Agency	As mentioned above, there are no clear plans to provide environmental enhancement. Opportunities for environmental improvement should be identified and funding made available to carry out these works included in the	Y	N/A	The Applicant has submitted an Outline Enhancement Strategy ( <a href="#">Volume F2, Chapter 14: Outline Enhancement Strategy</a> ) and Outline Net Gain Strategy ( <a href="#">Volume F2, Chapter 16: Outline Net Gain Strategy</a> ) as part of its DCO Application.

		project budget. Tree and hedge planting, wetland creation or restoration, grassland creation or improvement are amongst the possible ideas for environmental enhancement. Enhancement projects can be taken "off-site" in partnership with local conservation groups, such as the Yorkshire Wildlife Trust.			
S42_0047_039	Environment Agency	We are pleased to see that the temporary habitat disturbance in the intertidal area and the temporary increase in suspended solids and sediment deposition in the Hornsea Four array area and offshore Export Cable Corridor have been scoped into the Risk Register.	N/A	N/A	The Applicant notes this comment.
S42_0047_040	Environment Agency	<p>We would like to see the potential for introduction of invasive non-native species during the construction phase added to the Risk Register. Currently, the register only includes BIE-O-10, which relates solely to Marine Invasive Non-Native Species during operation of the development. The Commitment Register should reflect appropriate biosecurity measures, such as those outlined below:</p> <p>Biosecurity measures need to be in place for the duration of the works and strictly adhered to by all site operatives. As a minimum, the Check Clean and Dry campaign should be followed.</p> <ol style="list-style-type: none"> <li>1. Check - your equipment and clothing for live organisms before leaving an area - particularly in areas that are damp or hard to inspect.</li> <li>2. Clean - and wash all equipment, footwear and clothing thoroughly when works are completed. If you do come across any organisms, leave them at the water body where you found them.</li> <li>3. Dry - all equipment and clothing - some</li> </ol>	Y	N/A	<p>As part of the Extended Phase 1 Habitat Survey, a check for the presence of invasive non-native species was undertaken. The findings of which are reported within <a href="#">Volume A6 Annex 3.1 Extended Phase 1 Habitat Survey Report</a>. The desk study (which forms part of the Extended Phase 1 Habitat Survey) returned a total of 21 records of invasive non-native species. Of those records, only one for Canadian waterweed <i>Elodea canadensis</i> is located within the Hornsea Four Order Limits.</p> <p>Pre-construction surveys will also be undertaken to confirm the presence/absence of invasive non-native species within the Hornsea Four Order Limits and to confirm if there have been any changes to the baseline environment since the previous surveys. Further details on this can be found at <a href="#">Volume F2, Chapter 3: Outline Ecological Management Plan</a>.</p> <p>For the onshore, the Applicant has committed to developing a Code of Construction Practice (CoCP) in accordance with the Outline CoCP (Co124). The Hornsea Four Outline CoCP (Volume F2.2) submitted at PEIR stated that an onshore biosecurity protocol will be developed post-consent and will form part of the CoCP that will be approved under the DCO application, and once a Principal Contractor and Ecological Clerk of</p>

species can live for many days in moist conditions. Make sure you don't transfer water elsewhere

We would like to see this in the Commitment Register and secured through an appropriate requirement (e.g. Requirement 16). East Yorkshire is fortunate in that there are relatively few non-native invasive species in the county, and we want to keep it that way. One of the main causes of introduction is bringing equipment, vehicles, boats etc. in from an area that is infested with invasive species. Further information on biosecurity can be found at the following web address: <https://secure.fera.defra.gov.uk/nonnativespecies/checkcleandry/index.cfm>

Works (ECoW) has been appointed. Similarly, the Outline Code of Construction Practice submitted with the DCO contains an Outline Onshore Biosecurity Risk Assessment. The onshore biosecurity protocol sets out the measures to manage the biosecurity risks, including invasive non-native species, diseases and pathogens during the construction phase. The Applicant is in consultation with the Environment Agency in relation to biosecurity measures. An update on this position is summarised in [Volume F2, Chapter: Outline Code of Construction Practice](#).

Appropriate measures, including the latest relevant legislation and regulation, will be adopted when working in vicinity of invasive terrestrial plants and injurious weeds. Where necessary, works will be supervised by the Ecological Clerk of Works. Known locations of any recorded invasive non-native species will be marked on site and vehicle movements restricted in the vicinity of these locations where possible. Any spoil that is likely to contain invasive non-native species and the relevant bodies will be notified of their location.

In relation to the offshore the following steps will be taken to prevent and/ or manage Marine Invasive Non-Native Species:

1. A Biosecurity Plan will be produced and agreed in consultation with statutory consultees. A document detailing how the risk of potential introduction and spread of Marine Invasive Non-Native Species will be minimised. This will include measures for cable/scour protection in the unlikely event that this material is sourced from the marine environment (it is anticipated that this material will originate from non-marine sources).

2. The Biosecurity Plan will outline measures to ensure vessels comply with the International Maritime Organization (IMO) ballast water management guidelines, it will consider the origin of vessels and

					<p>contain standard housekeeping measures for such vessels as well as measures to be adopted in the event that a high alert species is recorded.</p> <p>3. A Project Environmental Management and Monitoring Plan (PEMMP) will be developed and implemented to cover the construction and operation and maintenance phases of Hornsea Four as per condition 13 of the Draft Development Consent Order (<a href="#">Volume C1, Chapter 1</a>). The PEMMP will include planning for accidental spills, contain a biosecurity plan to limit the spread of Marine Invasive Non-Native Species, address all potential contaminant releases and include key emergency contact details (e.g. the Environment Agency (EA), Natural England and MCA). A Decommissioning Programme will be developed to cover the decommissioning phase.</p>
S42_0047_041	Environment Agency	We have reviewed the chapter on Geology and Ground Conditions, and we agree with the risk assessment for groundwater and controlled waters during construction, operation and decommissioning. We agree that the implementation of the proposed mitigation measures will reduce any potential adverse impact on groundwater resources to a minimum.	I	N/A	The Applicant notes this comment.
S42_0047_042	Environment Agency	We are pleased to see that our guidance on piling and pollution prevention will be followed during this project.	I	Io	The Applicant has committed to following the 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (Environment Agency, 2001), or latest relevant available guidance, where piling might be undertaken during construction (Co6). The Commitments Register can be found at <a href="#">Volume A4, Annex 5.2: Commitments Register</a> .
S42_0047_043	Environment Agency	If any contamination is identified, then we agree that a contaminated land and groundwater scheme will need to be prepared; this has been secured by Requirement 13 of the draft Development Consent Order. The final scheme should be	N/A	N/A	If any contamination is identified, the Applicant agrees that a contaminated land and groundwater scheme will need to be prepared; this has been secured by Requirement 13 of the draft Development Consent Order. The final scheme should be agreed with East Riding of Yorkshire Council and the Environment Agency.

		agreed with East Riding of Yorkshire Council and the Environment Agency.			
S42_0047_044	Environment Agency	With respect to GGC-C-7 of the Risk Register, we would also like to remind you that any dewatering activities above the exemption limits will now require an environmental permit.	N/A	N/A	The Applicant has continued to engage with Environment Agency in regard to any abstraction and/or dewatering activities which may require an environmental permit. Should the need for environmental permits be identified, Hornsea Four will acquire these prior to works commencing.
S42_0047_045	Environment Agency	We recommend against scheduling any work on the onshore / offshore junction during the bathing water season (1st March - 31st September) to avoid any mobilisation of bacteria during construction. We would like to see this added to the Commitment Register.	N	N	The Applicant notes this comment. The Applicant has consulted further with the Environment Agency on further updates in relation to Commitments ( <a href="#">Volume A4, Annex 5.2: Commitments Register</a> ).
S42_0047_046	Environment Agency	We recommend using a management and reporting system to minimise and track the fate of construction wastes, such as that set out in PAS402: 2013, or an appropriate equivalent assurance methodology. This should ensure that any waste contractors employed are suitably responsible in ensuring waste only goes to legitimate destinations.  You must apply the waste hierarchy as a priority order of prevention, re-use, recycling before considering other recovery or disposal options. Government guidance on the waste hierarchy in England can be found here: <a href="https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf">https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf</a>	N/A	N	The Applicant undertook further consultation with the Environment Agency on the use of a management and reporting system, and the application of a waste hierarchy. Subsequent updates on this position are summarised in the Outline Site Waste Management Plan, which can be found in <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice</a> .
S42_0047_047	Environment Agency	Site Waste Management Plans (SWMP) are no longer a legal requirement, but in terms of meeting the objectives of the waste hierarchy and your duty of care, they are a useful tool and considered to be best practice. We are therefore pleased to see			A Site Waste Management Plan will be developed in accordance with the Outline Site Waste Management Plan ( <a href="#">Volume F2.2 Outline Code of Construction Practice</a> ).

		Co65 on the Commitment Register, which indicates that a SWMP will be developed.			
S42_0047_048	Environment Agency	<p>Requirement 7 (Fencing)</p> <p>We are not proposing any changes to the wording of Requirement 7, but we do wish to highlight that the erection of fencing may restrict access for routine or ad-hoc maintenance and inspection. Access may also be restricted during an emergency. We will want to see that routine or ad-hoc access is available and will want to ensure that our powers of entry are unaffected, e.g. for emergency access, inspection or repairs.</p>	N/A	N/A	<p>During the construction of Hornsea Four, the entirety of the onshore export cable corridor will be subject to the Construction (Design and Management) Regulations 2015 (CDM Regulations 2015, available at <a href="https://www.hse.gov.uk/construction/cdm/2015/index.htm">https://www.hse.gov.uk/construction/cdm/2015/index.htm</a>), or other latest available guidance and associated relevant Health, Safety and Environment (HSE) legislation available at the time. As currently defined by the CDM Regulations, the entire works area will be under the control of the Principal Contractor, employed by Ørsted to undertake the cable installation works. Any required Environment Agency works, including access, within the Hornsea Four Order Limits during the construction period will be controlled by the Principal Contractor. As such the Environment Agency and its Contractors would be required to comply with the requirements of the CDM Regulations in relation to its proposed works where and when access is required. Such requirements would include co-operation with the Principal Contractor and other Contractors in relation to HSE, compliance with the Construction Phase Plan and associated Principal Contractor and Ørsted requirements in relation to HSE. Early planning (or as early as possible, in the case of an emergency) and communication with the Applicant and the appointed Principal Contractor will ensure access is achieved in a timely and safe environment.</p>
S42_0047_049	Environment Agency	<p>Requirement 14 appears to be related to the substation works only and with respect drainage works. It is unclear why the Environment Agency has been specifically mentioned in isolation, whereas Requirement 12 (Surface and Foul Water) makes reference to "the relevant sewerage and drainage authorities." Detailed surface water design will require the comments of the Lead Local Flood Authority, plus any comments from operators, including the Internal Drainage Board. We suggest that</p>	Y	N/A	<p>The Applicant notes this comment. Requirement 14 (Schedule 1, Part 3) of the Hornsea Four Development Consent Order (<b>Volume C1, Chapter 1</b>) has been updated as suggested.</p>

		<p>the wording should better reflect those parties who will have an interest in the details of this requirement. Our suggested changes are highlighted in italics:</p> <p>14.—(1) No part of the onshore HVDC/HVAC substation shall commence until, in respect of that installation, a detailed surface water scheme has been prepared in consultation with the relevant sewerage and drainage authorities and Environment Agency and submitted to and approved in writing by the relevant planning authority.</p> <p>(2) The detailed surface water schemes must accord with the outline onshore infrastructure drainage strategy and—</p> <p>(a) be based on sustainable drainage principles;</p> <p>(b) an assessment of the hydrological and hydrogeological context of the onshore HVDC/HVAC substation, as applicable; and</p> <p>(c) include detailed designs of a surface water drainage scheme.</p> <p>(3) Construction of the onshore HVDC/HVAC substation or HVAC booster station as applicable must be carried out in accordance with the approved scheme.</p>			
S42_0047_050	Environment Agency	<p>Requirement 21 (Decommissioning)</p> <p>We are not suggesting any changes to the proposed text for Requirement 21 but wish to highlight that any decommissioning work would be subject to any permitting / consenting requirements at that time. The current flood risk permitting regime is included within the 2016 Environmental Permitting Regulations. As such, it is likely that parts of the decommissioning plan would require flood risk permits.</p>	N/A	N/A	The Applicant notes the comment. The Applicant has committed to developing an Onshore Decommissioning Plan, prior to decommissioning. The plan will include details relevant to flood risk and pollution prevention, and will be in line with the latest relevant available guidance (Co127).
S42_0047_051	Environment Agency	<p>Part (8) – It should be noted that the Environment Agency does not “own” all sewers or drains, but has permissive powers</p>	Y	N/A	Comments in relation to Article 15(8) of Part 4 (Supplement Powers) of the Hornsea Four Development Consent Order (Volume C1, Chapter 1) have been



		to undertake works on 'main rivers,' and in some circumstances, may also be the landowner. This may also affect (4)(a) which also refers to requesting approval from "whom the sewer or drain belongs." Part (9) - The Environment Agency currently has 2 months after an application for a flood risk permit is duly made, to make a decision. We therefore request that this wording is increased to reflect this. The 2 months is required to enable us to carry out various consultations and to determine a permit. Where a permit is being issued, appropriate conditions will be attached to that permit.			noted.  The Hornsea Four Development Consent Order ( <a href="#">Volume C1, Chapter 1</a> ) has been updated in line with the received comment.
S42_0047_052	Environment Agency	<p>The draft DCO includes Protective Provisions for the Environment Agency in Schedule 9, Part 5. These are included alongside the provisions for other drainage authorities. We would like to see this section expanded to distinguish between the powers of the Environment Agency and other drainage bodies. This may be more relevant if in the future the applicant considers disapplying other consenting regimes, including those covered by the Environmental Permitting Regulations. We have produced a standard template for Protective Provisions, which can be obtained on request. The text is largely similar to that included in Part 5 of the draft DCO, but removes any potential confusion through the use of "drainage authority." The standard template also includes a provision to "prevent any interruption of the free passage of fish."</p> <p>This part of the DCO references "sea defences." It is important to distinguish that sea defences maintained by the Coastal Protection Authority and/or those that</p>	N/A	N	<p>Part 5 (Protective Provisions) of Schedule 9 of the Hornsea Four Development Consent Order (Volume C1, Chapter 1) has been updated to include the standard Protective Provisions subsequently obtained from the Environment Agency via email on 29th November 2019 as appropriate.</p> <p>The Applicant also notes the Environment Agency's comments in relation to the definition of "sea defences" and is in consultation with the Environment Agency in relation to the wording in Schedule 9 Part 5 of the draft Development Consent Order (DCO). Subsequent updates on this position are summarised in The Draft DCO including Draft DML, which can be found in <a href="#">Volume C1, Chapter 2</a>.</p>

		<p>have a primary purpose of coastal erosion protection may require the consent of the Coastal Protection Authority, and not the Environment Agency. "Sea defences" can also refer to defences that have the primary purpose of preventing the inundation of land by the sea. This is particularly important, as Schedule 9 Part 5 refers to the protections afforded to "drainage authorities" including the Environment Agency. However, the consent of the Coastal Protection Authority (East Riding of Yorkshire Council) may be required for works on certain sea defences.</p> <p>The following is the definition of "sea defence", taken from the 2016 Environmental Permitting Regulations: "sea defence" includes any bank, wall, embankment (and any berm, counter wall or cross-wall connected to any such bank, wall or embankment), barrier, tidal sluice and other defence, whether natural or artificial, against the inundation of land by sea water or tidal water, including natural or artificial high ground which forms part of or makes a contribution to the efficiency of the defences of the regulator's area against flooding, but excludes any sea defence works which are for the time being maintained by a coast protection authority under the provisions of the Coast Protection Act 1949(9) or by any local authority or any navigation, harbour or conservancy authority. Under point 3 (3) (c), we suggest the addition of the word 'flooding,' after 'prevention of' and before 'pollution'.</p>			
S42_0047_053	Environment Agency	As part of the DCO, the applicant has the opportunity to consider dis-applying	N/A	N/A	The Applicant is currently engaging with the Environment Agency and is seeking to disapply the

certain legislation. In terms of flood risk, there is the possibility of dis-applying legislation associated with obtaining environmental permits. We would ask for clarity as to whether this is the case, as we will require time to consider what provisions we require in the DCO in order for us to agree to this. It would also be useful, if you are considering this approach, for the DCO to include a statement to that effect. On a project of this scale there are clear advantages and efficiencies to bringing that regime within the DCO. We would encourage you to consider discussing this with us as soon as possible, as it would serve for potential efficiencies, particularly at the construction stage. If you choose not to seek to dis-apply the 2016 Environmental Permitting Regulations (for flood risk activities), or we do not agree to this, we recommend that you parallel track any flood risk activity permits alongside the DCO application. There are large parts of the project that potentially require flood risk permits. Large parts of the construction and permanent works are likely to pose no major permitting concerns in terms of flood risk activity permits, when considered alongside the Commitments Register and the Outline Code of Construction Practice. However, we have highlighted a few areas within the application where we would require more detailed information to ensure we can provide you with the correct advice with regards associated permits. This position is in line with the Environment Agency's Annex D of Planning Inspectorate Advice Note 11, 'working with public bodies' which is available at the following link:

legislation associated with obtaining environmental permits (2016 Environmental Permitting Regulations). Subsequent updates on this position are summarised in the Draft DCO including Draft DML can be found in [Volume C1, Chapter 2](#).

		<a href="https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/04/Advice-note-11-Annex-D-EA.pdf">https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/04/Advice-note-11-Annex-D-EA.pdf</a> This would include works in, over, under or within 8 metres of any 'main river' or flood defence (including natural high ground that serves that purpose). On tidally influenced sections of 'main rivers' this distance extends to works within 16 metres of the watercourse, or flood defences where present. Certain activities in the wider floodplain may also require a permit.			
S42_0047_054	Environment Agency	We have the following observations with respect to flood risk and the interests of the Environment Agency, including where we exercise our powers for managing flood risk: Watercourse Integrity We support Co10, which states that, on completion of the works, working areas will be reinstated to pre-construction conditions wherever possible.	I	N/A	The Applicant notes this comment.
S42_0047_055	Environment Agency	Co18 states that the HDD shall have a minimum clearance of 1.2metres below the hard bed of any 'main river' watercourse. This distance must be taken based on the established hard bed of any watercourse, and the soffit or top of any below-ground feature of the cables, pipes, culvert; or other part of the structure being installed.  Co18 also states that HDD entry and exit points will be located at least 9 metres from any surface watercourses. We have taken the meaning of surface watercourses to mean any 'ordinary watercourses.' We would like to see this amended to keep these entry and exit points at least 20 metres from any 'main river' or landward	Y	Change	The Applicant has committed to installing the onshore export cables at least 1.2m beneath the hard bed of any watercourse being crossed by Horizontal Directional Drilling (HDD) (Co18). This will be at least to the top of the cables being installed.  As requested by the EA, the Applicant has now committed to locating HDD entry and exits points a minimum of 20m away from EA surface watercourses (see Co18, <a href="#">Volume A4, Annex 5.2: Water Framework Directive Assessment</a> )

		toe of embankments, or flood defences where present.			
S42_0047_056	Environment Agency	We support Commitment Co143 that the landfall works will avoid Barmston Main Drain.	I	Io	The Applicant notes this comment.
S42_0047_057	Environment Agency	We understand from the Onshore Crossing Schedule that all main rivers will be crossed using HDD, which is our preferred method. If there are any exceptions to this, we would expect these to be treated on a case by case basis with early consultation with us.	I	Io	The Applicant is committed to using HDD (or other trenchless technologies) to cross all EA Main Rivers. This is reflected in <a href="#">Volume A4, Annex 4.2: Onshore Crossing Schedule</a> and within Co1 of <a href="#">Volume A4, Annex 5.2: Water Framework Directive Assessment</a> . The Applicant does not propose to cross any EA Main Rivers using open cut techniques.
S42_0047_058	Environment Agency	We will need to ensure that during construction works, our access for routine, ad-hoc or emergency repairs is not affected. We are currently reviewing the crossing and access details provided in more detail and will update the applicant as part of ongoing conversations. We have identified access concerns for the crossing of the River Hull (Orsted ref. ECC_WA_140) and Watton Beck (Orsted ref. ECC_WA_173), which will require specifics to be agreed during and on completion of construction works.	N/A	N/A	The Applicant has engaged with the EA in regard to any access and maintenance arrangements which might be required during construction. It is Hornsea Fours view that early and continued engagement between the Applicant and the Environment Agency throughout the development and pre-construction phases of the project will help facilitate any access and maintenance which may be required, including those which are of concern at Watton Beck.
S42_0047_059	Environment Agency	The minimum clearance of 1.2 metres under watercourses (discussed above) should also be achieved under any raised embankments forming part of the flood defences. The horizontal distance should be taken as the point between the landward toe of any flood defences either side of the watercourse. The vertical distance should be 1.2metres below the hard bed.	Y	Change	The Applicant has updated Co18 to state that a minimum clearance of 1.2 metres will be maintained below the hard bed and the landward toe of any flood defences associated with EA Main Rivers. See <a href="#">Volume A4, Annex 5.2: Water Framework Directive Assessment</a> .
S42_0047_060	Environment Agency	As with all main rivers, it is assumed that HDD techniques shall be used under any raised embankments or flood defences. Checks should be made for any remote flood defences, which may or may not appear on our flood map.	Y	Change	The Applicant has committed to crossing all EA Main River by HDD (Co1) and that any HDD entry and exit pits will be located 20 m from the EA surface water course or the landward toe of any associated flood defence (Co18). See <a href="#">Volume A4, Annex 5.2: Water Framework Directive Assessment</a> .

S42_0047_061	Environment Agency	We have particularly concerned with respect the plans to cross Watton Beck in the proposed location. The riverbank and flood defences in this location are part of an ongoing assessment. Future works will be required to repair and/or replace those flood defences, and we will require further dialogue with the applicant to understand any implications of the pipeline being installed.	N/A	N/A	The Applicant has engaged with the Environment Agency in regard to any proposed Environment Agency improvement works and any access and maintenance arrangements which might be required during construction activities at Watton Beck. It is the Applicant's view that continued engagement with the Environment Agency throughout the pre-construction phases of the project will help facilitate any works, access and maintenance which may be required. This approach has been agreed with the Environment Agency during the Technical Panel Meetings held up to the point of Application.
S42_0047_062	Environment Agency	The scale of the stockpiling required is not clear, so we advise that the text is amended in line with that used in the flood risk permitting legislation. See - <a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/823465/Standard-Rule-2015-No-29.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/823465/Standard-Rule-2015-No-29.pdf</a> . The DCO Requirements 13 and 16 relate to this point, but could perhaps be more explicit. This may not be necessary if the Commitment Co64 ("no stockpiling within the floodplain of any watercourse") is followed. However, we would highlight that large areas of the working corridor appear to be within the floodplain according to our Flood Map for Planning.	N/A	N/A	The Applicant has committed that topsoil & subsoil stockpiling within the floodplain will be avoided (Co197). This commitment has been presented and wording agreed with the Environment Agency through the Technical Panel Meetings held up to the point of Application.
S42_0047_063	Environment Agency	In some areas, there may also be flood risk from other sources, including surface water. Where stockpiling is proposed, it should ensure it does not reduce flood storage or affect conveyance. For surface water, the applicant could use the Risk of Flooding from Surface Water maps.	I	N/A	Pre-construction drainage will be installed at the beginning of construction in order to intercept any severed land drainage and surface run-off as a result of the temporary works. The pre-construction drainage will be developed in consultation with landowners and the detailed methodology will be agreed in consultation with the relevant statutory stakeholders (including ERYC, the IDB and the EA), as required (Co14).
S42_0047_064	Environment Agency	Commitment Co183 states the need to ensure that the temporary haulage roads remain as consistent with ground levels as possible, in areas at risk of flooding, to	I	Io	The Applicant notes this comment.

		ensure no increase in flood risk. A permanent access track is identified on the Outline Onshore Infrastructure Drainage Strategy. This states that it will be commensurate with ground levels as much as is possible. Volume 6 Annex 2.2 identifies where that interacts with Flood Zone 3.			
S42_0047_065	Environment Agency	Commitment Co184 refers to both watercourse crossings and floodplain capacity concerns, and therefore may be misinterpreted. We suggest splitting this commitment into 2 parts – (i) to protect the floodplain and (ii) permanent watercourse crossings.	N/A	New	The Applicant has engaged in further consultation with the Environment Agency on further updates in relation to Commitments ( <a href="#">Volume A4, Annex 5.2: Commitments Register</a> ).
S42_0047_066	Environment Agency	Temporary bridges may be required on smaller watercourses. Table 2.16 in the Hydrology and Flood Risk chapter and the Impacts Register (HFR-C-2) both make reference to those watercourses that may be affected.	N/A	N/A	The Applicant notes this comment.
S42_0047_067	Environment Agency	Culverts are also mentioned as potentially being required for up to 30 months (Impacts Register HFR-C-2) on up to 15 crossings. Main rivers are mentioned, but it is unclear which watercourses these refer to. Although provisions are made within the Impacts register (HFR-C-02), Commitment Register Co124 (culvert sizing), Co172 (bed & banks) and Co175 (survey requirements), we are generally against the installation of culverts. Further clarity will be required on the location of any culverts and justification provided as to why alternatives are not available.	N/A	N/A	Locations where the Applicant proposes to take access across all watercourses are detailed in <a href="#">Volume A3, Annex 4.2 Onshore Crossing Schedule</a> . Where access is proposed, the type of bridge (i.e. Bailey bridge and/or culvert bridge) is also detailed within <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> . As such Hornsea Four does not propose to culvert any EA Main Rivers. The Schedule also provides information on where the Applicant does not propose to take access across more sensitive waterbodies, such as River Hull Headwater SSSI.
S42_0047_068	Environment Agency	We note that an Operational drainage strategy is being prepared for the construction stage (Impacts Register HFR-O-7; Outline Onshore Infrastructure Drainage Strategy Section 3.2.11). The draft DCO Requirements 12 and 16 cover	I	N/A	The Applicant notes this comment.

		<p>this. We are supportive of the application of the surface water hierarchy and pleased that discharge rates will be restricted to greenfield runoff rates.</p>			
S42_0047_069	Environment Agency	<p>The Outline Drainage Strategy for the permanent works at the substation seek to satisfy the DCO Requirement 14. We have made a minor suggested change to that condition towards the end of this letter, to ensure that other drainage authorities are involved where required.</p>	Y	N/A	<p>As per an earlier comment on Requirement 14 (Schedule 1, Part 3) of the Hornsea Four Development Consent Order (<a href="#">Volume C1, Chapter 1</a>) has been updated as suggested.</p>
S42_0047_070	Environment Agency	<p>The substation area is not covered by a recent and robust flood risk model. You may wish to undertake your own detailed modelling. We would recommend that this considers fluvial and surface water risks. Undertaking such a model would ensure that the development, given its sensitivity to flooding, could be designed with flood risk mitigated.</p> <p>If not undertaking detailed modelling, we would recommend utilising a freeboard about existing modelled and observed historic flood levels to ensure suitable mitigation is incorporated.</p> <p>Appropriate climate change allowances should be incorporated for the lifetime of the development, in accordance with the guidance at <a href="https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#vulnerability">https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#vulnerability</a>. It is worth highlighting that the current guidance is being reviewed in response to the latest UK Climate Projections 2018. We advocate a precautionary approach given the limited robust modelling available and the sensitive nature of the development.</p>	N/A	N/A	<p>The Applicant has engaged in further consultation with both National Grid and the Environment Agency in relation to flood risk modelling in the onshore substation area. Subsequent updates this position are summarised in <a href="#">Volume A6, Annex 2.2: Onshore Infrastructure Flood Risk Assessment</a>.</p>



S42_0047_071	Environment Agency	<p>The Hydrology and Flood Risk chapter (page 14) makes reference to the substation area. Substations may be considered 'essential infrastructure' according to the Planning Practice Guidance Table 2 (Paragraph 066) and should therefore be "designed and constructed to remain operational and safe in times of flood" (Table 3 of PPG Paragraph 067) in areas of Flood Zone 3a.</p> <p>Appropriate mitigation should be provided commensurate with the assessment of flood risk, taking into account any uncertainties. We recommend including freeboard within the assessment to account for the uncertainties.</p>	N/A	N/A	The Applicant is in consultation with the Environment Agency in relation to flood risk modelling and possible freeboard at the onshore substation. Subsequent updates this position are summarised in <a href="#">Volume A6, Annex 2.2: Onshore Infrastructure Flood Risk Assessment</a> .
S42_0047_072	Environment Agency	We would advise that the decommissioning strategy incorporates the best available understanding of flood risk at the time of decommissioning. This may be as a result of improvements to the understanding of flood risk (i.e. new models), or as a result of climate change.	Y	1o	The Applicant has committed to developing an Onshore Decommissioning Plan which will include details relevant to flood risk in line with the latest relevant available guidance (Co127). <a href="#">See Volume A4, Annex 5.2: Commitments Register</a> .
S42_0047_073	Environment Agency	Temporary activities associated with decommissioning may require conditions on the DCO, or within flood risk permits.	N/A	N/A	The Applicant has engaged with the Environment Agency, with a preference for disapplying the 2016 Environmental Permitting Regulations through the Development Consent Order. The Draft DCO including Draft DML can be found in <a href="#">Volume C1, Chapter 2: Explanatory Memorandum</a> .
S42_0047_074	Environment Agency	The Environment Agency holds land at Watton Beck, where the pipeline is proposed to cross. Please contact our Estates team, at <a href="mailto:EstatesEnq@environment-agency.gov.uk">EstatesEnq@environment-agency.gov.uk</a> , to discuss any issues relevant to access or use of Environment Agency held land.	N/A	N/A	The Applicant has engaged with the Environment Agency Estates team in relation to their land interests at Watton Beck, and has been kept informed as Hornsea Fours proposals develop.
S42_0047_075	Environment Agency	<p>Additional Points for Discussion</p> <p>We would like to discuss the following further with you, to ensure that we fully understand how the project will interact</p>	N/A	N/A	The Applicant has engaged with the Environment Agency in relation to the Environment Agency's ability to inspect, maintain or undertake works in and around Hornsea Four. Agreement has been obtained that in

		<p>with our ability to inspect, maintain, or undertake works in and around the pipeline.</p> <ul style="list-style-type: none"> <li>· Would there be any constraints on size of plant that can be used to place embankment fill above or near the pipeline?</li> <li>· Will there be any constraints on the rate at which fill can be placed?</li> <li>· What distance from the cable would concerns be extended?</li> <li>· Would any permits, consents or permissions be required once the pipeline is in place? What consultation would be required for future works?</li> </ul>			<p>operation, there will be no impacts on maintenance requirements from either the Applicant or the Environment Agency.</p>
S42_0052_10.2 1	Natural England	<p>The sensitivity of the designated sites (statutory and non-statutory) is considered to be medium, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.</p> <p>This suggests that it would be acceptable for works to leave a SSSI in a degraded condition up to 10 years. This is not the case, a temporal impact can still be significant.</p> <p>The report has no benchmark as to how it is assessing sensitivity/significance.</p> <p><i>NER: Create a benchmark for sensitivity/significance (in line with the methodology).</i></p> <p><i>Temporal impacts must be taken into account for designated sites (and priority habitats).</i></p> <p><i>Measures for SSSIs must provide certainty</i></p>	N	N/A	<p>Direct impacts on designated sites (including non-designated sites) during the construction phase have been scoped out in the Impacts and Effects Register, and this was agreed as part of the Evidence Plan meeting held with stakeholders including Natural England at an onshore Ecology Technical Panel meeting on 13th November 2019.</p> <p>The assessment of the significance and sensitivity of receptors is defined within <a href="#">Section 3.9 of Volume A3.3: Ecology and Nature Conservation</a> and in accordance with industry guidance from CIEEM. The supporting evidence used within the impact assessment has been presented in order to show how professional judgement has been using the baseline information and in line with the aforementioned benchmarks and guidance. Furthermore, the only SSSI crossed by The Applicant is the River Hull Headwaters SSSI, which is to be crossed via Horizontal Directional Drilling (HDD) techniques, therefore reducing the potential for temporal impacts. Hornsea Four will be producing a Code of Construction Practice (CoCP) alongside an Ecological Management Plan (EMP) which will be in accordance with their respective outline plans (<a href="#">Volume F2.2 and Volume F2.3</a>), which together will set out any further mitigation that may be required, in line with standard industry guidance.</p>

		that impacts should be adequately mitigated at all times.			The value and sensitivity criteria for water receptors presented in the <a href="#">Hydrology and Flood Risk PEIR Chapter (Volume 3, Chapter 2)</a> are based on the established best practice guidance provided in the Design Manual for Roads and Bridges (2018). In this context, we have interpreted “very high” sensitivity to refer to internationally designated sites (e.g. SAC, SPA) and “high” sensitivity to refer to nationally designated sites (e.g. SSSI), of which the River Hull Headwaters SSSI is one. Note that all potential impacts on the SSSI have been scoped out of the ES chapter on the basis of the project commitments and consultation with stakeholders as part of the PEIR process. This was agreed with the Environment Agency, the Yorkshire Wildlife Trust and Natural England in an onshore Ecology Technical Panel meeting on 13th November 2019.
S42_0052_10.2	Natural England	Standard workings are 80m wide except for Railways where they are 120m wide. This is to avoid settlement of the railway line.  <i>NER: Could this be replicated for the River Hull SSSI as potential mitigation for settlement impacts from HDD? Applicant would need to provide certainty that this would be successful at mitigating the impacts.</i>	N	N/A	The Applicant has committed to carrying out a hydrogeological risk assessment where it crosses sensitive sites, including where it crosses the River Hull Headwaters SSSI. This will inform a specific crossing method statement which would be agreed in advance of construction, with the relevant stakeholders. In the case of the River Hull Headwater SSSI, this will include Natural England. The HDD (or other trenchless method) can be achieved within the 60 m permanent easement identified in the Project Description, and the specific depth of the HDD will be agreed with Natural England, among other stakeholders, prior to construction.
S42_0052_10.6	Natural England	An assumption is made that crossing the River Hull Headwaters SSSI will take place using HDD, with a detailed methodology to be agreed at a later date. Certainty is needed that HDD methods will not impact SSSIs. It is not clear why ground investigations have not been carried out in advance to help determine the route.	I	N/A	The Applicant has committed (Co18) to installing the onshore export cables a minimum of 1.2 m below the hard bed of any watercourses to be crossed by HDD (or other trenchless technology), including the River Hull Headwaters SSSI. Where EA flood defences are present, a minimum of 1.2m vertical clearance will be maintained between the hard bed of the watercourse and landward toe of any associated flood defences. In recognition of potentially more sensitive sites, including

					<p>the River Hull Headwaters SSSI, The Applicant has committed to undertaking a pre-construction hydrogeological risk assessment, to inform a site-specific crossing method statement which will also be agreed with the relevant stakeholders. As such the optimal clearance depth beneath the River Hull Headwaters will be agreed with Natural England prior to construction.</p> <p>Additionally, as the River Hull Headwaters SSSI is an EA Main River, The Applicant has committed to locating the entry and exit pits a minimum of 20 m from the surface watercourse or the landward toe of any associated flood defence (Co18). As the detailed risk assessment and method statement for crossing the River Hull Headwaters SSSI will be agreed with stakeholders, including Natural England, prior to construction, ground investigations are not required at this stage.</p>
S42_0052_10.10	Natural England	<p>Cables, joint bays and link boxes will be left in place after decommissioning (for 35 years). This could impact the hydro-geomorphology of the River Hull Headwaters SSSI. It is unclear if the standoff of 9m for cables and 20m for joint bays and link boxes is sufficient to maintain the hydro-geomorphology of the river indefinitely.</p> <p><i>NER: A hydro-geomorphology survey is required to determine the stand-off required. The survey will also be able to ascertain whether the cables need to be buried deeper for the 35-year period. The survey should factor in environmental change (e.g. climate change).</i></p>	N/A	N/A	<p>In recognition of potentially more sensitive sites, including the River Hull Headwaters SSSI, The Applicant has committed to undertaking a pre-construction hydrogeological risk assessment, to inform a site specific crossing method statement which will also be agreed with the relevant stakeholders, including Natural England (Co18).</p> <p>Additionally, as the River Hull Headwaters SSSI is an EA Main River, The Applicant has committed to locating the entry and exit pits a minimum of 20 m from the surface watercourse or the landward toe of any associated flood defence (Co18). As the detailed risk assessment and method statement for crossing the River Hull Headwaters SSSI will be agreed with stakeholders, including Natural England, prior to construction, ground investigations are not required at this stage.</p> <p>The Applicant is in consultation with Natural England in relation to potential impacts in relation to the lateral</p>

					movement of the River Hull Headwaters SSSI. Subsequent updates on this position are summarised in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.
S42_0052_10.2 5	Natural England	There is no recognition of the severe risk the project poses to the River Hull Headwaters SSSI through the introduction of Invasive Non-Native Species.  <i>NER: Carry out a biosecurity risk assessment.</i>	I	N/A	<a href="#">Volume F2.2 Outline CoCP</a> states that an 'Onshore Biosecurity Protocol' will be developed post-consent as part of the Code of Construction Practice (and approved under DCO Requirement 16) upon the appointment of a Principal Contractor and Ecological Clerk of Works (ECoW). The Protocol will be used and implemented to minimise the risk of spreading invasive species.
S42_0052_10.1 5	Natural England	States that whilst several crossings are located in tributaries on the river Hull Headwaters SSSI, these don't directly interact with the main river. This is inaccurate - there is a direct connection to the SSSI through the water from the tributaries.  <i>NER: Recognise the link (and impacts) between the tributaries and the SSSIs.</i>	N	N/A	In this instance the reference being made is to the location of the Hornsea Four watercourse crossing. Here, although the Hornsea Four crossing is on a tributary to the River Hull Site of Special Scientific Interest (SSSI), it is not classified as a Main River and therefore is subject to different flood risk guidance and policy.  <a href="#">Volume 3, Chapter 2: Hydrology and Flood Risk</a> of the PEIR states that there will be no direct interaction with the River Hull Headwaters SSSI, and acknowledges that indirect effects could occur if connected watercourses (i.e. tributaries) are affected. As detailed in <a href="#">Volume 3, Chapter 2</a> the mitigation measures embedded within the scheme design and described in full in the Hydrology and Flood Risk Chapter ( <a href="#">Volume A3, Chapter 2</a> ) and secured via the <a href="#">Commitments Register (Volume A4, Annex 5.2)</a> mean that any impacts on the hydrology, geomorphology and water quality of the tributaries would be short term, reversible and insignificant in EIA terms. They would also be insufficient to result in deterioration in water body status under the Water Framework Directive (See <a href="#">Volume A6, Annex 2.3</a> for further details). They are therefore not considered to result in any changes to the condition of the River Hull Headwaters SSSI.
S42_0052_10.1 6	Natural England	SSSIs have higher WQ standards than other water bodies, yet the assessment treats them in the same way. It is not clear what			<a href="#">Volume 3, Chapter 2: Hydrology and Flood Risk</a> of the PEIR states that there will be no direct interaction with the River Hull Headwaters SSSI, and acknowledges that

the impacts are, how they will be mitigated and how they have arrived at the conclusion that the mitigation is sufficient.

*NER: Recognise the importance of SSSIs and carry out the required surveys to provide certainty that there are no impacts.*

indirect effects could occur if connected watercourses (i.e. tributaries) are affected. As detailed in [Volume 3, Chapter 2](#) the mitigation measures embedded within the scheme design and described in full in the [Hydrology and Flood Risk Chapter \(Volume A3, Chapter 2\)](#) and secured via the [Commitments Register \(Volume A4, Annex 5.2\)](#) mean that any impacts on the hydrology, geomorphology and water quality of the tributaries would be short term, reversible and insignificant in EIA terms. They would also be insufficient to result in deterioration in water body status under the Water Framework Directive (See [Volume A6, Annex 2.3](#) for further details). They are therefore not considered to result in any changes to the condition of the River Hull Headwaters SSSI.

Impacts on the watercourses which make up the River Hull Headwaters SSSI have been considered alongside impacts on all other surface water receptors, recognising that the drainage network is a connected and contiguous system. As such the importance of the River Hull Headwaters SSSI and connected watercourses in comparison with other non-designated watercourses is recognised through the assignment of receptor value and sensitivity, which is defined as high in [Volume A3, Chapter 2: Hydrology and Flood Risk](#).

The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 have been referenced as appropriate WFD compliance assessment ([Volume A6, Annex 2.3](#)). These apply to all water bodies and do not distinguish between SSSIs and non-designated rivers. Ørsted is in consultation with Natural England, and will consider additional water quality standards in the Environmental Statement if these are provided by Natural England.

EIA topic area: Ecology and Nature Conservation

Comment ID (consultation _response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitmen t (1o/Change / New or N/A)	Applicant Response
S42_0049_00 8	The Wildlife Trusts and Yorkshire Wildlife Trust	<u>Habitat Restoration</u>  Furthermore, the commitments register includes the proposed enhancement of habitats post construction as per the Landscape Management Plan, which is not provided at this time. Again, further clarification would be appreciated over how this will be achieved. We would assume most of the land will be returned to agricultural land; hence we would appreciate confirmation of this assumption and how a net gain in biodiversity can be achieved through restored habitat as per the NPPF. This should, as a minimum, include enhancements of hedgerows, field margins and grassland to be impacted by works. A timeline of when habitats are expected to be restored would also be helpful to assess the overall impacts of the scheme.	I	N	The Applicant has submitted and Outline Enhancement Strategy ( <a href="#">Volume F2, Chapter 14: Outline Enhancement Strategy</a> ) and Outline Net Gain Strategy ( <a href="#">Volume F2, Chapter 16: Outline Net Gain Strategy</a> ) as part of its DCO Application.
S42_0049_00 9	The Wildlife Trusts and Yorkshire Wildlife Trust	<u>Badgers - CONFIDENTIAL</u>  We appreciate the provision of the preliminary badger report by Orsted. Whilst we recognise that low level of activity has been identified thus far, we would like to reiterate that badgers tend to be highly under recorded in ERoY. We would therefore appreciate the implementation of a precautionary approach, with consideration made to the fragmentation of territories and	Y	New	The Applicant notes this comment

		loss of foraging habitats for clans of badgers within the vicinity of works. This should be achieved by implementing a sufficient survey buffer around the ECC route during survey.			
S42_0049_010	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Bats</u></p> <p>5.2.2.2 of the EPIHS states that no nocturnal surveys will be undertaken of structures considered to have low roosting potential. Under the BCT guidance, these structures must still be subject to a single nocturnal survey and we would be encouraged to see this amendment within the methodology.</p> <p>We would also wish consideration for the impacts of construction and operational lighting on bats to be included within the commitments register. This should include the retention of dark corridors along hedgerows and watercourses with a further sensitive lighting scheme also implemented.</p>	I	N/A	<p>The BCT guidance states that features (i.e. structures) assessed as having low suitability should be surveyed at least once. The Applicant can confirm that no 'structures' have been assessed as having low suitability for supporting bats a result, no such surveys were required. This was confirmed and agreed with the Yorkshire Wildlife Trust on 9th October 2019 (pers. comm), and with Natural England, the Environment Agency and the Environment Agency at the fifth onshore Ecology Evidence Plan Technical Panel meeting on Wednesday 13th November 2019.</p> <p><b>Volume F2.3 Outline Ecological Management Plan</b> states that where pre-construction surveys identify a bat roost, and where construction is being undertaken in the nearby surrounding area, construction lighting will be designed in accordance with the Institute of Lighting Engineers (ILE) Guidance Note 8 Bats and Artificial Lighting. Similarly, although night working will not be scheduled as part of the normal construction programme and will only be undertaken in exceptional circumstances, if it is avoidable, light fixtures will be directed away from habitats of value or otherwise notable species (see <b>Volume F2.2 Outline Code of Construction Practice</b>).</p>
S42_0049_011	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Birds</u></p> <p>The OEMP (3.3.1.7) states that ground nesting birds will be deterred within the works footprint. Whilst we appreciate the proposed methodology, we would</p>	N/A	N/A	<p>An updated Onshore Ornithology - <b>Wintering and Migratory Bird survey report (Volume A6, Annex 3.3), a full Breeding Bird survey report (Volume A6, Annex 3.4)</b> and related impact assessment and any proposed mitigation (<b>Volume A3, Chapter 3</b>) will be provided with the</p>



		<p>wish to see confirmation over the area in which this will be undertaken and an assessment of the potential cumulative impacts the methods will have upon these species. We would also like further confirmation over how the locations and period for both over-wintering species and breeding species will minimise impacts. As the proposals are stated to take up to 32 months this will affect up to three seasons; therefore, clarification over the considered impact upon species present in these, and surrounding areas must be taken into account. A timeline and assessment of length of impact and loss of habitat would be required. Consideration of impacts to flight paths over construction routes and buffers for disturbance would also be appreciated.</p> <p>The importance for habitats for farmland birds, including those of UK conservation concern, must not be understated.</p>			ES.
S42_0049_01 2	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Otter</u></p> <p>The PEIR has highlighted that otter may be present within the surveyed area and an artificial holt may be required. We would appreciate further information to be provided to the status of otters within the footprint of the route and the requirement for an artificial holt to be constructed. Detail of the design and location must also be provided, as necessary.</p>	N/A	N/A	No Otters were recorded within the Hornsea Four Otter survey area, and therefore no requirement for an artificial holt is anticipated at this time. Further details on the Hornsea Four otter surveys can be available at request in <a href="#">Volume A6, Annex 3.7 Otter Survey Report</a> (confidential).
S42_0049_01 3	The Wildlife Trusts and Yorkshire	<p><u>Water Voles</u></p> <p>We would wish confirmation that all watercourses will be subject to HDD.</p>	N/A	N/A	The Applicant has committed to using HDD (or other trenchless technologies) to cross all EA Main Rivers and IDB maintained drains (Co1). Where using HDD (or other trenchless

	Wildlife Trust	There is suggestion within the assessment for water voles (OEMP) that open trench techniques may be utilised, providing conflicting information to the commitments of Hornsea 4.			technologies) is not possible, watercourses may be crossed by open cut methods.  The ditches identified as having habitats potentially suitable for supporting water voles have been identified, mapped and surveyed in <a href="#">Volume A6, Annex 3.6 Water vole Survey Report</a> and any related impacts have been assessed in <a href="#">Volume A3, Chapter 3 Ecology and Nature Conservation</a> . The maximum design scenario (MDS) for the crossing of any one watercourse to be crossed has been assessed. For example, where The Applicant has committed to using HDD to cross certain watercourses (see Co1) the MDS will be HDD. For all other watercourse being assessed in relation to watercourses the MDS would be 'open cut,' as Hornsea Four proposes to retain the flexibility to use HDD or open cut. Full details on the proposed cross methodology for all watercourses can be found in <a href="#">Volume A4, Annex 4.2 Onshore Crossing Schedule</a> .
S42_0049_014	The Wildlife Trusts and Yorkshire Wildlife Trust	<u>Other</u>  We would appreciate the consideration for S41 species and local BAP species within the habitats on site. This may be achieved through the implementation or precautionary working methods.			The Applicant has engaged in further consultation with the Yorkshire Wildlife Trust in relation to the consideration for S41 species and local BAP species within the habitats on site.
S42_0049_006	The Wildlife Trusts and Yorkshire Wildlife Trust	Overall Yorkshire Wildlife Trust is happy with the approach that Orsted has taken to assessing the onshore ecological impacts of the scheme and the commitments put forward to mitigate these effects. We are also pleased to be consulted and involved with the evolution of these documents with regular meetings to discuss the proposals. However, we have a few	N	N/A	The Applicant notes this comment.

		outstanding queries with regards to this PEIR. These are outlined below, and we would appreciate clarification on these matters from Orsted.			
S42_0049_007	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>ECC Route</u></p> <p>We would like some further information over what constitutes a 'permanent footprint' for the cable route. Whilst we appreciate that the working route is 80m, the 'up to 60m permanent footprint' suggests that habitat cannot be restored in this area. We would therefore appreciate clarification over the area which will be restored.</p> <p>We would also appreciate the inclusion within PEIR that any LWS, or other designated sites and priority habitats, within the footprint of the ECC will also be subject to HDD. The information currently provided only identifies SSSI's to be subject to this methodology, although there is suggestion otherwise within the commitments register.</p> <p>We would appreciate confirmation over the 'low value habitats' to be subject to impacts by the scheme. It is our view that any areas of woodland, scrub or ruderal vegetation should be considered at least of moderate value; with hedgerows, watercourses and designated sites (including LWS) of high value. Consideration for the presence of keystone species within these habitats should also be considered. For instance, brown hare, a UK BAP species is highly reliant on woodland</p>	Y	N/A	<p>The Hornsea Four onshore ECC is where the permanent onshore electrical cable infrastructure will be located and the Hornsea Four onshore substation, including energy balancing infrastructure, is where the permanent onshore electrical substation infrastructure (onshore HVDC converter/HVAC substation, energy balancing infrastructure and connections to the National Grid) will be located.</p> <p>The 'permanent' footprint of the onshore export cable corridor (ECC) will be a maximum of 60 m within the 80 m onshore ECC which constitutes the Hornsea Four Order Limits. The only exception to this, is where Hornsea Four crosses the Hull to Bridlington Railway line, near Beswick. Here the maximum permanent footprint may extend up to 120 m in width.</p> <p>Reinstatement of temporary working areas will be undertaken as soon as is practicable after installation of the cables. Replacement planting will comprise native shallow-rooting hedgerow species typical of the local area and existing landscape, planted as 40 – 60 cm high whips (or larger), protected with spiral rabbit guards or other forms of protection from grazing. To prevent future root damage to cables, no trees will be planted within the cable easement of the onshore ECC.</p> <p>All land within the onshore ECC, will be reinstated to its pre-existing condition, as far as reasonably practical. Link boxes, which may have manhole covers, may be required nearby to the transition bays for operational access.</p>

		<p>during periods of poor weather; and hedgerows which most farmland birds, including those species of UK conservation concern such as linnet and yellowhammer, are highly reliant. Areas of scrub and ruderal must also not be undervalued for their value to these species.</p>		<p>The Applicant has committed to avoiding all ecologically designated sites (including LWS) and priority habitats (Co2). Where avoidance has not been possible, as is the case for the River Hull Headwaters SSSI, The Applicant has committed to using HDD to cross this designation. In relation to Local Wildlife Sites, the Applicant retains the option to open cut or use HDD (or other trenchless technologies), and will agree this with ERYC when required.</p> <p>The removal of hedgerows and trees will be limited where possible, however where removal is required, they will be replaced with species-rich and locally appropriate native species (Co26), in order to limit any impacts on the local environment. Further ecological mitigation measures for the pre-construction, construction, and post-construction phases of the project have been provided in <a href="#">Volume F2.3 Outline Ecological Management Plan</a>, covering trees, hedgerows, birds and badgers, for example.</p>
S42_0052_IN T2.6	Natural England	<p><b>Onshore ecology</b></p> <p>The information contained in this PEIR is too general and non-specific to be able to make any detailed comments regarding the hydrology, ecology and air quality impacts of the proposal. The specifics of actual works to be undertaken and the results of surveys in those areas will be needed to be able to comment. These surveys have been identified as being planned or undertaken in the PEIR and will form part of the ES.</p> <p>Similarly to Marine Processes the impact of the WCS has not been assessed on a receptor level, such as impacts on SSSIs and ancient</p>		<p>At the point of Application and since the publication of the PEIR, baseline surveys for all areas within the Hornsea Four Order Limits has been collected, All baseline surveys undertaken to inform the Application are reported in standalone survey specific survey reports, which are submitted as part of <a href="#">Volume A6</a> of the DCO Application.</p> <p>The findings of all baseline surveys undertaken to date have been used to inform the ecological impact assessment presented in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p> <p>Cosultation with Natural England on all baseline surveys and their results has been undertaken, with agreements reached. Natural England has reviewed all ecology related documents that</p>

		woodlands. The detailed methodologies for the works and their precise location will be necessary to determine any impact on protected sites or species, as well as to ensure that appropriate mitigation measures can be identified where appropriate. Natural England will provide our full nature conservation advice on the terrestrial ecology and nature conservation topics once the survey data is available to ensure that what has been proposed in relation to the scale of any impacts and mitigation measures remains fit for purpose.			form part of the DCO Application.
S42_0052_10.3	Natural England	<p>Access road design has not yet finalised, two of the access roads are close to River Hull Headwaters and Bryan Mills Field SSSI. One access road is directly next to an ancient woodland. The design of these access roads could impact the SSSIs and the ancient woodland.</p> <p><i>NER: Require certainty that design will not impact SSSIs.</i></p>	Y	N/A	<p>The Applicant is engaging with Natural England on the specific impacts which might be anticipated from the construction and/ or design of the access tracks nearest to the River Hull Headwaters and the Bryan Mills Field SSSIs. Subsequent updates on this position are summarised in <a href="#">Chapter 12 of Volume B1, Chapter 1: Consultation Report</a> and complete impact assessments on potential impacts have been provided in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p> <p>Between the publication of the PEIR and the ES, the permanent access track for the OnSS has been moved approximately 100 m away from the Birkhill Wood ancient woodland. This was discussed and met with the approval of Natural England in an onshore Ecology Evidence Plan Technical Panel meeting on 13th November 2019.</p>

S42_0052_10 .5	Natural England	<p>Target depth of cable is only 1.2m, this could have implications for hydro-geomorphology of the River Hull Headwaters SSSI.</p> <p><i>NER: Requires a hydro-geomorphology survey to demonstrate that 1.2m will not impact lateral movement of River Hull Headwaters SSSI.</i></p>	N/A	N/A	<p>The Applicant has committed (Co18) to installing the onshore export cables a minimum of 1.2 m below the hard bed of any watercourses to be crossed by HDD (or other trenchless technology), including the River Hull Headwaters SSSI. Where EA flood defences are present, a minimum of 1.2m vertical clearance will be maintained between the hard bed of the watercourse and landward toe of any associated flood defences. In recognition of potentially more sensitive sites, including the River Hull Headwaters SSSI, The Applicant has committed to undertaking a pre-construction hydrogeological risk assessment, to inform a site-specific crossing method statement which will also be agreed with the relevant stakeholders. As such the optimal clearance depth beneath the River Hull Headwaters will be agreed with Natural England prior to construction.</p> <p>Additionally, as the River Hull Headwaters SSSI is an EA Main River, The Applicant has committed to locating the entry and exit pits a minimum of 20 m from the surface watercourse or the landward toe of any associated flood defence (Co18).</p> <p>The Applicant is in consultation with Natural England in relation to potential impacts in relation to the lateral movement of the River Hull Headwaters SSSI. Subsequent updates on this position are summarised in <a href="#">Chapter 12 of Volume B1, Chapter 1: Consultation Report</a> and complete impact assessments on potential impacts have been provided in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p>
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S42_0052_10 .7	Natural England	<p>One of the access roads passes next to ancient woodland (Birkhill Wood). Method will strip topsoil and there are plans to make it a permanent road. It is likely that it will damage the ancient woodland (an irreplaceable habitat) and it contravenes Natural England's standing advice on ancient woodland.</p> <p><i>NER: Consider Natural England's standing advice on ancient woodland and apply it to the access road next to Birkhill Wood.</i></p>	Y	N/A	<p>Between the publication of the PEIR and the ES, the permanent access track for the OnSS has been moved approximately 100 m away from the Birkhill Wood ancient woodland. This was discussed and met with the approval of Natural England in an onshore Ecology Evidence Plan Technical Panel meeting on 13th November 2019.</p>
S42_0052_10 .8	Natural England	<p>Natural England welcome the use of ground investigations, but these should be available prior to determination, particularly for designated sites and ancient woodland. Without this information there is uncertainty about the potential impacts.</p> <p><i>NER: Carry out the required surveys to provide certainty that there are no impacts to the SSSIs and ancient woodland.</i></p>	N	N/A	<p>The Applicant has committed (Co18) to installing the onshore export cables a minimum of 1.2 m below the hard bed of any watercourses to be crossed by HDD (or other trenchless technology), including the River Hull Headwaters SSSI. Where EA flood defences are present, a minimum of 1.2m vertical clearance will be maintained between the hard bed of the watercourse and landward toe of any associated flood defences. In recognition of potentially more sensitive sites, including the River Hull Headwaters SSSI, The Applicant has committed to undertaking a pre-construction hydrogeological risk assessment, to inform a site-specific crossing method statement which will also be agreed with the relevant stakeholders. As such the optimal clearance depth beneath the River Hull Headwaters will be agreed with Natural England prior to construction.</p> <p>Additionally, as the River Hull Headwaters SSSI is an EA Main River, The Applicant has committed to locating the entry and exit pits a minimum of 20 m from the surface watercourse or the landward toe of any associated flood defence</p>

					<p>(Co18). As the detailed risk assessment and method statement for crossing the River Hull Headwaters SSSI will be agreed with stakeholders, including Natural England, prior to construction, ground investigations are not required at this stage.</p> <p>Between the publication of the PEIR and the ES, the permanent access track for the OnSS was moved approximately 100 m away from the Birkhill Wood ancient woodland. This was discussed and met with the approval of Natural England in an onshore Ecology Evidence Plan Technical Panel meeting on 13th November 2019.</p> <p>The Applicant is in continued consultation with Natural England in relation to potential impacts in relation to the River Hull Headwaters SSSI. Subsequent updates on this position are summarised in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p>
S42_0052_10 .13	Natural England	<p>Where there is a risk to the quality and/or function of the SSSI, the sensitivity should be considered very high (most only state high).</p> <p><i>NER: Change sensitivity to very high and alter mitigation as required.</i></p>	N	N/A	<p><a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement presents the findings from the ecological impact assessment that has been undertaken. In accordance with <a href="#">Table Error! No text of specified style in document..1: Definition of terms relating to receptor value and/or importance</a>, statutory designated sites are assigned a high sensitivity. This approach has been agreed with Natural England.</p> <p>A desk-based review of the existing environment in relation to the presence of geological SSSIs</p>



					<p>has been undertaken to inform the ES and presented in <a href="#">Volume A3, Chapter 1: Geology and Ground Conditions</a>. No geological SSSIs fall within or up to 1 km of the Hornsea Four onshore Order Limits. Therefore, any potential impacts on geological SSSIs have been scoped out. This conclusion has been agreed with Natural England through the Technical Panel Meeting process.</p> <p>The value and sensitivity criteria for water receptors presented in the <a href="#">Hydrology and Flood Risk PEIR Chapter (Volume 3 Chapter 2)</a> are in accordance based on the established best practice guidance provided in the Design Manual for Roads and Bridges (2019). In this context, we have interpreted “very high” sensitivity to refer to internationally designated sites (e.g. SAC, SPA) and “high” sensitivity to refer to nationally designated sites (e.g. SSSI). We have therefore assigned the River Hull Headwaters a high sensitivity. Note that all potential impacts on the SSSI have been scoped out of the ES chapter based on the project commitments and consultation with stakeholders as part of the PEIR process. Agreement from stakeholders (including Natural England) has been obtained on the impact assessments presented in the Environmental Statement.</p>
S42_0052_10.18	Natural England	States that Birkhill Wood is 150m away from the works, but it is actually 0m when considering the proposed access road.	Y	N/A	<p>Since the publication of the PEIR, the permanent access track for the OnSS has moved to be approximately 15 m from Birkhill Wood ancient woodland.</p> <p>This 15 m buffer is in accordance with Natural England’s standing advice and as agreed with Natural England at the Technical Panel Meeting held on the 1st April 2020.</p>

S42_0052_10 .41	Natural England	<p>Only 50% of the project area had a phase 1 ground survey the rest was done by aerial photography.</p> <p><i>NER: For a project of this size it would have been relatively efficient and cost effective to carry out some ecological modelling for habitats that couldn't be surveyed (provided that the initial data was collected at the right time of the year).</i></p>	N/A	N/A	<p>Subsequent to the submission of the PEIR, additional land access has been obtained and the entire area within the Hornsea Four Order Limits has been subject to an Extended Phase 1 Habitat Survey. The findings of which have been used to inform the Phase 2 ecology species-specific surveys. Findings from the Extended Phase 1 Habitat Survey is presented in <a href="#">Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report, Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables</a>.</p>
S42_0052_10 .47	Natural England	<p>Natural England disagree with a number of points that have been scoped out. HFR-C-1, HFR-C-6, HFR-D-9, HFR-C-12, HFR-O-13 (and to a lesser extent HFR-C-3, HFR-C-5) all have the potential to significantly impact the River Hull Headwaters SSSI.</p> <p>The River Hull Headwaters is a mostly natural river. There is an expectation that river SSSIs are allowed to flow and meander naturally. The stand-off for HDD is only 9m (and 20m for Joint Bays &amp; link boxes) and it is unknown if 9m will be sufficient to allow the river to meander without impediment in perpetuity.</p> <p>There is no evidence provided that the mitigation will be sufficient to prevent impacts. A hydro-geomorphology survey would determine whether the river can continue to function (laterally) during the operational phase and after decommissioning. It could also help to determine if a depth of 1.2m under the bed of the river is sufficient to</p>	N	N/A	<p>A walkover survey to identify the main geomorphological characteristics of the main rivers and Water Framework Directive water bodies which directly intersect with the onshore project area was undertaken in March 2019 (including those that form part of or drain into the River Hull Headwaters SSSI). This considered factors such as flow conditions, channel form, floodplain characteristics and evidence of channel modification. The findings of the survey are detailed in <a href="#">Volume A6, Annex 2.1: Geomorphological Baseline Survey Report</a>.</p> <p>Parts of the Upper River Hull catchment, including Lowthorpe / Kelk / Foston Beck and West Beck, are designated as part of the River Hull Headwaters SSSI because they retain the natural characteristics of a chalk river (e.g. shallow banks, clear flows and course substrates with a low proportion of silts and clays). However, most of the chalk rivers have been historically widened and deepened and as such are in sub-optimal condition. This is reflected in the River Hull Headwaters SSSI Condition Assessment, which states that at the most recent assessment, most of the SSSI units were considered to be in unfavourable condition.</p> <p>The low-energy conditions observed in the majority of the watercourses in the study area,</p>

allow natural functioning and to prevent an increase in temperature.

The SSSI is also at risk from water quality issues from sediment, nutrients and heavy metal pollutants. HDD can use a variety of complex fluids. There is a risk to the SSSI from these fluids through a drilling fluid return/formational drilling fluid loss etc.

It's unclear how large the entry and exit points for HDD, joint bays and links boxes. There is a risk that these could drawdown water from the SSSI.

Hydraulic fractures (or a 'frac-out') could cause a significant impact. Certain soils/geology are more prone to frac-outs and also where there is variation in the soils. The SSSI does appear to have these higher risk soils and a great deal of variation, from the citation:

The upper tributaries of the River Hull originate on the edge of the chalk Wolds and enter an alluvial flood plain with drift deposits of boulder clay and occasional pockets of sand and gravel within a few miles of their source. This surface geology influences the character of the river with gravel, sand and silt sediments deposited on the riverbed in varying proportions.

An investigation of the soils can reduce the chances of a frac-out occurring but this should be carried out prior to the application, to

including the chalk rivers, reflect the naturally low gradient of the systems and the extensive modifications that were undertaken to improve land drainage, facilitate milling and navigation, and improve flood defences during the eighteenth and nineteenth centuries (Royal Haskoning, 2010). These modifications include channel enlargement and straightening, the installation of weirs and locks, and the construction of flood embankments (often on both sides of the channel). As a result of these modifications and the prevailing low energy conditions, the watercourses in the study area are largely stable and do not display significant evidence of lateral instability (i.e. changes in channel planform) since the First Edition OS mapping was produced in 1851. This is only with the exception of the West Beck to the west of the village of Wansford, where meanders have widened as a result of localised bank erosion (Royal Haskoning, 2010). Moreover, no significant evidence of vertical instability (i.e. incision) have been observed (Royal Haskoning, 2010).

Hornsea Four has now committed to locating joint bays and link boxes a minimum 20 m offset during construction (see Co170). The final offset between the river channel and permanent infrastructure (including buried cabling) will be defined during the detailed design stage with reference to the hydrogeological risk assessment. The scope of the assessment will be agreed in consultation with the EA and Natural England prior to the commencement of the assessment, and the results will be used to agree a suitable burial depth beneath and adjacent to the SSSI river (Co18). The low rates of lateral and vertical migration observed to date mean that the presence of buried infrastructure is unlikely to constrain the

		<p>determine whether the SSSI will be damaged. HDD can also cause settlement, this could impact the hydrology and/or hydro-geomorphology of the site.</p> <p>It appears the SSSI has been treated with the same standards as other non-designated watercourses. The documentation should provide more specific details on how impacts on the SSSI will be avoided/mitigated.</p> <p>Without the phase 1 survey complete around the River Hull Headwaters SSSI, there is also uncertainty as to the impacts on the eco-hydrology of any potential designated habitats. Many of the concerns above also apply to Bryan Mills Field SSSI. The project has the potential to impact the eco-hydrology of the site. It is not clear what potential pathways and mitigation are in place to prevent impacts.</p> <p><i>NER: Carry out the required surveys to provide certainty that there are no impacts to the SSSIs.</i></p>			<p>adjustment of the River Hull Headwaters SSSI within (and beyond) the lifetime of the development.</p> <p>Impacts on the watercourses which make up the River Hull Headwaters SSSI have been considered alongside impacts on all other surface water receptors, recognising that the drainage network is a connected and contiguous system. As such the importance of the River Hull Headwaters SSSI and connected watercourses in comparison with other non-designated watercourses is recognised through the assignment of receptor value and sensitivity, which is defined as high in <a href="#">Volume A3, Chapter 2: Hydrology and Flood Risk</a>.</p>
S42_0052_10.1	Natural England	<p>There is not enough evidence to determine a baseline. The lack of evidence means that impacts have not been identified and that mitigation is inadequate. SSSIs and ancient woodland have been treated with the same standards as other habitats, with no specific surveys and very few specific measures to address impacts.</p> <p><i>NER: More evidence is required to</i></p>	N/A	N/A	<p>The Applicant has engaged in further consultation with Natural England in relation to baseline updates and the relevant SSSIs and ancient woodland. Subsequent updates on this position are summarised in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p>

		<p><i>provide certainty that the route is the most sustainable option and that designated sites and ancient woodland will not be adversely impacted by the scheme.</i></p>			
S42_0052_10.27	Natural England	<p>The citation for the River Hull Headwaters SSSI states: The river valley supports a diverse breeding bird community, including several waders such as lapwing, snipe and redshank, wildfowl, particularly mallard and mute swan, together with yellow wagtail, sedge warbler, reed warbler, reed bunting and many more widely occurring species. The impacts to this assemblage of breeding birds need to be assessed and mitigation proposed if necessary.</p> <p><i>NER: Breeding bird survey around the SSSI is required.</i></p>	I	N/A	<p>A wintering and migratory bird survey and breeding bird survey was undertaken between November 2018 and March 2019, and between April and June 2019 (inclusive), respectively. Vantage Point 24 of the over-wintering birds survey is situated adjacent to the River Hull Headwaters SSSI (south west of Brigham). A technical note providing the locations and the preliminary results were provided to Natural England on 8th April 2019, on which no comments have subsequently been received from Natural England.</p> <p>The baseline data was incomplete at the point that the PEIR was submitted, as discussed with Natural England through the Evidence Plan Technical Panel meetings held on 8th April and 9th July. In these meetings, it was agreed that where sufficient baseline was available, the baseline technical reports would be provided at PEIR, but that no assessments were to be provided. As such, a baseline technical report was provided for the onshore ornithology - wintering and migratory bird survey.</p> <p>An updated Onshore Ornithology - <a href="#">Wintering and Migratory Bird survey report (Volume A6, Annex 3.3)</a>, a full <a href="#">Breeding Bird survey report (Volume A6, Annex 3.4)</a> and related impact assessment and any proposed mitigation (<a href="#">Volume A3, Chapter 3</a>) will be provided with the ES.</p>

S42_0052_10 .25	Natural England	<p>One of the access roads that passes next to ancient woodland (Birkhill Wood). It is likely that it will damage the ancient woodland (an irreplaceable habitat) and it contravenes Natural England's standing advice on ancient woodland.</p> <p><i>NER: Consider Natural England's standing advice on ancient woodland and apply it to the access road next to Birkhill Wood.</i></p>	Y	N/A	<p>Since the publication of the PEIR, the permanent access track for the OnSS has moved to be approximately 15 m from Birkhill Wood ancient woodland.</p> <p>This 15 m buffer is in accordance with Natural England's standing advice and as agreed with Natural England at the Technical Panel Meeting held on the 1st April 2020.</p>
S42_0052_10 .11	Natural England	<p>States that a 'worst case scenario' (WCS) will be used for the methodology, however, this is not evident in the impacts register nor the methodology of the various chapters. For example:</p> <ul style="list-style-type: none"> <li>• The baseline data for the project is very poor, this means that we must assume that a WCS will have very significant impacts. This is not reflected in the documentation;</li> <li>• The impacts register scopes out a large number of impacts. But under a WCS these impacts should be scoped into the project.</li> </ul> <p>Volume 3, Chapter 3: Ecology and Nature Conservation sets a 50m buffer either side of the route. The purpose of this buffer is not clear. If this 50m buffer shows by how much the route could vary, then the figures presented do not represent the actual the WCS within the Maximum Design Scenario.</p> <p><i>NER: Review impact register, methodology chapter and figures to ensure that WCS.</i></p>	N/A	N/A	<p>At the point at which the PEIR was submitted, Hornsea Four provided the parameters which constitute the Maximum Design Scenario (MDS) and which are considered to be the worst-case construction, operation and/or decommissioning parameters used to inform the assessment. These were provided in <a href="#">Table 3.13 of PEIR Volume 3: Ecology and Nature Conservation</a>, for all potential impacts identified through the Scoping and PEIR processes. The baseline data was incomplete at the PEIR, as discussed with Natural England through the Evidence Plan Technical Panel meetings held on 8th April and 9th July. In these meetings, it was agreed that where sufficient baseline was available, the baseline technical reports would be provided at PEIR, but that no assessments were to be provided. As such, baseline technical reports were provided for the Extended phase 1 habitat survey, onshore ornithology - wintering and migratory bird survey, great crested newt survey, and the badger survey (available on request).</p> <p>Since the publication of the PEIR, landowner access has been obtained for the entire area within the Hornsea Four Order Limits and all agreed baseline ecological surveys completed.</p>

					<p>The findings of which have been used to inform the ecological assessment presented in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement. Agreement of the survey scope, results and findings has been obtained from stakeholders (including Natural England) through the Technical Panel meetings held since the PEIR publication and the submission of the DCO Application.</p> <p>Any updates to the MDS and full assessment of potential impacts are presented in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p> <p>No additional impacts have been identified by technical specialists in relation to the construction, operation and/or decommissioning of Hornsea Four between Scoping and the submission of the PEIR. Similarly, the impacts 'Scoped out' at Scoping, and those assessed at PEIR but 'Not considered in detail in the ES [as] No likely significant effect[s were] identified at PEIR', and those to be assessed in the ES were agreed with Natural England at the onshore Ecology Evidence Plan Technical Panel meeting on 13th November 2019.</p>
S42_0052_10.40	Natural England	<p>States that there is an additional 50m buffer. It is unclear if this means that it could be 50m closer to a SSSI and/or another habitat. This could change which sites should be in scope for the project and the results presented may not be precautionary.</p> <p><i>NER: Clarify whether the route may vary by up to 50m, if so change the scope and figures to show a WCS.</i></p>	N	N/A	<p>The Extended Phase 1 Habitat Survey Report includes a 50 m survey buffer in order to give an understanding of the ecological surroundings of the Hornsea Four Order Limits. The Hornsea Four pre-DCO boundary (submitted at PEIR) has been refined between PEIR and DCO. Where relevant changes have been described and explained in the technical reports and/ or Chapters which form the Environmental Statement submitted at DCO submission.</p>

S42_0052_10 .42	Natural England	<p>Survey carried out in February; this is not an appropriate time to carry out a survey. The survey could have missed key species and led to an incorrect assessment of condition. This could affect the assessment of significance of impacts and it means no habitats have been identified for a phase 2 survey (those identified in table 9).</p> <p>NER: Carry out surveys at an appropriate time of the year.</p>	N	N/A	<p>The approach to baseline surveys, including their proposed survey timings, was discussed and agreed with Natural England through the Evidence Plan Technical Panel meetings held on the 8th January. It was highlighted that landowner access was a determining factor in when the surveys were carried out. Due to landowner access limitations, 50% of the Hornsea Four boundaries was surveyed in February with approximately the remaining 49% subsequently surveyed in August/September 2019 (see <a href="#">Volume A6, Annex 3.1</a>, and <a href="#">Volume A6, Volume 3.2</a> for further details). Limitations associated with all baseline surveys is acknowledged and discussed in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement. Based on professional judgment it is considered that the baseline data obtained through the surveys completed to date provides a valid and robust understanding of the existing environment.</p>
S42_0052_10 .43	Natural England	<p>It looks like part of the SSSI and habitats next to the SSSI have not been surveyed. Habitat next to river is identified as 'poor semi-improved grassland' but the survey was conducted at wrong time of the year and it could actually be designated habitat (some of the target notes indicate this could be the case). The target notes also state that the SSSI river is a 'wide ditch' - this does not give us confidence that the surveyors were appropriately trained.</p> <p>NER: Carry out surveys at an appropriate time of the year and full coverage for SSSIs.</p>	N	N/A	<p>The habitat outside of the SSSI, and in the field adjacent has been identified as 'poor semi-improved grassland'. It has subsequently been visited twice per month in order to deploy a bat static detector as a part of the Phase 2 bat surveys, between May and October 2019, and this assessment of the adjacent habitat remains to be identified as 'poor semi-improved grassland.'</p> <p>All watercourses that were identified and mapped were given a unique reference number preceded by the word 'Ditch'. This is not reflective of the nature of the watercourse and was used solely to differentiate between watercourses and other linear features such as hedgerows that were recorded during the respective ecological survey.</p>



S42_0052_10 .44	Natural England	No ground assessment of habitats near Bryan Mills Field SSSI.  <i>NER: Carry out surveys at an appropriate time of the year and full coverage for SSSIs.</i>	N	N/A	The Extended Phase 1 Habitat Survey (see <a href="#">Volume A6, Annex 3.1</a> , and <a href="#">Volume A6, Annex 3.2</a> ) was undertaken on all land (where access permitted, i.e. 99% of the Hornsea Four Order Limits) plus up to 50 m from its boundaries. The closest element of The Applicant is approximately 100 m away from the Bryan Mills Field SSSI. As such, no 'ground assessment' has been identified as being required for Bryan Mills Field SSSI.
S42_0052_10 .45	Natural England	Natural England provide no comments as to whether the assessment should be simple or detailed. All impacts should be assessed adequately. Main provided comments are where items that should be scoped in have been scoped out.	N/A	N/A	Noted. No additional impacts have been identified by technical specialists in relation to the construction, operation and/or decommissioning of Hornsea Four between Scoping and the submission of the PEIR. Similarly, the impacts 'Scoped out' at Scoping, and those assessed at PEIR but 'Not considered in detail in the ES [as] No likely significant effect[s] were identified at PEIR', and those to be assessed in the ES were agreed with Natural England at the onshore Ecology Evidence Plan Technical Panel meeting on 13th November 2019.
S42_0052_10 .46	Natural England	Decommissioning has been scoped out. We disagree with this as decommissioning could have a significant impact on the naturalness of the River Hull Headwaters SSSI.  <i>NER: Decommissioning should be scoped into the assessment.</i>	N	Co127	As stated in <a href="#">Volume A3, Chapter 3: Ecology and Natural Conservation</a> and in the Impacts Register ( <a href="#">Volume A4, Annex 5.1</a> ) the any impacts related to decommissioning are considered to be less than or equal to, but certainly no more than those experienced at construction. To minimise the environmental disturbance during Hornsea Four decommissioning the onshore export cables will be left in place in the ground with the cable ends cut, sealed and securely buried as a precautionary measure. The structures of the jointing pits and link boxes will be removed only if it is feasible with minimal environmental disturbance or if their removal is required to return the land to its current agricultural use (see <a href="#">Volume A1, Chapter 4</a> ).

					Hornsea Four has also committed to developing an Onshore Decommissioning Plan prior to decommissioning. It will be in line with the latest relevant available guidance will include details relevant to flood risk, pollution prevention and the avoidance of ground disturbance (Co127).
S42_0052_10 .48	Natural England	Without a sufficient baseline, it is not clear how the project will prevent no net loss. It is not clear that the measures included in this document will lead to a biodiversity enhancement. There is no mention of how the project will attempt to achieve a biodiversity net gain.  <i>NER: Update and provide adequate mitigation and enhancements/net gain once baseline is sufficient.</i>	N/A	N/A	The Applicant has has agreed on sufficient baseline with Natural England submitted an Outline Enhancement Strategy ( <b>Volume F2, Chapter 14: Outline Enhancement Strategy</b> ) and Outline Net Gain Strategy ( <b>Volume F2, Chapter 16: Outline Net Gain Strategy</b> ) as part of its DCO Application.
S42_0052_10 .49	Natural England	There is only one reference to a SSSI within the document and no references to ancient woodland. Without a complete baseline, it is not clear that the measures will be sufficient.  <i>NER: Update and provide adequate mitigation once evidence base is sufficient.</i>	I	N/A	The Outline Ecological Management Plan (OEMP) provided at PEIR gives information on ecological mitigation and management to be provided by Hornsea Four for the pre-construction, construction, and post-construction phases of the project. Should any further mitigation and/or management be identified, the OEMP will be updated, as required.
S42_0052_10 .50	Natural England	There is only one reference to a SSSI within the document. Without a complete baseline, it is not clear that the measures will be sufficient.  <i>NER: Update and provide adequate mitigation once evidence base is sufficient.</i>	I	N/A	The Outline Onshore Infrastructure Drainage Strategy provided at PEIR gives information on any pre-construction, construction, operational and decommissioning drainage of Hornsea Four landward of Mean High-Water Springs. As state in the document, the Drainage Strategy is a live document and will be updated as necessary prior to its implementation.

S42_0052_10 .51	Natural England	<p>There is not enough information for us to assess the impacts to protected species.</p> <p><i>NER: Provide evidence and surveys.</i></p>	N/A	N/A	<p>The baseline data was incomplete at the point at which the PEIR was submitted, as discussed with Natural England through the Evidence Plan Technical Panel meetings held on 8th April and 9th July. In these meetings, it was agreed that where sufficient baseline was available, the baseline technical reports would be provided at PEIR, but that no assessments were to be provided. As such, baseline technical reports were submitted for the Extended Phase 1 Habitat Survey, onshore ornithology - wintering and migratory bird survey, great crested newt survey, and the badger survey (available on request).</p> <p>Since the publication of the PEIR, landowner access has been obtained for the entire area within the Hornsea Four Order Limits and all agreed baseline ecological surveys completed. The findings of which have been used to inform the ecological assessment presented in <b>Volume A3, Chapter 3: Ecology and Nature Conservation</b> of the Environmental Statement. Agreement of the survey scope, results and findings has been obtained from stakeholders (including Natural England) through the Technical Panel meetings held since the PEIR publication and the submission of the DCO Application.</p>
S42_0052_11 .1	Natural England	<p>Natural England notes this list does not include an outline operations and maintenance plan. Outline operations and maintenance plans have been included for all recent wind farm applications. They provide clarity during operation on what has been licenced for operations and maintenance and what may need further consent, or updated methodologies. They are also linked to Deemed Marine licence conditions.</p>	Y	N/A	<p>The Applicant confirms that an outline Offshore Operations and Maintenance Plan has been included within Article 36(1) of the draft DCO.</p>

		<p>NER: Provide an Outline Operations and maintenance plan and update the article, and the DMLs condition 12 (1) (i).</p>			
S42_0052_11.4	Natural England	<p>Firstly, Natural England assumes there is a typographical error here and the ancillary works should be on a separate line. The disposal works described at (c) should detail the maximum volumes of hard and soft substrate to be disposed of, i.e. maximum volumes of seabed levelling and volumes of boulder clearance/drill arisings. The impacts from hard and soft substrate are different and should both be subject to restriction to the maxima to which they have been assessed.</p> <p>NER: Amend to include maximum volumes of different disposals.</p>	I	N/A	The Applicant notes this comment.
S42_0052_11.5	Natural England	<p>Natural England notes the use of Mean Sea Level (MSL). In previous applications this distance was always given from Lowest Astronomical Tide (LAT). Given the increased height is a key mitigation please could you explain the change and what this means in terms of the efficacy of the mitigation?</p> <p>NER: Clarification requested.</p>	I	N/A	The Applicant notes this error and confirm that the DCO has been updated to state 'Lowest Astronomical Tide (LAT)'
S42_0052_10.19	Natural England	<p>The only impacts considered are:</p> <ul style="list-style-type: none"> <li>• Degradation of key habitats and species for which the sites are cited for (Table 3.8); and</li> </ul>	I	N/A	<a href="#">Section 2.11 of the Hydrology and Flood Risk PEIR Chapter (Volume 3, Chapter 2)</a> considers direct impacts on the hydrology and geomorphology of surface watercourses,

• Direct contamination of watercourses from construction spills. This is not fully consider all of the impacts to the SSSIs and ancient woodland.

*NER: Consider all of the impacts, for example (not exhaustive):*

- *Dust (where construction is less than 200m away from a SSSI/ancient woodland);*
  - *Air quality;*
  - *Water quality;*
  - *Hydrology;*
  - *Geo-morphology;*
  - *Eco-hydrology;*
  - *Breeding birds;*
  - *Invasive non-native species;*
- Where taken into account elsewhere, please reference.*

including the River Hull Headwaters SSSI, resulting from temporary watercourses crossings. Impacts on hydrology, geomorphology and water quality resulting from, for example, changes to surface and subsurface flows, sediment supply, and the supply of contaminants during construction and operation have been 'scoped out' in the Impacts Register (see [Volume A3, Chapter 2: Hydrology and Flood Risk](#), and [Volume A4, Annex 5.1 Impacts Register](#) for further details) on the basis of the measures secured in the [Commitments Register \(Volume A4, Annex 5.2\)](#).

Impacts relating to Breeding Birds has been assessed in [Volume A3, Chapter 3: Ecology and Nature Conservation](#).

As part of the Extended Phase 1 Habitat Survey (see [Volume A6, Annex 3.1](#), and [Volume A6, Annex 3.2](#)), a check for the presence of invasive non-native species was undertaken. The desk study (which forms part of the Extended Phase 1 Habitat Survey) returned a total of 21 records of invasive non-native species. Of those records, only one for Canadian waterweed *Elodea canadensis* is located within the Hornsea Four Order Limits. As such no requirement for related Phase 2 surveys have been identified, however measures to protect against the introduction and spread of non-native species have been provided in [Volume F2.2 Outline Code of Construction Practice](#).

Additionally, as outlined in the [Outline Ecological Management Plan \(Volume F2.3\)](#) pre-construction surveys will also be undertaken to confirm the presence/absence of invasive non-native species within the Hornsea Four Order Limits and if there have been any changes since the previous surveys.

					<p>The Applicant is consulting with Natural England in regards to potential impacts to SSSIs from air quality and dust (where construction is less than 200 m away from the SSSI / ancient woodland) and further information has been provided in <a href="#">Volume A3, Chapter 9: Air Quality</a>.</p>
S42_0052_10.20	Natural England	<p>States that HDD will be placed sensitively within certain standards (Co1 &amp; Co18) and thus impacts will be minor. But without surveys and evidence, there is no certainty that these standards will be adequate to prevent impacts.</p> <p><i>NER: Recognise the importance of SSSIs and carry out the required surveys to provide certainty that there are no impacts.</i></p>	I	N/A	<p>The Applicant has committed to using HDD (or other trenchless technologies) to cross the River Hull Headwaters (Co1). In recognition of potentially more sensitive sites, including the River Hull Headwaters SSSI, The Applicant has committed to undertaking a pre-construction hydrogeological risk assessment, to inform a site-specific crossing method statement. This will also be agreed with the relevant stakeholders, including Natural England (Co18).</p> <p>Additionally, as the River Hull Headwaters SSSI is an EA Main River, The Applicant is committing to locating the entry and exit pits a minimum of 20 m from the surface watercourse or the landward toe of any associated flood defence (Co18). As the detailed risk assessment and method statement for crossing the River Hull Headwaters SSSI will be agreed with stakeholders, including Natural England, prior to construction, ground investigations are not required at this stage. The River Hull Headwaters SSSI has been surveyed, as a part of the Extended Phase 1 Habitat Survey and Phase 2 bat surveys which have taken place. Where relevant and appropriate, information and data gathered on these surveys will be used to inform the assessments provided in <a href="#">Volume A3, Chapter 3 Ecology and Nature Conservation</a> and any updates to <a href="#">Volume A4, Annex 5.1: Impacts Register</a> which form part of the ES.</p>

S42_0052_10 .22	Natural England	<p>The report states that 373 ha of arable land will be affected, and it is of negligible importance but there is little evidence to support this. There could be important assemblages of farmland birds or arable plants. The extended phase 1 survey would not have picked up these species and there is no attempt to cross reference this with any other data (e.g. how many Agri-environment schemes/options does it cross?).</p> <p><i>NER: Carry out more detailed fieldwork and/or cross reference other datasets to obtain an accurate baseline and understanding of impacts.</i></p>	N	N/A	<p>Further ecological surveys have been undertaken since the PEIR submission. The findings of which are reported in technical annexes and used to inform the ecological impact assessment presented in Volume A3, Chapter 3: Ecology and Nature Conservation of the Environmental Statement.</p> <p>The classification of ecological importance of habitats and/or species has been undertaken in accordance with industry guidance (i.e. CIEEM) and using professional judgement. The findings from all baseline surveys have been used to inform the classification of ecological receptors (see <a href="#">Annex 6.3.1 to Annex 6.3.15</a>), with supporting evidence also being presented as to how these judgements have been determined.</p> <p>Agri-environmental schemes have also been checked and where present will be covered in the <a href="#">Land Use and Agriculture Chapter (Volume A3, Chapter 6)</a>, with a cross reference also included to the Ecology and <a href="#">Nature Conservation Chapter (Volume A3, Chapter 3)</a>.</p>
S42_0052_10 .23	Natural England	<p>The report states that impacts on non-designated sites are minor and it dismisses any importance that these habitats have in these areas. These areas may not have many habitats left; therefore, small impacts may cause comparatively large impacts. This conclusion cannot be made without supporting evidence. A comparison between priority habitat data and/or Agri-environment data within the search area and the route could demonstrate that other habitats are available in the area. Connectivity modelling could also aid the analysis.</p> <p>Our concerns (above) are valid for all</p>	N	N/A	<p>Agri-environmental schemes have been checked and where present will be covered in the <a href="#">Land Use and Agriculture Chapter (Volume A3 Chapter 6)</a>, with a cross reference also included to the <a href="#">Ecology and Nature Conservation Chapter (Volume A3, Chapter 3)</a>. Priority habitat data was considered (and presented) at PEIR stage.</p>

		<p>of the other non-designated assessments within the report (i.e. the impact may have been understated due to a lack of evidence).</p> <p><i>NER: Carry out more detailed fieldwork and/or cross reference other datasets to obtain an accurate baseline and understanding of impacts.</i></p>			
S42_0068_006	RSPB	<p><b><u>Onshore ornithological impacts</u></b></p> <p>The RSPB has considered the documents submitted in relation to onshore impacts. We have restricted our consideration to ornithological issues only.</p> <p>We have identified no issues of concern in relation to wintering and migratory birds. We reserve comments on breeding birds until the Survey Report is published.</p>			The Applicant notes this comment.
S42_0068_007	RSPB	<p><b><u>The Outline Ecological Management Plan</u></b></p> <p>We note that paragraphs 3.3.1.1 to 3.3.1.3 are repeated in paragraphs 3.3.1.4 to 3.3.1.6.</p> <p>We note in paragraph 3.3.1.7 the proposed measures to deter ground-nesting birds from large fields where birds might breed. We urge that such measures are used sparingly.</p>			At the point of Application, the Outline Ecological Management Plan has been updated to reflect the comments and requests from stakeholders (including the RSPB) received during the Technical Panel Meetings held to date. Agreement has been obtained from stakeholders (including the RSPB) on the contents of the Outlined Ecological Management Plan and the proposed mitigation measures in respect to breeding birds that will be implemented during the Hornsea Four construction works.
S42_0072_0076	Environment Agency	<p>I spoke to the officer who provided comments on the WFD assessment. She confirmed that she reviewed the document and the relevant mitigation was in place for</p>	N	N/A	The Applicant notes this comment.



disturbance to intertidal habitats. Anything further offshore we wouldn't usually comment on.

## EIA topic area: Landscape and Visual

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/New or N/A)	Applicant Response
S42_0038_0005	ERYC	<p><b>Landscape and Visual Impact</b></p> <p>The draft Preliminary Environmental Information Report provides information regarding the way in which landscape character and visual issues (both offshore and onshore) have been considered in the development of the proposal, and the proposed manner by which construction, operational and residual effects will be attempted to be mitigated. Accordingly, the findings and conclusions of the relevant chapters of the subsequent Environmental Statement will need to be a key element of the Examining Authority's decision-making process and, based on the information that has been submitted at this stage, it appears that there is sufficient and satisfactory information provided to allow the Examining Authority to make an appropriate decision in respect of the proposed development.</p>	N	N/A	The assessment methodology was agreed through consultation with East Riding of Yorkshire Council. It is acknowledged that the assessment presented in the PEIR has been reviewed and considered satisfactory.

## EIA topic area: Historic Environment

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0059_002	East Yorkshire & Derwent Area Ramblers	It has been suggested that the Footpath from the A164 along Jillywoods was part of a drovers' road from Skidby in the west to Skidby lngs in the east, so any trees and plants along its length might qualify as "ancient". The access road from the A1079 will cut this footpath, I am not sure whether this is in a wooded area.	N	N/A	A hedgerow and tree survey has been undertaken, the results of which will be presented in <a href="#">Volume A6, Annex 3.14: Hedgerow and Arboricultural Survey Report</a> . 'Important' hedgerows, as defined by the Hedgerow Regulations 1997, will be listed within this report. Areas of Ancient Woodland are identified in the Historic Environment assessment, presented in <a href="#">Volume A4, Chapter 5: Historic Environment</a> .
S42_0059_003	East Yorkshire & Derwent Area Ramblers	There may be hedges that qualify as ancient woodland in the land marked out for permanent and temporary access	N	N/A	
S42_0065_005	Historic England	Volume 3, Chapter 5: Historic Environment:  Although we consider the assessment presented in Chapter 5 (Historic Environment) to be a coherent Summary of the archaeological potential of the terrestrial route, it is clear that gaps still remain in this phase of the work. As noted above, the Priority Archaeological Geophysical survey is incomplete which also means that the correlation between it and the Geoarchaeological work is also incomplete, as is the formulation of a comprehensive WSI. We note that further work is to be undertaken with regard to assessment of visual impacts on designated and non-designated heritage assets (5.11.3.19 and 5.11.3.23).	N	N/A	The Applicant notes this comment. The Historic Environment baseline data has been updated since PEIR, see <a href="#">Volume 6, Annex 5.3: Priority Archaeological Geophysical Survey</a> .

		Paragraphs 5.11.2.29 to 5.11.2.41. The suggested mitigation of both buried archaeological remains and built heritage is sensible and proportionate, but we note that an outline WSI will only be submitted to support the DCO.			
S42_0065_002	Historic England	Chapter 5 We consider that the Historic Environment chapter of the Preliminary Environmental Information Report (PEIR) is a sound and comprehensive document representing our current level of understanding of the terrestrial route and its impact on designated and non-designated heritage assets. It is recognised that the area traversed by the export cables (the Yorkshire Wolds and Vale of Holderness) are rich, complex and distinctive archaeological landscapes (Section 5.7.2) However, we note paras 5.6.5.3 to 5.6.5.5 (page 26) which state that the priority geophysical survey is incomplete owing to problems of access and crop cycles, but the remaining survey work is being progressed as fields become available and will presumably become available at DCO stage. We agree with the assessment that the potential for encountering archaeological remains of varying importance within the Hornsea Four Project boundary is 'high' (para 5.7.9.2, page 35)			The Applicant notes this comment. The Historic Environment baseline data has been updated since PEIR, see <a href="#">Volume 6, Annex 5.3: Priority Archaeological Geophysical Survey</a> .

## EIA Topic Area: Land Use and Recreation

Comment ID (consultation_response)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response

ID_subsecti on number)					
S42_0023_001	Beswick Parish Council	<p>Beswick Parish Council draws Ørsted Hornsea Four's attention to the fact that several C-class roads crossed by the cable corridor are used to connect PROWs or to access PROWs that intersect the highway. Ørsted Hornsea Four needs to be aware that, although these roads are open to motorised traffic, users include pedestrians and horse riders. Of particular interest to Beswick Parish Council are the proposed crossings (by HDD) of Wilfholme Lane and Barhill Causeway. Other interests lie in adjacent parishes, particularly Carr Lane, Watton, and Station Road, Lockington.</p>			<p>Further to a meeting held with ERYC on 29 October 2019, the Applicant has identified all PROWs that will be temporarily closed during construction works, in addition to those that will be temporarily diverted.</p> <p>Details are presented in the Public Right of Way Management Plan, within <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice</a>.</p>
S42_0023_002	Beswick Parish Council	<p>Beswick Parish Council is very concerned that the Consultation Documents state: "Given the lack of potential significant effects no monitoring in relation to land and agriculture is proposed as part of Hornsea Four?"</p> <p>Beswick Parish Council is of the opinion that restoration of the cable corridor where it crosses PROWs will leave soils in a dilated state (meaning that soils will have lower bulk density and lower shear strength and, hence, lower load carrying capability).</p> <p>It also believes that consolidation of soil (sub- and topsoil) over time will lead to linear micro-topographical depressions along the PROWs that will retain ponded water and severely reduce the utility of the PROW, especially in winter.</p> <p>Users will be either discouraged from traversing or will be encouraged to trespass off the PROWs and, hence, effect crop</p>			<p>The Applicant recognises the importance of PRow and the requirements to manage them during the construction phase of Hornsea Four, as demonstrated through Co79. Through the adherence of this commitment, the Applicant has committed to the reinstatement of PRow on completion of construction works to ensure that all PROWs are reinstated to their pre-construction condition and/or improved where practicable to do so. Consultation with ERYC PRow officers has been undertaken as part of the Technical Panel Meetings held up to the point of Application, where agreements have been made on the PRow management and monitoring requirements.</p> <p>It was noted that on past projects the Applicant has not undertaken specific monitoring and it is not proposed for Hornsea Four; however, as part of</p>

		<p>damage. These problems of access will extend, in each case, at least 60 m (the width of the cable corridor) and this could be longer where the intersection of cable corridor and PROW is oblique.</p> <p>Beswick Parish Council wishes to see stated a commitment to monitoring all PROWs where these have been affected by Open-Cut -i.e. trenched - cable corridor crossings and a further commitment to suitable restoration measures where PROWs are affected by soil consolidation and surface subsidence.</p> <p>These commitments should be guaranteed for at least seven years after soil restoration. Of particular interest are affected PROWs in Beswick, Watton and Lockington Parishes.</p>			<p>agreements with relevant landowners, the Applicant is obligated to maintain and resolve any issues that occur as a result of Hornsea Four.</p> <p>Furthermore, specific measures (for example but not limited to, pre-construction photography) relating to the management of PROW are presented within <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice</a>.</p>
S42_0023_003	Beswick Parish Council	<p>Beswick Parish Council wishes to emphasise that the two C-class roads in the Parish that are crossed by the proposed cable corridor - Wilfholme Lane and Barhill Causeway - are single-track, exceedingly narrow and cul-de-sac. They are much used for local farm traffic and for access by local residents, the Environment Agency (servicing the strategic Wilfholme Pumping Station) and Network Rail. Movements of Hornsea Four HGVs should not conflict with local traffic and access for residents, farm operations and strategic facilities should not be restricted.</p>			<p>The Applicant produced a Construction Traffic Management Plan, included as a requirement of the DCO to be approved by the relevant Highways Authority. The CTMP will contain details of measures to manage construction traffic routeing. An Outline CTMP is included as an Appendix to <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice</a>.</p>
S42_0024_002	NFU	<p>Volume 6, Annex 1.1: Land Quality Preliminary Risk Assessment:</p> <ul style="list-style-type: none"> <li>Section 3.2.3 – Groundwater Abstractions clearly identifies a number of abstraction points within the PEIR boundary. As such, we would welcome further details on what measures Orsted</li> </ul>	N	N/A	<p>'The Applicant is in consultation with the relevant authorities (i.e. the Environment Agency, East Riding of Yorkshire Council and the Beverley and North Holderness Internal Drainage Board) in relation to any requirements and licences for potential abstraction. Should the Applicant need to abstract,</p>

		<p>will take to negate any potential risk to abstractors or compensation.</p> <ul style="list-style-type: none"> <li>Section 3.3.2 – Surface Water Abstractions clearly identifies an abstraction points within the PEIR boundary and 85 records within 1km PRA study area. As such, we would welcome further details on what measures Orsted will take to negate any potential risk to abstractors or compensation.</li> <li>Table 13: Regulatory Information – This table identifies a number of consents within 250m of the PRA study area. As such, we would welcome further details on what measures Orsted will take to negate any potential risk to consent holders.</li> </ul>			<p>this will be with the agreement of the relevant authorities and/ or landowner, as applicable.'</p>
S42_0038_004	ERYC	<p><u>Public Rights of Way</u></p> <p><b>The Definitive Map Team</b></p> <p>Following on from the consents meeting and the formal consultation for the Hornsea Project Four: Draft Development Consent Order, I would like to add the following point in addition to the response from Andrew Chudley in the Countryside Access Team: Part 3 (11) Stopping up and diversion of public rights of way - discussions will be required with the Definitive Map Team and the Countryside Access Team to agree a proposed route for the permanent diversion of Skidby Footpath No.16.</p> <p><b>The Countryside Access Team</b></p> <p>Following on from the consents meeting, the</p>	N	N/A	<p>The Applicant held a meeting with ERYC on 29 October 2019 to discuss impacts on the PRoW and cycle network. The meeting achieved the following:</p> <ul style="list-style-type: none"> <li>Permanent diversions of PRoW SKID16 and Rowley Bridleway No.13 were discussed, with an agreement made in respect of routes. The ERYC requested that Rowley Bridleway No.13 was routed along the southern side of the proposed access road, rather than to the north. The diversion of SKID16 was agreed as per the option presented by the Applicant. The routes are presented in the Public Right of Way Management Plan, within <a href="#">Volume F2, Chapter 2:</a></li> </ul>

Countryside Access Team reiterate that temporary diversions within the DCO need to be well signed and managed on the ground with parish councils and user groups informed of when routes will be affected, and preferably publicised in advance through the press. The surface of diversion routes should be firm, level, drained and meet the required minimum width for its status. A photographic condition survey should be undertaken and sent to the Countryside Access Team prior to work commencing. This will be required to ensure that the surface of the public right of way where it has been disturbed is returned to a similar firm, level and drained condition and there should be monitoring for 12 months to ensure any settlement, slump or wet areas are re-filled.

The temporary closures and diversions outside of the DCO will need consultation with parish councils and user groups before applying for the order two months prior to required commencement. Temporary Closure (Diversion) Applications are dealt with by the Countryside Access Team.

The permanent diversion required for the OnSS will require legal procedures to be completed before work can commence on the current definitive line. This process involves public consultation and could take 6 months if no objections are received. However, if there are objections that cannot be resolved, there could be considerable delays while the application is considered by the Planning Inspectorate, possibly requiring a public inquiry adding 12 months to the proceedings. Legal changes to the Definitive Map and Statement are dealt with by the Definitive Map Team. These proceedings

## Outline Code of Construction

**Practice.** The permanent diversions are captured and authorised within the DCO.

- The temporary stopping up of a number of PRoWs was agreed with ERYC, based on local knowledge. The routes identified are presented in the Public Right of Way Management Plan, within **Volume F2, Chapter 2: Outline Code of Construction Practice**.
- PRoWs of particular note (based on frequency of use, or interconnectivity) were identified by ERYC, and requested to be rerouted during construction activity, instead of stopping up. These are identified in the Public Right of Way Management Plan, within **Volume F2, Chapter 2: Outline Code of Construction Practice**. The details will be agreed prior to the commencement of the connection works. Furthermore, it was noted that on past projects the Applicant has not undertaken specific monitoring; however, as part of agreements with relevant landowners, the Applicant is obligated to maintain and resolve any issues that occur as a result of Hornsea Four. A photographic condition survey will be undertaken before work commences to ensure a baseline is recorded for future reinstatement.

		should be started as soon as possible due to the timescales involved.			
S42_0050_001	East Riding of Yorkshire and Kingston upon Hull Joint Local Access Forum (JLAF)	JLAF recognises that Ørsted Hornsea Four has acknowledged the disruption and inconvenience that will affect users of Public Rights of Way that lie across the proposed route of the cable corridor and at the site of the substation. JLAF has noted that there is a promise to minimise inconvenience by ensuring, with two identified exceptions, that closure of PROWs will be temporary and that signed diversions will be provided. JLAF will have purview of applications for such closure and will offer to the County Council advice about the suitability of diversions for users.	N	N/A	Further to a meeting held with ERYC on 29 October 2019, the Applicant has identified all PROWs that will be temporarily closed during construction works, in addition to those that will be temporarily diverted. Details are presented in the Outline Public Right of Way Management Plan, within <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice</a> .
S42_0050_002	East Riding of Yorkshire and Kingston upon Hull Joint Local Access Forum (JLAF)	JLAF draws Ørsted Hornsea Four's attention to the fact that several C-class roads crossed by the cable corridor are used to connect PROWs or to access PROWs that intersect the highway. Ørsted Hornsea Four needs to be aware that, although these roads are open to motorised traffic, users include pedestrians and horse riders.	N	N/A	Impacts on PROW are assessed within Environmental Statement <a href="#">Volume A3 Chapter 6: Land Use and Recreation</a> . Interaction with other road or recreational users (e.g. pedestrians) is assessed in <a href="#">Volume 3, Chapter 7: Traffic and Transport</a> , with mitigation measures set out in the outline CTMP. All roads intersected by Hornsea Four are set out in the Onshore Crossing Schedule ( <a href="#">Volume 4, Annex 4.2: Onshore Crossing Schedule</a> ).
S42_0050_003	East Riding of Yorkshire and Kingston upon Hull Joint Local Access Forum (JLAF)	JLAF has concerns regarding the PROW identified as requiring diversion and/or extinguishment i.e. Skidby Footpath No. 16. The Consultation Document (Volume 3, Chapter 6) appears dismissive of the value of this PROW, stating "There is a relatively dense PROW network in this area and other routes moving (sic) east-west and north-south are available in the local vicinity" and that "SKID16 is considered to be a PROW of local importance as it is not designated as a national or regional...route". JLAF points out	N	N/A	The Applicant has met with the JLAF at an Onshore Substation Workshop, held on 24 September 2019, upon completion of the Section 42 consultation period. The diversion of SKID16 was discussed at length, with key agreements established in respect of how the PROW would be routed and integrated into the Hornsea Four landscape planting. Furthermore, it was agreed that the route would be stopped up during construction



		that designation of PROWs as part of a national or regional route does not make them more important and that local usage is often more intense for daily exercise, health (both physical and mental) and enjoyment of the countryside. Given its remit, JLAF will scrutinise the application for proposed diversion and/or extinguishment and advise the County Council of its appropriateness.			activities. Further details are provided in the Outline Public Right of Way Management Plan, within <b>Volume F2, Chapter 2: Outline Code of Construction Practice.</b>
S42_0050_004	East Riding of Yorkshire and Kingston upon Hull Joint Local Access Forum (JLAF)	JLAF notes with concern what appears to be an omission of consideration of the impact on Woodmansey Bridleway No. 30 of the access road to the Onshore Substation (Temporary Works) from the A1079 - the access road appears to run along the Bridleway for circa 200 m. JLAF asks for clarification of proposals regarding diversion of this bridleway which connects with Rowley Bridleway No.13, the western end of which also appears to be affected by an access road to the cable corridor.	N	N/A	The omission is noted and has been rectified. The Applicant has since attended a meeting with ERYC on 29 October 2019 to discuss the permanent diversion of the Rowley Bridleway No.13 (which connects to Woodmansey Bridleway No.30). It was proposed by ERYC that the PRoW should be rerouted to the south of the proposed access road. Further details are provided in the Outline Public Right of Way Management Plan, within <b>Volume F2, Chapter 2: Outline Code of Construction Practice.</b>
S42_0050_005	East Riding of Yorkshire and Kingston upon Hull Joint Local Access Forum (JLAF)	JLAF notes that Ørsted The Applicant is proposing prolonged closure of Barmston Footpath No. 4 and, if designated, diversion of The English Coast Path. JLAF suggests that a permissive path be established eastwards off Barmston Footpath No 3 south of the Logistics Compound that would allow connection with the beach and foreshore.	N	N/A	The Applicant has undertaken further discussions with ERYC (during a meeting held on 29 October 2019). Both ERYC and the Applicant identified potential methods of temporarily diverting Barmston Footpath No. 4 within the Hornsea Four Order Limits. The preferred diversion option was presented to JLAF at the OnSS Working Group on 26 November 2019 and it was agreed that the solution is comparable to the idea suggested by the JLAF in this consultation response and therefore satisfactory. It is however noted that this is subject to the final Landfall Compound site selection, which will be determined pre-construction. Further detail is provided

					in the Public Right of Way Management Plan, within <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice.</a>
S42_0050_006	East Riding of Yorkshire and Kingston upon Hull Joint Local Access Forum (JLAF)	JLAF is very concerned that the Consultation Documents state: "Given the lack of potential significant effects no monitoring in relation to land and agriculture is proposed as part of Hornsea Four". JLAF is of the opinion that restoration of the cable corridor where it crosses PROWs will leave soils in a dilated state (meaning that soils will have lower bulk density and lower shear strength and, hence, lower load carrying capability). It also believes that consolidation of soil (sub- and topsoil) over time will lead to linear micro-topographical depressions along the PROWs that will retain ponded water and severely reduce the utility of the PROW, especially in winter. Users will be either discouraged from traversing or will be encouraged to trespass off the PROWs and, hence, effect crop damage. These problems of access will extend, in each case, at least 60 m (the width of the cable corridor) and this could be longer where the intersection of cable corridor and PROW is oblique. JLAF wishes to see stated a commitment to monitoring all PROWs where these have been affected by Open-Cut -i.e. trenched - cable corridor crossings and a further commitment to suitable restoration measures where PROWs are affected by soil consolidation and surface subsidence. These commitments should be guaranteed for at least seven years after soil restoration.	N	N/A	The Applicant recognises the importance of PROW reinstatement upon completion of construction works. A meeting has been held with ERYC (on 29 October 2019) in which the matter of monitoring was discussed. It was noted that on past projects the Applicant has not undertaken specific monitoring and it is not proposed for Hornsea Four; however, as part of agreements with relevant landowners, the Applicant is obligated to maintain and resolve any issues that occur as a result of Hornsea Four. Furthermore, specific methodologies have been outlined within the Public Right of Way Management Plan (such as pre-construction photography), within <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice.</a>
S42_0050_007	East Riding of Yorkshire and	The National Planning Policy Framework (paragraph 98) states that 'Planning policies	N	N/A	The Applicant has identified potential enhancement opportunities associated

	Kingston upon Hull Joint Local Access Forum (JLAF)	and decisions should protect and enhance public rights of way and access, including taking opportunities to provide better facilities for users. Given the inevitable disruption to the PROW network during project delivery, JLAF is disappointed that the scope for potential enhancements to the network – in accordance with paragraph 98 - is not strongly evident within the PEIR ( <a href="#">Volume 3, Chapter 6</a> ). It is however acknowledged that enhancements could potentially be delivered through the allocation of Section 106 (or other similar) funding specifically relating to rights of way and public access, and JLAF therefore requests the provision of such funding for this project to mitigate the negative impacts and ensure that PROW enhancements are delivered.			with the PROW network within <a href="#">Volume F2, Chapter 12: Outline Enhancement Strategy</a> . These measure include the enhancement of SKID16, provision of signposts where deemed appropriate, and the provision of signage at the proposed landfall site, detailing history of the local area. Furthermore, <a href="#">Volume A4, Annex 4.6: Outline Design Vision Statement</a> details the design vision across the Hornsea Four footprint, including at the OnSS.
S42_0059_001	East Yorkshire & Derwent Area Ramblers	<b>The following comments mainly concern the Onshore Substation and adjacent features.</b>  There are woodlands in this general area of East Yorkshire that have been identified as ancient. Any woodlands and hedges that are affected by the present scheme, especially within the site of the new substation, should be examined by a qualified botanist to ensure that damage to the vegetation is minimised. As you will know, ancient woodlands are afforded some protection in law.	N	N/A	A hedgerow and tree survey has been undertaken, the results of which will be presented in <a href="#">Volume A6, Annex 3.14: Hedgerow and Arboricultural Survey Report</a> . 'Important' hedgerows, as defined by the Hedgerow Regulations 1997, will be listed within this report.
S42_0059_004	East Yorkshire & Derwent Area Ramblers	It is not clear why the land around the existing Creyke Beck Substation for several hundred metres is shown as part of the export corridor.	N	N/A	The 400kV ECC search area identifies where the connection between the Hornsea Four OnSS and the NGET substation at Creyke Beck will be located. The area has been refined since PEIR, and will be detailed in <a href="#">Volume A1, Chapter 3: Site selection and Consideration of Alternatives</a> . The

					final area required, a total of 12 export cables installed within a 40 m permanent easement within a 60 m working corridor, is much less than shown. The additional area shown is to allow for the future location of the Grid Connection to be determined in consultation with National Grid.
S42_0059_005	East Yorkshire & Derwent Area Ramblers	It would be helpful if future editions of your maps of this part of the project include the line of rights of way, it is difficult to have to refer to the OS 1:25,000 map for footpaths and compare this with your maps.	N	N/A	The Applicant notes this comment. Maps indicating the location of all PRoWs were included in the PEIR and will be retained in <a href="#">Volume A3, Chapter 6: Land Use and Agriculture</a> .

## EIA topic area: Traffic and Transport

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (No/Change/New or N/A)	Applicant Response
S42_0006_002	Highways England	<p>The Traffic and Transportation part of PEIR <a href="#">Volume 3 (Chapter 7)</a> was a little short of the detail we require to assess the impact of this project on the Strategic Road Network [SRN], particularly the A63 and A1033 roads. We were concerned to find that Link 81 (A63 west of A15) projects an increase of HGVs 14.9%, and Link 82 (A63 Clive Sullivan Way) 14.4%.</p> <p>However, as you will find on the plan attached, it has not been easy to relate the descriptions for your links, and I don't believe my map represents your intended routes. Is Link 81 correct on my map? Did you mean for Link 82 to go further east? Link 74 is defined as "A1079, A164 to A1033", but it</p>	Y	N/A	<p>The Applicant has met with Highways England on 5 September 2019, since the formal consultation response was received.</p> <p>The methodology for the Hornsea Four Transport Assessment was presented, including identification of the study area, derivation of traffic flows, and proposed mitigation measures to be secured in the Construction Traffic Management Plan (CTMP), which is part of the Code of Construction Practice (CoCP). The CoCP includes detailed on Construction Workers Plan.</p>

		<p>isn't possible to extend to the A1033 without going along the A63 first. If Link 74 is intended to terminate as soon as it hits the SRN (at the A63), this leaves a section of the A63 and A1033 without consideration; importantly this includes the Castle Street Improvement which will be in construction from 2020 to 2025 with major disruption to traffic in this area.</p> <p>Highways England would like more information about how your traffic will travel on the A63 and the A1033, and details of the likely impact. Your projected increases are given mainly for HGV traffic, with smaller vehicles apparently been at much lower levels. I note that your document does give some information about Abnormal Indivisible Loads [AIL], but not the quantum of the Cable Drum loads.</p> <p>Highways England are looking for a Transport Assessment to be submitted in respect of the SRN and approved by us ahead of planning permission being given. Later, we will want to be consulted about the construction phase, in particular we will want you to submit a Construction Transport Management Plan, and a Construction Workers Plan for our approval prior to commencement.</p>			<p>The links queried in the Highways England consultation response were discussed and clarified.</p> <p>Highways England presented further information regarding the A63 Castle Street Improvement Scheme, which was unavailable in the public domain at the time of drafting the PEIR.</p> <p>The implications of the Castle Street Improvement Scheme on the movement of Abnormal Indivisible Loads (AILs) associated with Hornsea Four was discussed and it was agreed that AILs for Hornsea Four would not be able to use the A63 if the two projects coincide. This is reflected in the AIL study submitted to support the DCO.</p> <p>It was concluded and agreed that the extent of the impacts of Hornsea Four on the strategic road network will not be fully understood until the pre-construction phase, when key assumptions such as port selection, suppliers and contractors are known. The Transport Assessment will therefore account for the maximum design scenario, with appropriate mitigation measures secured within the outline CTMP to account for the worst-case scenario. The requirement for detailed junction modelling will be identified pre-construction, in agreement with Highways England.</p>
S42_0015_002	Cherry Burton Parish Council	Why did you not include a traffic impact on Cherry Burton and what measures do you think should be taken to prevent HGVs from the project going through the village?	N	N/A	The routing of Hornsea Four construction traffic has been planned to avoid settlements where possible. It is anticipated that HGV traffic will

					avoid Cherry Burton, with management measures in place to ensure appointed contractors comply, secured through a requirement for a Construction Traffic Management Plan (CTMP)
S42_0023_003	Beswick Parish Council	<p>Beswick Parish Council wishes to emphasise that the two C-class roads in the Parish that are crossed by the proposed cable corridor - Wilfholme Lane and Barfhill Causeway - are single-track, exceedingly narrow and cul-de-sac.</p> <p>They are much used for local farm traffic and for access by local residents, the Environment Agency (servicing the strategic Wilfholme Pumping Station) and Network Rail.</p> <p>Movements of Hornsea Four HGVs should not conflict with local traffic and access for residents, farm operations and strategic facilities should not be restricted.</p>			The Applicant produced a Construction Traffic Management Plan, included as a requirement of the DCO to be approved by the relevant Highway Authority. The CTMP will contain details of measures to manage construction traffic routeing. An Outline CTMP is included as an Appendix to the Outline Code of Construction Practice.
S42_0038_006	ERYC	<p><b>Traffic and Transport</b></p> <p><b>Infrastructure and Facilities</b></p> <p>A164 and Jocks Lodge Junction Improvement - discussions have taken place with Orsted at the recent consultation day meeting and a further meeting has been arranged for Wednesday 25 September with Orsted to discuss the further issues raised.</p> <p><b>Highways Development Management</b></p> <p>The PEIR is a thorough document. Discussions are programmed to take place with the Council's Area Engineers and Orsted in early October to discuss the necessary highway works on a micro scale to ensure</p>	N	N/A	The Applicant attended a meeting with ERYC on 25 September 2019 to discuss the proposed A164/Jocks Lodge Improvement scheme. This meeting provided the opportunity for ERYC to present amendments to the project, over and above available information within the public domain at the time. It was noted that the access location from the A1079 was agreed with ERYC in 2018 and the Applicant is not able to amend the strategy. An amendment has been made however to the onshore ECC (to cross the A164 at an angle closer to 90 degrees due to the proposed road widening), in addition to the access location off the A164. It is expected that liaison will continue

		<p>that for example any junction alternations and passing places are acceptable and can be agreed in advance of the construction of the cable route. The highway works will be carried out under a Section 62 Agreement and legal services have agreed that one Agreement can cover the whole of the scheme. The Area Engineers Teams will carry out site inspections and look after any traffic management requirements. Inspection fees will be paid, which is based on the estimated cost of the highway works, the inspection fee will be 7.5% of that figure. The standard highway conditions covering works within highway works, access points, contractors parking and wheel wash facilities will form part of our response once their application is submitted. As with other offshore wind farm cable routes that have been constructed in the East Riding regular meetings with the developer have greatly assisted in smooth delivery from a highway's perspective and I'm confident that this will be the case with the Orsted scheme.</p>			<p>between the Applicant and ERYC regarding interaction between the two projects. .</p> <p>The Applicant welcomes the response from ERYC that the Traffic and Transport Assessment is comprehensive. The Applicant has had continued contact with ERYC regarding this topic area, inclusive of a workshop with the area highway engineers to agree on all access points associated with Hornsea Four.</p>
S42_0042_002	Public Health England	<p>The traffic and transport section (Para 7.11.1.41) identifies that HGV movements will avoid school opening and closing times as a mitigation measure. The final times need to be agreed with the individual schools and account for pre and after school activities.</p>	N	N/A	<p>The Applicant notes this comment. The Applicant has also committed to the production of a Construction Traffic Management Plan (Commitment Co144). The CTMP will contain details of measures to manage construction traffic routeing and where appropriate, timing and will be agreed with the relevant planning authority prior to the commencement of the onshore connection works.</p>

## EIA topic area: Noise and vibration

Comment ID	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment	Applicant Response
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(consultation_response ID_subsection number)				(1o/Change/New or N/A)	
S42_0057_1.6.1	MMO	<p><u>Subsea Noise Technical Report (A4.4.5):</u></p> <p>Piling and other (non-impulsive) sources have been considered including dredging, drilling, cable laying, rock placement and vessel noise. Paragraph 6.2.11 states that noise levels have been predicted using a simple modelling approach based on measured data from Subacoustech's own underwater noise measurement database, scaled to relevant parameters for the site and specific noise source. Full details of this modelling approach should be provided. Without this information, the MMO is unable to advise on the validity of any of the predictions in the assessment.</p>	Y	N/A	<p>The calculation of underwater noise transmission loss for non-impulsive sources is based on an empirical analysis of noise measurements taken from transects around the source. Updated detail is provided in <a href="#">Volume 4, Annex 4.5: Subsea noise Technical Report</a>.</p>
S42_0057_1.6.8	MMO	<p><b>Minor Comments</b></p> <p><u>Subsea Noise Technical Report (A4.4.5):</u></p> <p>The MMO's technical advisers, Cefas have previously requested (for other developments) the references to support the source levels stated for each of the 'continuous' activities (see Table 62). Ørsted subsequently clarified that "the datasets used to estimate the unweighted source levels are not formally published, and so cannot be directly referenced. This data was included due to the lack of available published data and the limited nature of that which is available. It should be noted that data from hundreds of datasets have been built into the model and it doesn't refer explicitly to any of them, they only identify trends. In addition, because of confidentiality it is not possible to specifically reference any</p>	Y	N/A	<p>Source level data presented in Table 62 of <a href="#">Volume A4, Annex 4.5: Subsea Noise Technical Report</a> is based on data measurement undertaken by Subacoustech over a 20-year period. Some of which is referenceable, some is internal only and others are under confidentiality clauses. This is clarified within the accompanying text to Table 62. References have been added to the end of Section 8 in <a href="#">Volume A4, Annex 4.5: Subsea Noise Technical Report</a> as "References for continuous noise sources".</p>



		other projects". The MMO would expect to see some citation or reference of the datasets used to estimate these source levels, even if they are not formally published. It would be helpful if this clarification could be included in future versions of the report.			
S42_0057_1.6.9	MMO	Effect ranges (based on the SELcum) are predicted to be <100 m for all marine mammal species, for all activities, with one or two exceptions – rock placement is predicted to cause TTS in high-frequency cetaceans at 990m from the source (see Table 63 in the report). Further, dredging is predicted to cause TTS at 230m from the source. However, animals would have to remain close to the source continuously for 24 hours. Predicted impact ranges are <50 m for fish species. The report should provide further context to explain these results. For example, based on past experience, some effect ranges >100m for low-frequency cetaceans would be expected (large cumulative effect ranges are predicted for low-frequency cetaceans during piling).	Y	N/A	The receptor would need to remain within the calculated range of the continuous, moving noise sources over a complete 24-hour period to acquire necessary exposure. While considered highly unlikely, this would only mean that the receptor reaches the 'onset' stage, which is the minimum exposure potentially leading to TTS. The overall risk of any significant effect to a receptor is therefore low. Further context has been added to <a href="#">Volume A4, Annex 4.5: Subsea Noise Technical Report</a> .
S42_0057_1.6.10	MMO	Operational turbine noise is considered in Section 6.3. As per paragraph 6.3.1.5, "the operational source levels (as SPLRMS) for the measured sites are given in Table 66 (Cheesman, 2016), with an estimated source level for Hornsea Four in the bottom row. To predict operational WTC noise levels at Hornsea Four, the level sampled at each of the sites has been taken and then a linear correction factor has been included to scale up the source levels (Figure 18). A linear fit was applied to the data as this was the most conservative extrapolation, leading to the highest, and thus maximum design, estimation of source level noise from the larger 305 m diameter rotor WTCs...". It has	Y	N/A	The available data on operational source levels is so little that the extrapolation is speculative, though a linear fit provides a worst, reasonable case for the noise increase with turbine scale. Even when given the worst case estimated noise levels, the ranges of potential impact are negligible. Any risk of injury to fish during turbine operation, even with substantially increased predicted noise levels, would remain low. Further context has been added to <a href="#">Volume A4, Annex 4.5: Subsea Noise Technical Report</a> .

		previously been queried why a linear correction factor is the most conservative extrapolation. This explanation should be included within the report.			
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## EIA topic area: Air Quality and Health

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (No/Change/New or N/A)	Applicant Response
S42_0015_003	Cherry Burton Parish Council	Do you intend to install Diesel generation capacity as part of the Energy Balancing Infrastructure?	N	N/A	The Applicant will select the technology based on the performance characteristics needed to deliver the required services at the time of detailed design. Hornsea Four have no intention to use diesel generators.
S42_0046_001	Public Health England	<p>Human Health and Wellbeing</p> <p>We welcome the adoption of the WHO definition of health and the wider determinants considered within the scoping report. We acknowledge the proposal to have a separate Health Impact Assessment (HIA) report to be based on the London HUDU model and submitted as part of the DCO application. We note from Table 5.5 - HIA Assessment Framework, the areas to be scoped out and the study areas will be determined by the other specific technical study areas.</p> <p><b>Recommendations</b></p> <p>The draft HIA should receive targeted consultation prior to the submission of the DCO.</p> <p>We expect an assessment to include consideration of the need for monitoring and</p>	N/A	N/A	<p>The Applicant has provided a standalone <b>Health Impact Assessment (Volume A4, Annex 5.8)</b>, which contains an overview of the potential health impacts as a result of Hornsea Four.</p> <p>The Applicant will continue to engage with Public Health England regarding health impact assessment.</p>

		<p>the Environmental Statement (ES) should clearly state the principles on which the monitoring strategy has been established, including monitoring in response to unforeseen impacts or effects.</p> <p>It may be appropriate to undertake monitoring where:</p> <ul style="list-style-type: none"><li>• Critical assumptions have been made in the absence of supporting evidence or data.</li><li>• There is uncertainty about whether significant negative effects are likely to occur, and it would be appropriate to include planned monitoring measures to track their presence, scale and nature.</li><li>• There is uncertainty about the potential success of mitigation measures.</li><li>• It is necessary to track the nature of the impact or effect and provide useful and timely feedback that would allow action to be taken should negative effects occur.</li><li>• Any monitoring strategy should be published as a separate chapter to ensure a transparent, coordinated and consistent approach.</li><li>• The monitoring strategy to set out:<ul style="list-style-type: none"><li>• Monitoring methodologies<ul style="list-style-type: none"><li>• Data sources</li><li>• Assessment methods</li><li>• Publication methodology</li><li>• Reporting frequency</li><li>• Temporal and geographic scope</li></ul></li></ul></li></ul>			
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S42_0046_004	Public Health England	<p><b>Electric and Magnetic Field (EMF)</b></p> <p>Based on the electric and magnetic field (EMF) assessment presented in the PEIR Volume 4 Annex 43, it is concluded that no significant EMF public health impact has been identified and therefore PHE does not intend to make any further comments on this aspect of the development.</p>	N	N/A	The Applicant notes this comment.
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## EIA topic area: Socioeconomics

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0038_003	ERYC	<p><b>Economic Development</b></p> <p>On behalf of the Economic Development department of the East Riding of Yorkshire Council I would like to extend our full support to the Hornsea Four Offshore Wind Farm project. Offshore wind is recognised as critical in combatting climate change through the generation of low-carbon energy, and its development will be essential in meeting the Government's target of the UK becoming carbon neutral by 2050. The Humber is perfectly situated to drive this goal forward, as it contributes to over a quarter of the UK's energy, and is at the forefront of developing a world-leading offshore wind sector. East Riding of Yorkshire Council's Economic Development team are fully committed to working with the developer in the Humber region in order to maximise its economic growth potential and to work towards the Humber becoming a</p>	N	N/A	The Applicant welcomes the response from ERYC.

		<p>zero-carbon industrial economy by 2040. The Humber was highlighted in the offshore wind sector deal announced in March 2019 as an exemplar LEP area for maximising opportunities within the sector with projects such as 'Aura' and 'ergo' led by the University of Hull and ERYC respectively, bringing together a coalition of public and private sector partners to sustain the region as a global leader in offshore wind. As a local authority we will continue to work with the Humber LEP who are investing in skills and business support to maximise opportunities in the offshore wind sector including supply chain and specialist skills job creation. The Council also particularly welcomes the commitments made by the developer to ensure that the project does not impact on sensitive marine and terrestrial ecological sites.</p>			
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**EIA topic area: Marine Geology, Oceanography and Physical Processes**

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0052_I NT2.1	Natural England	<p>2) Impacts on the natural environment</p> <p>Although it is clear from the points raised above and within the annexes that Natural England has not been able to fully identify all of the potential areas of concern relating to the Hornsea Four development, we feel that there are early indications of a number of notable areas of concern at this stage that need to be highlighted. We would like to stress that this should not be considered a</p>	N	N/A Co188, Co189	Additional seabed data was collected in 2019 to inform the baseline, refine proposals and avoid/minimise/reduce impacts where possible. The combined and updated 2018-2019 survey data is presented applied in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> and all assessments within the Environmental Statement have been updated in light of this data.

		<p>complete assessment, and it is likely that there will be further areas identified as additional survey data and outputs become available. Please refer to our colour coding in ANNEX 12.</p> <ul style="list-style-type: none"> <li>• Marine Processes</li> </ul> <p>The lack of data to inform baseline characterisation presents significant uncertainties and therefore conclusions cannot be drawn with any confidence. Not all receptors, pressures and impacts have been identified and the WCS are not clearly defined. Consequently, Natural England cannot agree with the conclusions of the PEIR at this stage.</p> <p>Impacts on coastal processes and nearshore sediment pathways are likely to be key consenting risks for this project. It is therefore important that these aspects are fully assessed and that there is sufficient time to fully explore options to ideally avoid, or if not mitigate the impacts prior to application. The Project should consider options to avoid impacts to Smithic Bank completely, and to reduce/remove the potential for impacts on coastal processes.</p>			<p>All maximum design scenarios presented in <a href="#">Volume A1, Chapter 4: Project Description</a> and <a href="#">Volume A4, Annex 5.1: Impacts Register</a> have been reviewed and updated where required.</p> <p>The importance of Smithic Sands Bank is recognised. Offshore export cable crossings adjacent to Smithic Sands Bank are described in <a href="#">Volume 1, Chapter 4: Project Description</a> which details the assumptions and calculations behind the project's maximum design scenario parameters. Further the Applicant has committed (Co188 and Co189) to ensure offshore export cable crossings remain clear of Smithic Sands Bank as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>. The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p>
S42_0052_1.9	Natural England	<p><b>Project Parameters</b> <b>Project Definition</b></p> <p>There is a lack of data provided in support of the PEIR and as a consequence the project parameters are broad. Information is also missing on key aspects such as beach access, cliff stability, boulder clearance, the proposed design of the HVAC booster station and the use of cable protection (See detailed comments)</p> <p>NER: Further detail to be provided on all</p>	Y	N/A	<p><b>Project Description</b></p> <p>The Project Description has been updated to reflect the very latest in project design and site-specific information available at the time of application (<a href="#">Volume 1, Chapter 4: Project Description</a>).</p> <p><b>Worst Case Scenario (WCS)</b></p> <p>Hornsea Four have considered a maximum design scenario assessment</p>

	<p>aspects of the proposal. Parameters to be refined based on geophysical/ geotechnical survey information.</p> <p><b><u>Worst Case Scenario (WCS)</u></b></p> <p>The impact assessment sets out a number of potential impacts and the Maximum Design Scenarios associated with them, but it does not identify the worst case scenario at a receptor level.</p> <p>For example, a maximum design scenario for sandwave clearance along the total length of the export cable corridor is provided, but it is not clear how this total volume relates to Smithic Sands (and other) receptor(s), and consequently if/how the impact (i.e. Sandwave clearance on Smithic Sands) has been assessed.</p> <p>NER: The Maximum Design Scenarios (MDS) should be used to identify a Worst Case Scenario (WCS) for the receptor.</p> <p>NE position on WCS</p> <p>Natural England do not agree with the WCS presented</p> <p>NER: As above.</p> <p><b><u>Baseline Characterisation Data suitability and baseline characterisation</u></b></p> <p>As highlighted throughout the PEIR chapter, the baseline surveys are not complete and therefore there is insufficient information to enable a characterisation of baseline conditions. Baseline conditions need to be</p>		<p>approach. All maximum design scenarios presented in <a href="#">Volume A1, Chapter 4: Project Description</a> and <a href="#">Volume A4, Annex 5.1: Impacts Register</a> have been reviewed and updated where required.</p> <p>Some restructuring has been considered to make the association clearer between maximum design scenarios and related receptors but also to align with greater clarity on the areas being assessed.</p> <p><b><u>Baseline Characterisation</u></b></p> <p>With reference to baseline characterisation, the Applicant acknowledge the data gaps presented in the Preliminary Environmental Information Report but confirms the EIA draws upon both 2018 and 2019 infill geophysical survey to establish an appropriate a baseline for the seabed.</p> <p><b><u>Identified Impacts</u></b></p> <p>With regard to those potential pressures/impacts assumed missing from the Preliminary Environmental Information Report, The Applicant confirms beach access is fully described in <a href="#">Volume 1, Chapter 4: Project Description</a>; cliff stability is no longer considered in detail owing to a project commitment (Co187) to horizontal directional drill beneath the cliff line at landfall; and boulder clearance and cable protection are fully described in <a href="#">Volume 1, Chapter 4: Project Description</a> and were not considered</p>
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	<p>fully established.</p> <p><b><u>Data gaps</u></b></p> <p>Geophysical/geotechnical data for the ECC, HVAC area and Array. The need for further information beyond this is not yet clear, however additional information may be required in relation to key receptors including Smithic Sands, Flamborough Front and the Holderness Coast.</p> <p><b><u>Data analysis</u></b></p> <p>N/A</p> <p><b><u>Environmental Impact Assessment Identified Impacts</u></b></p> <p>A number of potential pressures/impacts appear to be missing from the assessment including:</p> <ul style="list-style-type: none"> <li>- Beach access</li> <li>- Cliff stability (as a result of landfall)</li> <li>- Boulder clearance</li> <li>- Use of cable protection</li> </ul> <p>There are also examples of impacts not being identified/assessed in full – e.g. cable installation</p> <p><b><u>Page 21 of 82</u></b></p> <p>seems to focus solely on sediment plumes and does not consider the impact of the actual installation of the cable itself. The basis upon which ‘changes to offshore sediment pathways’ has been scoped out is also unclear. (See detailed comments for further information)</p>		<p>significant impacts in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a>.</p> <p>Impacts associated with cable installation are fully detailed and assessed in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a>; <a href="#">Volume 2, Chapter 2: Benthic and Intertidal Ecology</a> and <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p> <p>The basis upon which changes to offshore sediment pathways were scoped out at the Scoping phase has been further justified in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a>.</p> <p><b><u>Methodology</u></b></p> <p>The application of sensitivity and magnitude of impacts assessed has been clarified where necessary in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p> <p>The identification of marine process receptors was developed bespoke to Hornsea Four. The Holderness Coast was identified as a specific receptor in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> and has been expanded to refer to relevant infrastructure, the Holderness Inshore MCZ and the Humber Estuary SAC, SPA, Ramsar, SSSI, as considered to be relevant. The assessment will consider</p>
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	<p><b><u>Methodology</u></b></p> <ul style="list-style-type: none"> <li>The definitions of sensitivity and magnitude used appear to be reasonable, however it is not always clear how they have been applied.</li> </ul> <p>The identification marine process receptors appears to have drawn largely from the assessments at Hornsea One and Two, however, it should be noted that as The Applicant is much further inshore, additional receptors need to be considered, notably the Holderness Coast (including its infrastructure), Holderness Inshore MCZ and the Humber Estuary SAC, SPA, Ramsar, SSSI. (There may also be receptors beyond this point that should be considered).</p> <ul style="list-style-type: none"> <li>The assessment does not appear to have been made in consideration of the WCS for a particular receptor. Taking sandwave clearance as the example, considering the impact of proposed sandwave clearance at Smithic Sands on Smithic Sands is likely to be an order or magnitude greater than considering the impact of sandwave clearance at a North Sea Scale.</li> </ul> <p>NER: Impacts should be assessed based on the WCS as it pertains to each receptor.</p> <p><b><u>Cumulative Effect Assessment (CEA)</u></b></p> <p>The CEA should also include projects along the Holderness Coast and potentially within the Humber Estuary.</p> <p><b><u>Overall Assessment Conclusion</u></b></p> <p>As highlighted within the Marine Process</p>		<p>MDS issues on each receptor.</p> <p><b><u>Cumulative Effect Assessment</u></b></p> <p>The cumulative effect assessment includes projects along the Holderness Coast and potentially within the Humber Estuary where considered relevant.</p> <p><b><u>Overall Assessment Conclusion</u></b></p> <p>Baseline characterisation has been updated with 2019 geophysical data. The Project Description has been updated to reflect the very latest in project design and site specific information available at the time of application (<a href="#">Volume 1, Chapter 4: Project Description</a>). <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> have been reviewed and all relevant receptors, pressures and impacts identified in line with the proportional approach.</p> <p>Some restructuring has been considered to make the association clearer between maximum design scenarios and related receptors but also aligning with greater clarity on the areas being assessed.</p> <p><b><u>Other Comments</u></b></p> <p>Impacts on coastal processes and nearshore sediment pathways were recognised in the Preliminary Environmental Information Report and</p>
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	<p>chapter, the lack of data to inform baseline characterisation presents significant uncertainties and therefore conclusions cannot be drawn with any certainty. Beyond this</p> <ul style="list-style-type: none"> <li>- Project parameters are not clearly defined</li> <li>- Not all of the relevant receptors have been identified</li> <li>- Not all pressures and impacts have been identified</li> <li>- WCS has not been clearly identified and assessed at a receptor level</li> </ul> <p>Consequently Natural England cannot agree with the conclusions of the PEIR at this stage.</p> <p><b><u>Other Comments</u></b></p> <p>Impacts on coastal processes and nearshore sediment pathways are likely to be key consenting risks for this project. It is therefore important that these aspects are fully assessed and that there is sufficient time to fully explore options to ideally avoid, or if not mitigate the impacts prior to application. The Project should consider options to avoid impacts to Smithic Bank completely. This could involve:</p> <ul style="list-style-type: none"> <li>- Consideration of an alternate cable route around Smithic Bank</li> <li>- Changing the point at which the DBCB cable is crossed to a location further offshore.</li> <li>- Moving the proposed HVAC booster station further offshore</li> <li>- Matching DBCB's condition prohibiting the use of cable protection within the 10m depth contour (as a starting point)</li> </ul> <p>The project should also consider removing the option of trenching the cable at landfall (in line with DBCB).</p>		<p>have been reviewed and refined in line with the updated <a href="#">Volume 1, Chapter 4: Project Description</a>.</p>
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S42_0052_2.1	Natural England	<p>The wording of the fourth bullet point implies that monitoring could prevent, minimise or reduce impacts. Natural England advise that monitoring is not a form of mitigation. Natural England assume that the intension is that the PEIR would highlight additional monitoring requirements, as well as highlighting mitigation measures.</p> <p><i>NER: Please clarify</i></p>	Y	N/A	The Applicant confirms the text has been reconsidered as appropriate.
S42_0052_2.2	Natural England	<p>In relation to the third paragraph, it is unclear how the proposed designs have incorporated measures that seek to minimise the potential for impact on the physical environment as per paragraph 2.6.196 of NPS EN-3.</p> <p>The project parameters include a range of installation methods, some of which have a greater impact than others.</p> <p>Additionally, the PEIR only proposes measures where the impacts are considered to be significant and adverse, whereas the NPS refers to minimising impact more generally.</p> <p><i>NER: Sufficient data should be collected prior to application in order to refine proposals as far as reasonably practicable. Measures that would avoid/minimise/ reduce all impacts should be considered.</i></p>	Y	N/A	Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. Project design and a description of those measures which seek to minimise the potential for impact on the physical environment are considered in the updated <b>Volume 1, Chapter 4: Project Description</b> .
S42_0052_2.3	Natural England	<p>3rd Row</p> <p>All sites that could potentially be affected by the interruption of sediment transport along the Holderness Coast should be considered, particularly the Humber Estuary SAC, SPA SSSI and Ramsar.</p> <p><i>NER: Clarifications/ updates should be made in the relevant ES chapters and the MCZ assessment and RIAA updated accordingly.</i></p>	Y	N/A	All sites potentially affected by the interruption of sediment transport along the Holderness Coast have been considered in <b>Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes and Volume A5, Annex 1.1: Marine Processes Technical Report</b> .

S42_0052_2.4	Natural England	<p>4th Row</p> <p>Whilst the dynamic nature of the Holderness coast is recognised, Natural England is concerned that the potential impacts have not been fully considered for the lifetime of the project.</p> <p>Additionally, key receptors such as the Humber Estuary require further consideration.</p> <p>See comments below</p> <p><i>NER: Impacts to be fully assessed</i></p>	Y	N/A	<p>Potential impacts on the Holderness Coast are considered relative to the lifetime of the project in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a>.</p>
S42_0052_2.5	Natural England	<p>7th Row</p> <p>As per POINT 2.2 above, it is unclear how the proposed designs address this requirement.</p> <p><i>NER: Sufficient data should be collected prior to application in order to refine proposals as far as reasonably practicable.</i></p> <p><i>Measures that would avoid/minimise/ reduce all impacts should be considered.</i></p>	Y	N/A	<p>Additional seabed data has been collected to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. Issues related to proposed designs (for the methods of construction, including use of materials should be such as to reasonably minimise the potential for impact on the physical environment) are considered in the updated <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>
S42_0052_2.6	Natural England	<p>It may be useful to include the Shoreline Management Plan and the East Riding of Yorkshire Local plan here for completeness</p>	Y	N/A	<p>This comment is noted by the Applicant and relevant details are provided within <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography</a>.</p>
S42_0052_2.7	Natural England	<p>Natural England would have anticipated that the PEIR would have included geophysical and geotechnical survey data for the full extent of the project area.</p> <p>Natural England notes that the survey work to support this chapter is due to complete in 2019 and will be included in the final application, but are concerned that there will be insufficient time between surveys completing and the application being submitted to ensure that all of the potential impacts have been fully explored and addressed.</p>	Y	N/A	<p>Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. A summary of pertinent data is presented in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p>

S42_0052_2.8	Natural England	It should be noted that sediment transport could be strongly to the North or South. It is only when this movement is averaged over a number of years that the separation zone is apparent.	Y	N/A	The Applicant clarifies that drift divide is a function of sheltering from Flamborough Head, which eliminates the influence of north-easterly waves therefore leaving only southerly waves to move sediments north. This statement IS enhanced in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography of the Environmental Statement</a> .
S42_0052_2.9	Natural England	It is not clear how the predicted retreat distances quoted here have been calculated and what they are based on.  Predictions should be based on a Worst Case Scenario and take account of factors such as sea level rise.  <i>NER: Please provide more details as to how these figures have been arrived at.</i>	Y	N/A	Retreat distances are based on published retreat rates. <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography</a> of the Environmental Statement provides further supporting details on these rates.
S42_0052_2.10	Natural England	Impacts on sediment supply that may arise in the landfall area could have impacts further afield – i.e. Humber Estuary. Additional infrastructure located along the Holderness coast may also require consideration	Y	N/A	Reference is made in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report (Section 4.4.2.8)</a> to similar landfall works undertaken nearby which did not appear to have had any far-field influences. Landfall works will be short-term, temporary and localised.
S42_0052_2.11	Natural England	It should be noted that conditions have been applied to dredge disposal within this location to minimise the impact on Bridlington Harbour and Flamborough Head SAC.	Y	N/A	This comment is noted by the Applicant and relevant details are added to <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography</a> .
S42_0052_2.12	Natural England	Smithic Sands is a classic banner bank and as such is essential for the connection of sediment pathways from the North of Flamborough to the Holderness Coast and beyond.  The importance of this is not really drawn out in the text.  On this basis additional receptors should also	Y	N/A	Smithic Sands is identified as a pertinent feature, formed largely by local sediment supply. Additional comment has been added to <a href="#">Volume A2, Chapter 1: Marine Geology, Oceanography</a> . Receptors in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> have been expanded

		<p>be considered, including but not limited to Holderness Inshore MCZ and the Humber Estuary SAC, SPA, SSSI and Ramsar</p> <p><i>NER: Sections to be updated with full consideration of receptors.</i></p>			<p>to refer to the Holderness Inshore MCZ and the Humber Estuary SAC, SPA, Ramsar, SSSI, as considered to be relevant.</p>
S42_0052_2.13	Natural England	<p>Geophysical surveys should establish if chalk is present as this may impact the size/shape of suspended sediment plumes</p> <p><i>NER: Geophysical surveys to be completed and shared with the Technical Panel prior to application.</i></p>	Y	N/A	<p>Additional seabed survey data was collected in 2019 to support the Environmental Impact Assessment (EIA), refine proposals and avoid/minimise/reduce impacts where possible. Where feasible, the geophysical survey data has been considered for chalk layers to inform the EIA. This is presented in <a href="#">Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a>. Sediment plumes have been modelled with the results presented in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> and Appendix D of the same volume.</p>
S42_0052_2.14	Natural England	<p>It is not clear where these cable crossings are located or how they have been/will be assessed. Therefore, Natural England cannot agree with and conclusions reached. See POINT 1.23.</p> <p><i>NER: The 40 potential cable crossings referred to should be clearly identified and fully assessed in the ES</i></p>	Y	N/A	<p><a href="#">Figure 1.15</a> indicates the locations of crossings. <a href="#">Volume A4, Annex 4.1: Offshore Crossing Schedule</a> details all planned crossings. <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> of the Environmental Statement will indicate locations of all relevant pipeline crossings and identify their local water depths.</p>
S42_0052_2.15	Natural England	<p>It is not currently clear at which point the revised designs of consented projects become legally secured in order to be considered the baseline assumption of cumulative/in combination assessment within an ES or HRA.</p> <p>Guidance should be sought from the regulators on this point</p>	Y	N/A	<p>The Applicant engaged with the Marine Ecology and Processes Technical Panel through the Evidence Plan process, noting constructed projects are often of lesser extent than those described within their consented envelope. At the advice of the panel, the baseline assumptions for cumulative and in/comparison assessments now</p>

		<p><i>NER: Discussion welcomed with the wider Steering Group.</i></p>			<p>include the as built and final designs for Hornsea Project One and Hornsea Project Two Offshore Wind Farms.</p> <p>In addition, the scale of effects on waves from the present baseline has also been demonstrated using the available wave monitoring evidence to contrast with the MDS case for Hornsea Project One. This evidence is presented within the Operational Wave Technical Note discussed and agreed with the Marine Ecology and Processes Technical Panel.</p> <p>Agreements made with consultees through the Evidence Plan process are set out in the topic specific Evidence Plan Logs which are appendices to the <a href="#">Hornsea Four Evidence Plan (Volume B1, Annex 1.1: Evidence Plan)</a>, an annex of the Hornsea Four Consultation Report (<a href="#">Volume B1, Chapter 1: Consultation Report</a>).</p>
S42_0052_2.16	Natural England	<p>Natural England notes that sea level rise could place the vertical profile of Smithic Sands lower in the tidal frame which would lead to increased cliff erosion. Natural England would like to understand if/how the proposed cable route over the top of Smithic Sands might contribute to this impact. Natural England would also like to understand how this potential impact has been incorporated in the cliff erosion predictions.</p> <p><i>NER: Further clarification required.</i></p>	Y	N/A	<p>Smithic Bank exists in dynamic equilibrium with its local sediment supply from cliff erosion. Any climate change related effects are part of the present and future baseline and the reasonable prognosis is that the bank would respond and store more sediment to balance against any (slow rates) of sea level rise. This comment is noted by the Applicant and relevant details are added to <a href="#">Volume A2, Chapter 1: Marine Geology, Oceanography</a>.</p>
S42_0052_2.17	Natural England	<p>Given the significance of this receptor it is important that it is fully assessed</p>	Y	N/A	<p>This comment is noted by the Applicant and confirms that the Preliminary Environmental Information</p>

		<p>NER: Further discussions should be held within the technical group in order to identify the best way to assess it</p>			<p>Report recognised the importance of this (undesigned) feature. <b>Volume A2, Chapter 1: Marine Geology, Oceanography</b> examines this further in line with the updated Project Description.</p>
S42_0052_2.18	Natural England	<p>Blockage to nearshore sediment transport has the potential to impact along the full extent of the Holderness coast and beyond. The current list of receptors is incomplete. The Humber Estuary SPA, SAC, SSSI Ramsar and Holderness Inshore MCZ should be included as a minimum.</p> <p>NER: List of receptors should be re-evaluated.</p>	Y	N/A	<p>Table 11.1 recognises the Holderness Coast cliffs as a receptor. Receptors have been expanded in <b>Volume A5, Annex 1.1: Marine Processes Technical Report</b> to refer to the Holderness Inshore MCZ and the Humber Estuary SAC, SPA, Ramsar, SSSI, as considered to be relevant.</p>
S42_0052_2.19	Natural England	<p>A number of impact pathways, such as sediment plumes, cannot be fully assessed until the 2019 surveys are completed. Elements of these chapters may need to be re-assessed when this information becomes available.</p> <p>NER: Potential implications of this to be noted and discussed at Technical Panel meetings</p>	Y	N/A	<p>Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. This data is presented in <b>Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</b> and <b>Volume 5, Annex 1.1: Marine Processes Technical Report</b>.</p>
S42_0052_2.20	Natural England	<p>MP-O-7</p> <p>Whilst NE support the use of data from Hornsea One and Two to inform the assessment of Hornsea Four, it should be noted that The Applicant is much closer inshore and therefore has the potential to interact with different receptors. It is therefore important that Hornsea Four demonstrate the applicability of any information or conclusions drawn from its sister projects.</p> <p>The justification text only considers impacts arising from the array, however the project activity and impact only states 'offshore'. Whilst MP-O-6 refers to 'nearshore' impacts, it is not clear how this is delineated. In this case, the potential impact on Smithic</p>	Y	N/A	<p>Hornsea Four is at least 65 km offshore. Evidence at PEIR from Hornsea One and Hornsea Two is representative of similar impacts for scales of change in the physical environment. For offshore sediment pathways, the impacts are considered to be similar.</p> <p><b>Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes</b> and <b>Volume 5, Annex 1.1: Marine Processes Technical Report</b> has been updated to provide additional justification.</p>



		<p>Sands as a result of the cable route, cable crossings and HVAC and the knock on implications this may have on a number of other near-shore receptors could be highly significant, and therefore this activity should not be scoped out.</p> <p>NER: Further justification should be provided to support scoping this impact out.</p>			
S42_0052_2.21	Natural England	<p>The project description states that cable and scour protection will be left in situ at decommissioning.</p> <p>It is not clear from the PEIR how impacts beyond the lifetime of the project have been assessed.</p> <p><i>NER: Further details on the assessment of ongoing impacts beyond the decommissioning phase to be provided.</i></p>	Y	N/A	<p><b>Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes</b> and <b>Volume A5, Annex 1.1: Marine Processes Technical Report</b> has been updated to provide further detail.</p>
S42_0052_2.22	Natural England	<ul style="list-style-type: none"> <li>• It is unclear why 8 HDD exit pits are required for the installation of 6 cables.</li> <li>• Boulder clearance should be included. The removal of all boulders over 30cm in diameter along the cable corridor could represent a significant alteration to the composition of the seabed.</li> <li>• Total spoil in the offshore array area appears to be incorrect.</li> <li>• Disposal of material is not considered.</li> </ul> <p>Access to the beach area and the requirement for any associated infrastructure has not been considered</p>	Y	N/A	<p>Six offshore export cables require six HDD exit pits plus up to two additional contingency HDD pits. <b>Volume A1, Chapter 4: Project Description</b> has been updated to clarify this.</p> <p>Clarification is also offered in <b>Volume A5, Annex 1.1: Marine Processes Technical Report</b> for boulder clearance, total spoil in the array and spoil disposal.</p>
S42_0052_2.23	Natural England	<ul style="list-style-type: none"> <li>• Within MP-C-1 the export cable within the array area is considered with the EEC, whereas here it is considered with the array. We request that this information be presented consistently to avoid confusion.</li> <li>• Cable trenching in the offshore array area – It is unclear if the use of a single vessel would represent a WCS (i.e. smaller amount of sediment release over a longer time period</li> </ul>	Y	N/A	<p>Clarity on how the offshore export cable corridor is assessed has been provided in <b>Volume 5, Annex 1.1: Marine Processes Technical Report</b>.</p> <p><b>Volume 1, Chapter 4: Project Description</b> has been updated to clarify cable trenching in the offshore array</p>

		<p>vs larger amount of sediment release over a shorter time period)</p> <ul style="list-style-type: none"> <li>• 180 WTG foundations – the WCS anticipates drilling at 10% of sites. Natural England would like to understand how this parameter could be captured in the DCO/dML</li> </ul> <p>Access to the beach area and the requirement for any associated infrastructure has not been considered</p>			<p>and any requirements for infrastructure associated with beach access.</p> <p>The Applicant acknowledges this comment regarding drilling 10% foundations and confirms this has been detailed in <a href="#">Volume A1, Chapter 4: Project Description</a> and <a href="#">Volume A4, Chapter 5, Annex 1: Impacts Register</a>.</p>
S42_0052_2.24	Natural England	<p>There the potential for impacts on cliff stability from preparation and installation activities does not appear to have been captured.</p> <p><i>NER: Impacts to be assessed</i></p>	Y	N/A	<p><a href="#">Volume A1, Chapter 4: Project Description</a> has been updated to clarify options for beach access and any necessary provisions to manage risks of cliff instability.</p>
S42_0052_2.25	Natural England	<p>Cable protection appears to be missing from the table. Only cable protection at rock berms has been considered.</p> <p><i>NER: Impacts to be assessed</i></p>	Y	N/A	<p>Cable protection for cable crossings and where seabed mobility leads to reduced burial requiring rock armouring are considered in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p>
S42_0052_2.26	Natural England	<p>The impact assessment is activity led rather than receptor led, consequently, it is not always clear how the Maximum Design Scenario (MDS) is translated into a receptor led Worst Case Scenario (WCS)</p> <p>For example, Table 1.14 provides an overall volume of sandwave clearance across the total length of the export cable corridor (MDS), but it is not clear from this how much sandwave clearance is anticipated in and around Smithic Sands.</p> <p><i>NER: Receptor specific Worst Case Scenarios should be identified and assessed.</i></p>	Y	N/A	<p>The environmental impact assessment is based on the standard source-pathway-receptor approach. All maximum design scenarios, including that for Sandwave clearance, are presented in <a href="#">Volume A1, Chapter 4: Project Description</a> and <a href="#">Volume A4, Chapter 5, Annex 1: Impacts Register</a>.</p>
S42_0052_2.27	Natural England	<p>The requirement for 8 HDD exit pits for 6 cables is unclear. Natural England would like to understand upon what circumstances a HDD location might be considered to be unsuitable after the exit pit has been dug; what level of activity is likely to have taken</p>	Y	N/A	<p>Six offshore export cables require six HDD exit pits plus up to two additional contingency HDD pits. <a href="#">Volume A1, Chapter 4: Project Description</a> has been updated to clarify this and</p>

		<p>place before this is known, and what works might need to be undertaken to reinstate in order to ensure that cliff stability is maintained.</p> <p>Natural England would also request that lessons learnt from other projects should be considered to ensure that all potential impacts are fully assessed.</p> <p><i>NER: Further detail to be provided</i></p>			<p>describe the rationale for contingency pits.</p> <p><b>Volume A1, Chapter 4: Project Description</b> describes the circumstances in which an HDD location might be considered unsuitable; what level of activity is required; and what works might need to be undertaken to reinstate exit pits.</p> <p>The Applicant regularly utilises lessons learnt from previous offshore windfarm projects and these are captured throughout the development design and DCO application.</p>
S42_0052_2.28	Natural England	<p>The experience of other developments in this area has been that excavated material has winnowed away quickly due to wave/tidal action. Further consideration should be given to the storage of material in order to have confidence that infilling will not require the use of any additional materials.</p> <p><i>NER: Further detail needed.</i></p>	Y	N/A	<p><b>Volume A1, Chapter 4: Project Description</b> describes the preferred storage solution for side casted material noting the maximum design scenario for coastal processes remains side-casting, with the risk of winnowing away material.</p>
S42_0052_2.29	Natural England	<p>Seabed Preparation : Sandwave Clearance The lack of information on the presence and distribution of sand waves within the ECC means that this impact cannot be meaningfully assessed.</p> <p><i>NER: Geophysical surveys to be completed and assessment to be undertaken and shared with the Technical Panel prior to application.</i></p>	Y	N/A	<p>Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. This data is presented in <b>Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes</b> and <b>Volume A5, Annex 1.1: Marine Processes Technical Report</b>. All maximum design scenarios, including that for Sandwave clearance, are presented in <b>Volume A1, Chapter 4: Project Description</b> and <b>Volume A4, Annex 5.1: Impacts Register</b>.</p>
S42_0052_2.30	Natural England	<p>Seabed Preparations: HVAC Booster Area The lack of geophysical information within the HVAC area means that this impact cannot be meaningfully assessed.</p> <p><i>NER: Geophysical surveys to be completed</i></p>	Y	N/A	

		<i>and assessment to be undertaken and shared with the Technical Panel prior to application.</i>			
S42_0052_2.31	Natural England	Seabed levelling: Offshore Array Area The lack of information means that this impact cannot be meaningfully assessed  <i>NER: Geophysical surveys to be completed and assessment to be undertaken and shared with the Technical Panel prior to application.</i>	Y	N/A	
S42_0052_2.32	Natural England	Open cut trenching across the intertidal at the export cable landfall.  The potential for impacts on the stability of the cliff do not appear to have been considered, therefore Natural England do not agree with the conclusion of 'not significant' Natural England consider the use of trenching at this location to constitute a significant impact and request that HDD is taken forward as the installation method.  <i>NER: Project commitment to the use of HDD at the landfall.</i>	Y	New Co187	Open cut trenching at landfall has been removed from the project design as described in <a href="#">Volume A1, Chapter 4: Project Description</a> and secured by commitment (Co187) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .
S42_0052_2.33	Natural England	Cable Trenching Offshore EEC The only impacts that appear to have been considered relate to increases in suspended sediment. The direct impact of trenching on receptors such as Smithic Sands has not been considered. The narrative around the magnitude of impact refers to 'the nearshore section of the offshore ECC trenching' - it is not clear what it meant by this and which receptors are therefore being considered. Again, this consideration only appears to relate to increases in suspended sediment. As not all impacts have been assessed, and due to the lack of clarity around which receptors the conclusion of 'not significant'	Y	N/A	The potential for impacts of cable installation across Smithic Sands and a definition for nearshore have been considered in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> .

		relates to, Natural England does not agree with this conclusion.  <i>NER: The impact of cable installation on Smithic Sands should be assessed. Clarity should be provided over what it meant by 'nearshore' and which receptors are included within this broad term.</i>			
S42_0052_2.34	Natural England	Cable Trenching: Offshore array The lack of information means that this impact cannot be meaningfully assessed  <i>NER: Geophysical surveys to be completed and assessment to be undertaken and shared with the Technical Panel prior to application.</i>	Y	N/A	The combined and updated 2018-2019 geophysical survey data have been presented via the Marine Ecology and Process Evidence Plan process and described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> . Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. This data is presented in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> . All maximum design scenarios are presented in <a href="#">Volume A1, Chapter 4: Project Description</a> and <a href="#">Volume A4, Chapter 5, Annex 1: Impacts Register</a> .
S42_0052_2.35	Natural England	Foundation Installation: drilling at HVAC booster area The lack of information means that this impact cannot be meaningfully assessed  <i>NER: Geophysical surveys to be completed and assessment to be undertaken and shared with the Technical Panel prior to application.</i>	Y	N/A	
S42_0052_2.36	Natural England	Foundation Installation: drilling at offshore array area The lack of information means that this impact cannot be meaningfully assessed  <i>NER: Geophysical surveys to be completed and assessment to be undertaken and shared with the Technical Panel prior to application.</i>	Y	N/A	
S42_0052_2.39	Natural England	Foundation Scour: HVAC Booster Area The lack of geophysical data means that this impact cannot be meaningfully assessed.  <i>NER: Geophysical surveys to be completed and assessment to be undertaken and shared with the Technical Panel prior to application.</i>	Y	N/A	
S42_0052_2.37	Natural England	Scour around cofferdams – landfall area As it is only intended that the cofferdams will be in place for the HDD installation it is	Y	N/A	

		<p>unclear why they are considered at the O&amp;M stage. This would fit better in the site preparation section.</p> <p><i>NER: Move to the site preparation section.</i></p>			<p><a href="#">Marine Processes Technical Report</a> have been updated accordingly.</p>
S42_0052_2.38	Natural England	<p>If the impact assessment is predicated on the cofferdams being in place for up to 4 months, this should be secured within the DCO/dML.</p> <p><i>NER: Include as relevant in the draft DCO/dML</i></p>	Y	N/A	<p>The Applicant has noted this comment. The anticipated construction programme is described in <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>
S42_0052_2.40	Natural England	<p>The base width of the large offshore substation at 150m with additional scour protection of 50m has the potential to cause significant disturbance to sediment flow. This should be fully assessed on an individual and cumulative basis</p>	Y	N/A	<p>The main sediment transport at this location is expected to be bedload driven by tidal currents and exhibited as sandwave migration. The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a>.</p>
S42_0052_2.41	Natural England	<p>The impact of up to 24 cable crossings is considered to be minor on the basis of sediment type (1.11.2.32) and yet in 1.11.24 it is stated that there are uncertainties relating to sediment types along the cable corridor.</p> <p>Given this contradiction, and the lack of evidence presented to support the assumption of minor, Natural England do not agree with this conclusion and requests that these impacts are fully assessed, taking account of the proximity of receptors such as Smithic Sands.</p>	Y	N/A	<p>The combined and updated 2018-2019 geophysical survey data have been presented via the Marine Ecology and Process Evidence Plan process and described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p> <p>The impact remains unchanged, but the certainty has increased. The impact is minor, relative to the scale of the area involved rather than the sediment type. The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a>.</p>
S42_0052_2.42	Natural England	<p>Turbulent wakes : HVAC Booster station Natural England does not agree that the scale of impact has been adequately assessed, and disagree that there is no pathway for effects given the proximity of</p>	Y		<p>The distance between the HVAC booster station search area and Smithic Sands is considerable and the axis of tidal wakes is not aligned with Smithic Sands. There is no sediment pathway</p>

		<p>Smithic Sands. A full impact assessment should be provided</p>			<p>connecting the two areas. <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> offers additional comment in line with the updated information presented in <a href="#">Volume A1, Chapter 4: Project Description</a> and updated wave modelling presented in <a href="#">Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> of the Environmental Statement.</p>
S42_0052_2.43	Natural England	<p>There do not appear to be any conclusions associated with this.</p>	Y	N/A	<p>Additional detail is provided in <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> utilising results of updated wave modelling.</p>
S42_0052_2.44	Natural England	<p>Smithic Sands provides connectivity between the area North of Flamborough and the Holderness Coast and consequently any impacts on this feature may be significant to a number of other receptors. The installation of six cables over the top of the bank has the potential to cause changes in sediment pathways, which could have implications for a number of coastal/nearshore receptors including designated sites. In addition, there is no consideration of the potential requirement for cable protection in the nearshore environment, or the potential impacts of this. Again, the placement of hard structures perpendicular to the coast has the potential to interrupt sediment flow, which in turn may result in significant impacts on a number of receptors (including designated sites). Cable crossings and the HVAC station, also need to be fully assessed and these impacts need to be fully considered both individually and cumulatively. The option of trenching at landfall should also be removed. Given the connectivity with designated sites</p>	Y	Change Co188, Co189	<p>Smithic Sands is identified as an important feature to coastal processes in the nearshore. Updated modelling to support <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> examines the potential changes on waves and currents due to the installation of cable crossings, the HVAC booster station search area and the offshore array to support the conclusions presented in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a>. The Applicant has committed to ensuring no cable protection will be employed within 350m seaward of MLWS (Co188) and any crossings required at the Dogger Bank Project cables will be positioned east of Smithic Bank and seaward of the 20 m depth contour (Co189) (see <a href="#">Volume A4, Annex 5.2: Commitment Register</a>).</p>

		<p>(such as the Humber Estuary SAC/SPA/SSSI/ Ramsar), Hornsea Four will need to have certainty beyond reasonable scientific doubt in their conclusions. This may prove problematic given the limited amount of historic data available for Smithic Sands. Given this, the project may wish to consider alternative options which would avoid impacting on this feature.</p> <p><i>NER: As a minimum the condition applied to Dogger Bank Creyke Beck - No use of cable protection within the 10m depth contour – should be applied.</i></p> <p><i>Given the lack of historic information relating to Smithic Bank, alternative cable route options should be considered.</i></p>			
S42_0052_2.45	Natural England	<p>Consideration of impacts on coastal processes (i.e. as a result of trenching at landfall) have not been captured in this section.</p> <p>There is no consideration of the potential impacts of cable protection in this section. Both of these issues have the potential to be significant.</p> <p><i>NER: Assessment to be updated</i></p>	Y	New Co187	<p>Open cut trenching at landfall has been removed from the project design as described in <a href="#">Volume 1, Chapter 4: Project Description</a> and horizontal directional drilling secured by commitment (Co187) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>Updated modelling to support <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> examines the potential changes on waves and currents due to the installation of cable crossings and is presented in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a>.</p>
S42_0052_2.46	Natural England	<p>Hornsea One should be included in the table. Given the connectivity along the Holderness coast and beyond, additional plans and projects should be scoped in. This should include (but not necessarily limited to), pipelines, outfalls and coastal infrastructure.</p>	Y	N/A	<p><a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> has been updated to consider Hornsea Project One and Hornsea Project Two Offshore Wind Farms. The inclusion of other plans and projects will depend on any relevant connectivity.</p>



		<p>NER: Further scoping of plans and projects. This could be discussed at a technical panel meeting.</p>			
S42_0052_2.47	Natural England	<p>It is not currently clear at which point the revised designs of consented projects become legally secured in order to be considered the baseline assumption of cumulative/in combination assessment within an ES or HRA. Guidance should be sought from the regulators on this point</p> <p>NER: Further discussion with the regulators around this point.</p>	Y	N/A	<p>The Applicant engaged with the Marine Ecology and Processes Technical Panel through the Evidence Plan process, noting constructed projects are often of lesser extent than those described within their consented envelope. At the advice of the panel, the baseline assumptions for cumulative and in/combination assessments now includes the as built and final designs for Hornsea Project One and Hornsea Project Two Offshore Wind Farms. Agreements made with consultees within the Evidence Plan process are set out in the topic specific Evidence Plan Logs which are appendices to the Hornsea Four Evidence Plan (<a href="#">Volume B1, Annex 1.1: Evidence Plan</a>), an annex of the Hornsea Four <a href="#">Consultation Report (Volume B1, Chapter 1: Consultation Report)</a>.</p> <p>In addition, the scale of effects on waves from the present baseline has also been demonstrated using the available wave monitoring evidence to contrast with the MDS case for Hornsea Project One.</p>
S42_0052_2.48	Natural England	<p>The majority of comments made in relation to the Marine Processes chapter. In order to avoid duplication, these have not been repeated in relation to the technical annex.</p>	Y	N/A	<p>The Applicant has noted this comment.</p>
S42_0052_2.49	Natural England	<p>As the lease is for 35 years, the erosion rates should account for at least this period. Further consideration should be given to any infrastructure that is likely to remain in situ at the coast (ducts, concrete jointing bays etc), when this may become exposed and the</p>	Y	N/A	<p>Annual coastal erosion rates have been used to determine the setback distance of Hornsea Four landfall infrastructure. The distance from the actively eroding coast and the HDD or trenchless installation techniques mean that no</p>

		likely remedial works required. This may require consideration of erosion rates well beyond the 35-year time period.  <i>NER: Erosion rates should cover the full lifespan of the project.</i>			infrastructure is expected to become exposed in the future.
S42_0052_2.50	Natural England	It is not clear if the coastal erosion predictions have taken account of the landfall works associated with this project. Natural England would like to see the predicted erosion rates calculated for both landfall installation options (i.e. HDD and trenching), and to take account of any other elements of the project design which may result in changes to coastal processes  <i>NER: Erosion rates presented should take account of the impacts associated with the project.</i>	Y	New Co187	Open cut trenching at landfall has been removed from the project design as described in <a href="#">Volume 1, Chapter 4: Project Description</a> and secured by commitment (Co187) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> . Horizontal direction drilling will not affect erosion rates. Additional detail is provided in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0052_2.51	Natural England	Certain sediment compositions may take longer to disperse than others. More detail should be provided on the likely time it would take for sands/gravels/muds/clays to dissipate.  <i>NER: Further information required.</i>	Y	N/A	The combined and updated 2018-2019 geophysical survey data is described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> and supported by further detail on likely rates of winnowing and dispersion of side-casted material.

## EIA topic area: Benthic and Intertidal Ecology

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0052_I NT2.2	Natural England	<b>Benthic Ecology</b>  Similarly to marine processes, there is a lack of data to inform baseline characterisation and lack of clarity regarding the WCS. There are also instances when the MDS has been	Y	N/A	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. The combined and updated 2018-2019 survey data is described in

		<p>miscalculated (sometimes by a significant order of magnitude) and as a consequence the WCS has not been assessed. The key issues associated with benthic ecology are not necessarily related to particular impacts or receptors, but with the uncertainty of the assessment caused by the lack of up to date baseline data, namely for the ECC, the lack of clarity and accuracy of the WCS and the significance of impacts (see comment above).</p>			<p><b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> and all assessments within the Environmental Statement have been undertaken in light of this updated data.</p> <p>All maximum design scenarios presented in <b>Volume A1, Chapter 4: Project Description</b> and <b>Volume A4, Annex 5.1: Impacts Register</b> have been reviewed and updated where required. <b>Volume A2, Chapter 2: Benthic and Intertidal Ecology</b> has been updated to correct the area affected and clarify the total offshore export cable corridor area.</p>
S42_0052_2.52	Natural England	<p><b>Project Parameters</b> <u>Project Definition</u></p> <p>It was not clear how relevant components of the project were calculated, such as scour protection for instance.</p> <p><i>NER: Clearly define the assumptions behind the project's maximum parameters design so these can be fully understood.</i></p> <p><u>Worst Case Scenario (WCS)</u></p> <p>It was not always clear the assumption behind the WCS assessed and in cases there were miscalculations or inconsistencies with project description. Natural England also has concerns on the stretching of the Rochdale envelope and the consequences on determining the WCS.</p> <p><i>NER: Clearly define the WCS and the assumptions behind the calculations done so</i></p>	Y	N/A	<p><u>Project Parameters</u> <b>Volume 1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and calculations behind the project's maximum design scenario parameters. Further detail is provided in <b>Volume 4, Annex 4.9: Pro-rata Annex</b>.</p> <p><u>Baseline Characterisation</u> An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. The combined and updated 2018-2019 survey data is described in <b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology</b> Technical Report and all assessments within the Environmental Statement have been undertaken in light of this updated data.</p>

*these can be verified and fully understood.  
Acquire sufficient data to allow to streamline  
the project so WCS can be more realistic.*

#### NE position on WCS

Natural England does not agree with all  
WCS presented in the benthic chapter mainly  
due to lack of clarity or miscalculations

*NER: As above*

#### **Baseline Characterisation**

##### Data suitability and baseline characterisation

The data acquired so far is appropriate  
however up to date PSA data for the ECC is  
still lacking

*NER: Include PSA data from ECC and update  
relevant assessments.*

##### Data gaps

Up to date PSA data for the ECC is still  
lacking

*NER: Include PSA data from ECC.*

##### Data analysis

N/A

#### **Environmental Impact Assessment**

##### Identified Impacts

Some impacts have been screened out of the  
CEA that need to be screened in, such as  
temporary habitat disturbance during  
construction or direct disturbance to seabed

#### Environmental Impact Assessment

**Volume 2, Chapter 2: Benthic and  
Intertidal Ecology** has been updated to  
screen-in all relevant impacts into the  
Cumulative Effects Assessment. As  
detailed within the assessment  
methodology, classification of effect is  
determined by expert judgement.

**Volume 2, Chapter 2: Benthic and  
Intertidal Ecology** has been updated to  
ensure sufficient evidence is provided to  
support all conclusions.

Cumulative Effects Assessment is  
updated to include Viking Link, Dogger  
Bank Creyke Beck A & B export cables  
and Hornsea Project Two export  
cables.

Assessment and conclusions within  
**Volume 5, Annex 2.1: Benthic and  
Intertidal Ecology Technical Report**  
have been updated to reflect all  
updated maximum design scenarios.

from jack-up vessels and cable maintenance activities

*NER: Screen all relevant impacts into CEA*

### Methodology

The methodology presented implies that for an impact on a receptor for which sensitivity is high while the magnitude of the impact is minor that the significance of effect is minor or moderate. On all occasion but one when this was the case the applicant concluded minor significance of effects (not significant in EIA terms) and not moderate which in turn would be significant in EIA terms. The precautionary principle would assume otherwise, unless there is evidence to say the contrary, but no further evidence has been presented to support the conclusion of minor significance.

*NER: Provide evidence to why these conclusions have all be assuming the lesser significance or adopt precautionary principle and assume significance of these impacts to be moderate.*

### Cumulative Effect Assessment (CEA)

Viking Link, Dogger Bank Creyke Beck A and B Export Cables as well as Hornsea Project Two Export Cables have not been include in the CEA although these projects were screened in. Also impacts that have been screened out need to be screened back in when considering the above projects

*NER: Include those projects in CEA and screen relevant impacts in.*

		<p><u>Assessment</u></p> <p>Assessment of all impacts could not be conducted on all occasions due to miscalculations of MDS and inconsistencies with project description which cause uncertainty on the MDS to assess</p> <p><i>NER: Review relevant MDSs and assess those appropriately</i></p> <p><u>Assessment Conclusion</u></p> <p>Natural England cannot agree with the current assessment conclusions since some MDSs need to be updated and reassessed.</p> <p><i>NER: Update MDSs and reassess impacts.</i></p>			
S42_0052_3.1	Natural England	<p>Natural England does not agree that “no benthic and intertidal monitoring for the construction, operation or decommissioning phases of The Applicant is considered necessary at this stage”. Benthic monitoring will be necessary to validate predictions in the ES. If post-construction monitoring show no changes and validate the ES prediction on impacts, the need for further monitoring can be evaluated.</p> <p>NES: Benthic monitoring should be included in the ES.</p>	Y	N/A	Pre- and post-construction monitoring surveys will be undertaken to determine the location, extent and composition of any biogenic or geogenic reef features, as set out within the <a href="#">Volume A2, Annex 7: In Principle Monitoring Plan</a> .
S42_0052_3.2	Natural England	<p>It is mentioned that “A Project Environmental Management and Mitigation Plan (PEMMP) will be produced”, in accordance with Co111. However, Co111 states that “A Marine Pollution Contingency Plan (MPCP) will be developed”. It is not clear if this is supposed to be the same document or two different documents.</p> <p><i>NES: Clarification or amendment needed.</i></p>	Y	1o Co111	The Marine Pollution Contingency Plan forms part of the wider Project Environmental Management and Mitigation Plan. The relevant commitment (Co111) has been updated to reflect this as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .

S42_0052_3.3	Natural England	It is stated that "to fill the data gaps for the purposes of this PEIR assessment a predictive habitat model strategy was developed and agreed with the Marine Ecology and Processes Evidence Plan Technical Panel". This seems to suggest that panel members had a role developing the predictive habitat model and that was not the case. The technical panel members were only able to comment on the predictive habitat model proposed by the applicant. Please see our general comments regarding the evidence plan process.	Y	N/A	Text has been updated in <a href="#">Volume A2, Chapter 2: Benthic and Intertidal Ecology</a> to reflect input the Marine Ecology and Processes Technical Panel had in the predictive habitat model.
S42_0052_3.4	Natural England	The EA recommended that a sediment management plan is put in place to reduce the potential for smothering benthic habitats. In the associated response Hornsea Project Four has not made clear if a sediment management plan will or will not be put in place. Please note that the concern raised was to do with smothering and not release of contaminants.  <i>NES: Clarification or amendment needed.</i>	Y	N/A	<a href="#">Volume A2, Chapter 2: Benthic and Intertidal Ecology</a> describes impacts associated with smothering of benthic habitats. The conclusions of this assessment failed to identify a need for a Sediment Management Plan.
S42_0052_3.5	Natural England	Please note that Natural England was not present on the meeting on the 12 December 2018, Marine Processes and Ecology Technical Panel Meeting Two.	Y	N/A	The Applicant has noted this comment.
S42_0052_3.6	Natural England	Please note that Cefas was present on the meeting on the 30 April 2019, Marine Processes and Ecology Technical Panel Meeting Three.	Y	N/A	
S42_0052_3.7	Natural England	Natural England queries why a 10 km buffer surrounding the array area, and a 15 km buffer around the offshore ECC were chosen for benthic ecology since the size one tidal excursion is approximately 16km.  <i>NER: Clarify why these buffers were chosen or</i>	Y	N/A	Additional marine processes modelling (as presented within Appendix D of <a href="#">Volume A5, Annex 1.1: Marine Processes Technical Report</a> ) has been undertaken, the results of which have been used to define a study area around both the array area and the offshore ECC in relation to the appropriate tidal cycles to be used.

		<i>update to 16km buffer all around the development.</i>			
S42_0052_3.8	Natural England	<p>Natural England suggests that vague language, such as “where possible” (Co48, Co83) or “wherever reasonably practicable” (Co84) should be removed from the two commitments or that the alternative(s) to when it is “not possible” or “not practicable” are presented in the commitment as well.</p> <p><i>NER: Amend commitments to avoid vague language and/or present alternatives.</i></p>	Y	N/A	The Applicant notes this comment and confirm that a review of the commitments register has been undertaken to refine the wording of commitments wherever possible. The commitments register provides clear signposting to the DCO to ensure each of the commitments are adequately secured. See <a href="#">Volume A4, Annex 5.2: Commitments Register</a> .
S42_0052_3.9	Natural England	<p>Natural England does not agree with the calculation for the total temporary habitat disturbance area:</p> <ul style="list-style-type: none"> <li>• Boulder and sandwave clearance in array area have been calculated as 20,700m<sup>2</sup>. For a 30m wide corridor along 690km of cable this area is meant to be three orders of magnitude higher, 20,700,000m<sup>2</sup>.</li> <li>• Sandwave clearance within the ECC for a 30m cable corridor along 654km of cable corridor is 19,620,000m<sup>2</sup>, (similar to what was calculated for boulder clearance within the ECC) and not 757,000m<sup>2</sup>. If there is a reason for this not to be the case please clarify.</li> <li>• It is also not clear why within the array area boulder and sandwave clearance cover the same area but not in the cable corridor. Additionally, the project description only details the width of the corridor for both activities but not the length. If the values specified above are indeed the correct ones, total temporary habitat disturbance will then be c. 103km<sup>2</sup> more than double the assessed 42km<sup>2</sup>. For decommissioning (page 46) the total disturbance area from removal of all cables</li> </ul>	Y	N/A	<a href="#">Volume 1, Chapter 4: Project Description</a> is updated to provide further detail on the assumptions and calculations behind the project's maximum design scenario parameters. Further detail is provided in <a href="#">Volume 4, Annex 4.9: Pro-rata Annex</a> .



		was calculated to be 102.6 km <sup>2</sup> , indicating the calculations above might be correct.			
S42_0052_3.10	Natural England	<p>Following from POINT 3.9 the highest proportion of temporary habitat disturbance in the Hornsea Four array area and offshore ECC clearly comes from boulder and sandwave clearance, which correspond to almost 80% of total temporary disturbance (assuming the numbers proposed above are the correct ones).</p> <p>If detailed geophysical data would be available prior to application it would be possible to establish with a better degree or certainty the areas where boulder and sandwave clearance would be necessary and the project would not have to apply a blanket 100% of cover of cable installation for these activities which Natural England believes to be an unnecessary stretching of the Rochdale envelope approach. Please see POINT 1.1 on Project Description chapter.</p>	Y	N/A	<p><b>Volume 1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and calculations behind the project's maximum design scenario parameters. Further detail is provided in <b>Volume 4, Annex 4.9: Pro-rata Annex</b>.</p> <p>The combined and updated 2018-2019 geophysical survey data is presented in <b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b>.</p>
S42_0052_3.11	Natural England	<p>Total area of introduced hard substrate considered for colonisation and introduction of invasive species is the same area considered for long-term habitat loss/ change from the presence of foundations, scour protection and cable protection. This implies that the hard-surface provided by the submerged portion of the turbines has not been considered as an area available for colonisation or propagation of invasive species.</p> <p><i>NER: Consider the surface provided by the submerged portion of the turbines as potential area available for colonisation or propagation of invasive species.</i></p>	Y	N/A	<p>The introduction of hard substrate, provided by the submerged portion of the wind turbines, is included within the assessment described in <b>Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> as potential area for colonisation or propagation of invasive species.</p>
S42_0052_3.12	Natural England	Natural England did not cross check absolutely all values with the project description, but another example of	Y	N/A	<p><b>Volume 1, Chapter 4: Project Description</b> is updated to provide further detail on the assumptions and calculations behind the project's maximum design</p>

		<p>inconsistency is where long-term habitat loss/ change for pre- and post-lay rock berm area, based on 10 cable crossings within the export ECC area totals 268,000 m2. Project description states these are to be 15 crossings with total pre- and post-lay rock berm area of 293,000m2. The MDS to be assessed need to be accurate.</p> <p>Similarly, changes to seabed habitats arising from effects on physical processes anticipate 34 crossings within the array area and 10 within the ECC, whilst project description describes 40 crossings within the array area and 15 within the ECC.</p> <p><i>NER: Provide consistent MDS throughout the PEIR / ES documents.</i></p>			<p>scenario parameters. Further detail is provided in <a href="#">Volume 4, Annex 4.9: Pro-rata Annex</a>.</p>
S42_0052_3.13	Natural England	<p>Regarding the impact assessment methodology, it is stated that where a range of significance of effect is presented, the final assessment for each effect is based upon expert judgement. This happened on a number of occasions, generally where the sensitivity of the receptor was high and the magnitude of the impact was minor, resulting on a minor or moderate effect. On all occasions where this happened the significance of the effect was assumed to be minor (and therefore not significant on EIA terms), with no further justification. Please see POINT 1.57.</p> <p><i>NER: On the cases where there is a range of significance of effect, justify why the less significant category has been chosen.</i></p>	Y	N/A	<p>As detailed within the assessment methodology, classification of effect is determined by expert judgement. <a href="#">Volume 2, Chapter 2: Benthic and Intertidal Ecology</a> has been updated to ensure sufficient evidence is provided to support all conclusions.</p>
S42_0052_3.14	Natural England	<p>The total maximum area of temporary loss/disturbance of subtidal habitat loss due to construction activities was predicted to be up to approximately 41.7 km2 but as mentioned above in POINT 3.9 should be 103km2. Also, it is not clear from project</p>	Y	N/A	<p><a href="#">Volume A2, Chapter 2: Benthic and Intertidal Ecology</a> has been updated to correct the area affected and clarify the total offshore export cable corridor area.</p>

		<p>description or from this chapter the parameters defining an area of 320 km<sup>2</sup> for the ECC. Project description states the development area is indeed 600km<sup>2</sup> (as stated here for the array area) but the ECC is said to be 99km long. The width of ECC (permanent cables) to be 1.5km and total width 2.5 km (temporary work buffer 0.5 km either side). On the Selection and Refinement of Offshore Infrastructure chapter, the HVAC booster station search area is described as having been reduced at PEIR to an area 3km wide per 8km long on the ECC. Putting all of this together it does not add up to 320km<sup>2</sup>. It could be the wider nearshore area, but this should have been made clear at least in the project description so other chapters could refer to. As a matter of detail 600 km<sup>2</sup> from the array area plus 320 km<sup>2</sup> from the ECC total 920 km<sup>2</sup> and not 926 km<sup>2</sup> as stated.</p> <p><i>NER: Update assessment to correct area affected and clarify the total ECC area, possibly in project description chapter.</i></p>			
S42_0052_3.15	Natural England	<p>Areas of temporary disturbance need to be assessed as per in POINT 3.9 above if the calculations above are correct.</p> <p><i>NER: Reassess impact considering total disturbed areas as per comment above.</i></p>	Y	N/A	
S42_0052_3.16	Natural England	<p>The methodology presented implies that for an impact on a receptor for which sensitivity is high while the magnitude of the impact is minor that the significance of effect is minor or moderate (Table 2.16). On all occasion where this combination of sensitivity and magnitude presented itself the applicant has concluded that the significance of the impacts were always minor (not significant in EIA terms) and not moderate which in turn would be significant in EIA terms. The</p>	Y	N/A	<p><b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> is updated to provide further detail on the assumptions and calculations behind the assessment conclusions.</p>

		<p>precautionary principle would assume otherwise, unless there is evidence to say the contrary, but no further evidence has been presented to support the conclusion of minor significance.</p> <p>Examples of where this has been applied on the benthic ecology chapter include:</p> <ul style="list-style-type: none"> <li>• Temporary increase in SSC and sediment deposition (2.11.1.23 to 2.11.1.39)</li> <li>• Temporary habitat disturbance from decommissioning of foundation substructures and cables (2.11.3.2 to 2.11.3.7)</li> <li>• Loss of introduced habitat from the removal of foundations (2.11.3.10 to 2.11.3.14)</li> <li>• Cumulative temporary increase in SSC and sediment deposition (2.13.1.1 to 2.13.1.5)</li> <li>• Cumulative colonisation of the WTGs and scour/ cable protection (2.14.1.5 to 2.14.1.11)</li> </ul> <p>The same approach has also been applied to other chapters.</p> <p><i>NER: Either update that maximum significance is moderate or justify why a significance of minor is to be chosen, since between minor and moderate the maximum is moderate.</i></p>			
S42_0052_3.17	Natural England	<p>Temporary increase in SSC and sediment deposition in the Hornsea Four array area and offshore ECC only accounted for biotopes identified within Hornsea Four. However, this impact will extend beyond the boundaries of Hornsea Four. Considering that apparently there is data available for these areas (e.g. Figure 9 from Volume 5, Annex 2.1 Benthic and Intertidal Ecology Technical Report) this need to be assessed.</p>	Y	N/A	<p><b>Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> is updated to consider impacts of suspended sediment concentrations and sediment deposition beyond the boundaries of Hornsea Four, within the area of potential secondary impact.</p>

		<i>NER: Consider impacts of SSC and sediment deposition beyond Hornsea Four.</i>			
S42_0052_3.18	Natural England	<p>In the case of drilling for monopiles due to the high accumulation of sediment it was considered as habitat loss and supposedly assessed as such. However, the MDS considered in habitat loss does not appear to include drilling for monopiles. It might be the case that the MDS considered another type of foundation which will cause a habitat loss larger than the habitat loss from drilling but this has not been specified or clarified.</p> <p><i>NER: Clarify if habitat loss from drilling has been assessed and how.</i></p>	Y	N/A	<p>Habitat loss from drilling is of a smaller magnitude than presence of suction bucket caissons and as such this represented the maximum design scenario assessed at PEIR.</p> <p>Gravity base foundations are now considered in the project design described in <a href="#">Volume A1, Chapter 4: Project Description</a> for use on all infrastructure and therefore represent the maximum design scenario for habitat loss.</p>
S42_0052_3.19	Natural England	<p>Same comment as per Table 2.13 in POINT 3.11.</p> <p><i>NER: As per recommendation in POINT 3.11</i></p>	Y	N/A	<p>The introduction of hard substrate, provided by the submerged portion of the wind turbines, is included within the assessment described in <a href="#">Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</a> as potential area for colonisation or propagation of invasive species.</p>
S42_0052_3.20	Natural England	<p>When assessing changes to seabed habitats arising from effects on physical processes, it is stated that "The Marine Geology, Oceanography and Physical Processes assessment has determined that the impacts on hydrodynamic and wave regimes will be Not Significant and would therefore not result in any significant changes to sediment transport and consequently will not have any impacts on benthic ecology." The same statement has been presented when assessing this impacts in the CEA (2.14.1.13). Natural England has raised a number of concerns with the marine processes assessment so cannot agree at this stage with the statement above.</p> <p><i>NER: Address comments raised for marine processes and reassess if necessary.</i></p>	Y	N/A	<p>The Applicant has noted this comment.</p>

# Hornsea 4



S42_0052_3.21	Natural England	<p>According to the Offshore Cumulative Effects Chapter (Volume 4 Annex 53) Viking Link, Dogger Bank Creyke Beck A and B Export Cables as well as Hornsea Project Two Export Cables have been screened in for Benthic and Intertidal Ecology cumulative assessment, however they have not been included in the cumulative assessment. A justification has not been presented.</p> <p><i>NER: Include said projects in the CEA</i></p>	Y	N/A	<p>Cumulative Effects Assessment is updated to include Viking Link, Dogger Bank Creyke Beck A &amp; B export cables and Hornsea Project Two export cables.</p> <p>Assessment and conclusions within <a href="#">Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</a> have been updated to reflect all updated maximum design scenarios.</p>
S42_0052_3.22	Natural England	<p>The distance from Bridlington A disposal site to Hornsea Four ECC (27.75km) and to HVAC Booster Area (2.10km) might need to be updated since according to Figure 2.6 the site lies in very close proximity to the ECC but not so close to the HVAC booster area. As a matter of detail, the units for the distance have not been provided although very likely to be km.</p> <p><i>NER: Confirm and update accordingly</i></p>	Y	N/A	<p><a href="#">Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</a> has been updated to include distance units.</p>
S42_0052_3.23	Natural England	<p>Impacts such as temporary habitat disturbance (Construction phase) or direct disturbance to seabed from jack-up vessels and cable maintenance activities (Operation and maintenance phase), have been scoped out based on the highly localised nature of the impacts (i.e. they occur entirely within the Hornsea Four boundary only). However when scoping in the projects mentioned above (Viking Link, Dogger Bank Creyke Beck A and B Export Cables as well as Hornsea Project Two Export Cables), there will be physical overlap between some of these projects and Hornsea Project Four and as such these impacts need to be assessed cumulatively.</p>	Y	N/A	<p>The impacts identified have been scoped into Cumulative Effects Assessment and presented in <a href="#">Volume 2, Chapter 2: Benthic and Intertidal Ecology</a>.</p>

		<i>NER: These impacts need to be scoped in and assessed within CEA.</i>			
S42_0052_3.24	Natural England	The volume of sediment disposal in Bridlington A disposal site is mentioned as likely to be greater than Hornsea Project Four. Sediment disposal at Bridlington A is subject to additional conditions which should be factored in when making this comparison. Natural England would like to see further evidence to support this statement.  <i>NER: Update with information from Bridlington A disposal site.</i>	Y	N/A	Further evidence for sediment disposal in Bridlington A is provided in <a href="#">Volume 2, Chapter 2: Benthic and Intertidal Ecology</a> .
S42_0052_3.25	Natural England	"Background traffic growth across projects result in cumulative nutrient nitrogen deposition which may impact Saltmarsh in the Humber estuary". Clarification is needed on where impacts on the Humber estuary have been considered.	Y	N/A	Impacts on the Humber Estuary have been considered in <a href="#">Volume 2, Chapter 2: Report to Inform Appropriate Assessment</a> .
S42_0052_3.26	Natural England	It is not clear why the three interrelated effects presented in Table 2.24 on page 79 are included in the project lifetime interrelated effects if these are only to occur on the O&M phase. These are meant arise throughout more than one phase of the project  <i>NER: Amend as necessary</i>	Y	N/A	The inter-related assessment has been updated as necessary to remove effects that only occur within the operational and maintenance phase.
S42_0052_9.2	Natural England	Assuming that on the table the header "Offshore and Intertidal Ecology" is in fact "Offshore and Intertidal Ornithology", otherwise ornithology has not been considered.  <i>NER: Amend if necessary</i>	N/A	N/A	The Applicant notes this typographic error and has corrected it in <a href="#">Volume A4, Annex 5.3: Offshore Cumulative Effects</a> . The Applicant notes this typographic error and has corrected it in <a href="#">Volume A4 Annex 5.3: Offshore Cumulative Effects</a> .
S42_0052_9.3	Natural England	According to <a href="#">Figure 2.6 in Volume 2, Chapter 2 Benthic and Intertidal Ecology</a> , Bridlington A is very close to landfall but a considerable distance from the booster offshore HVAC Booster Station Area. The table shows that	N/A	N/A	

		<p>Bridlington A is 27.75km from Hornsea Four ECC and 2.10km from the HVAC Booster Station Area. There is probably a mistake on either the values stated or the headers of the table.</p> <p><i>NER: Amend values or table headers accordingly</i></p>			
S42_0052_9.4	Natural England	<p>Viking Link, Dogger Bank Creyke Beck A and B Export Cables as well as Hornsea Project Two Export Cables have been screened in for Benthic and Intertidal Ecology, however they have not been assessed in the corresponding chapter (<a href="#">PEIR Volume 2 Chapter 2 Benthic and Intertidal Ecology</a>, see POINT 3.21).</p> <p><i>NER: Include the mentioned projects in the CEA for benthic and intertidal ecology</i></p>	I	N/A	<p>The long list of cumulative schemes is being reviewed and the updated results of cumulative screening are being carried through to relevant ES chapters. The Applicant ensures that all projects screened in for assessment within <a href="#">Volume A4, Annex 5.3: Offshore Cumulative Effects</a> have been carried through for assessment within the relevant ES chapters.</p>
S42_0057_1.2.1	MMO	<p><b><u>Marine Geology, Oceanography and Physical Processes</u></b></p> <p>A proportionate approach has been used using lessons learnt from Hornsea 1, 2 and 3. Hornsea 4 is different in that the sensitive receptors (in this case coastline and geomorphological features) are significantly closer. The following commentary reflects these issues.</p>	Y	N/A	<p>Hornsea Four is at least 65 km offshore. Evidence at PEIR from Hornsea One and Hornsea Two is representative of similar impacts for scales of change in the physical environment. For offshore sediment pathways, the impacts are considered to be similar.</p> <p><a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> have been updated to provide additional justification.</p>
S42_0057_1.2.2	MMO	<p>Major Comments</p> <p>The following comments relate to: ‘Volume 2: Offshore Environmental Assessment: Section - Marine Geology, Oceanography and Physical Processes’ (A2.1):</p>	Y	N/A	<p><a href="#">Volume 1, Chapter 4: Project Description</a> is updated to provide further detail on the assumptions and calculations behind the project’s maximum design scenario parameters.</p> <p>Note the HVAC booster station search</p>



		Table 1.2 - The design of the slab-sided HVAC stations has not been shown. Furthermore, any mitigation in terms of orientation, shape or seabed preparation has not been shown in detail. This is especially important in shallower waters (<20m) where wave activity can be significant and the "sensitive receptor" of the coast/Smithic bank is close.			area is not located in shallow water (<20m) or in proximity to the sensitive receptors of the coast/Smithic Sands.
S42_0057_1.2.3	MMO	Section 1.11.2.16 – The lack of location surface sediment and sub surface geotechnical data (understood to be underway in summer 2019) is resulting in greater uncertainties than is normal for a PEIR. For instance, detailed scour assessments for the HVAC station, cable route target depth are not identified (in general terms).	Y	N/A	The Applicant notes this comment. The combined and updated 2018-2019 geophysical survey data have been presented via the Marine Ecology and Process Evidence Plan process and described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0057_1.2.4	MMO	Section 1.7.5.17 (and 1.11.2.86) – The Joint Nature Conservation Committee (JNCC) have identified Smithic Bank as a potential Annex 1 feature, and thus maintaining its form and function in terms of sediment transport is important. Furthermore, as a classic banner bank, it is essential for the connection of sediment transport pathways from north of Flamborough with the Holderness coastline. Driving the 6 export cables over the top of the bank (see A1.1 Figure 1.10) may cause changes in sediment transport pathways. These could be further exacerbated by any cable protection measures. Such issues will need to be fully assessed in the Cable Burial Risk Assessment (CBRA). Are there any re-routing options away from the bank? Further to full assessment in the Environmental Statement (ES) and formal application, the MMO may consider it appropriate for the DMLs to include a condition stipulating that no cable protection measures are used in waters of	Y	New Co188, Co189	<p>The importance of Smithic Sands is recognised. Offshore export cable crossings adjacent to Smithic Sands are described in <a href="#">Volume 1, Chapter 4: Project Description</a> which details the assumptions and calculations behind the project's maximum design scenario parameters.</p> <p>The Applicant has committed (Co188 and Co189) to ensure offshore export cable crossings remain clear of Smithic Sands as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p>

		less than 10m depth, as per the Dogger Bank Creyke Beck Offshore Wind Farm (OWF) DCO.			
S42_0057_1.2.5	MMO	Section 1.7.7.5 – The MMO note that if chalk is confirmed in any of the recent geophysical surveys, this may have a significant impact on the size and shape of any suspended sediment plumes from drilling activity. Furthermore, deposited material may be re-suspended giving longer transport routes than expected.	Y	N/A	Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible. This data is presented in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> and <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0057_1.2.6	MMO	Section 1.7.8.1 – Further details are required identifying the route of potentially three extra pipelines in the area. A further 40 cable crossings should be identified and assessed, and should also be assessed in the Cumulative impacts section.	Y	N/A	<a href="#">Volume A4, Annex 4.1: Offshore Crossing Schedule</a> details all planned crossings. <a href="#">Volume A5, Annex 1.1 Marine Processes Technical Report</a> indicates locations of all relevant pipeline and cable crossings. The precise number and locations of infrastructure crossings per asset will be determined once the Hornsea Four layout is approved in the pre-construction phase of the development. Relevant projects (such as the Viking Link cable and the Dogger Bank A & B offshore export cables) are included in the cumulative assessments for the relevant topics.

S42_0057_1.2.7	MMO	Section 1.7.8.3 and in technical annex – Whilst a full years' worth of numerical model data has been assessed for Mixed Layer Depth (MLD), only one snapshot is shown. The MMO would expect this data to be illustrated as a probability plot showing the number of days that the front was found in each grid position. This should then be validated by using satellite-based temperature maps showing the detailed dynamics of the Flamborough Front, e.g. Peter Millers work on fronts – see: <a href="https://www.oceanologyinternational.com/RXUK/RXUK_OceanologyInternational/documents/marine_renewables_ocean_fronts_as_indicator_of_marine_animals_p_miller_pml.pdf">https://www.oceanologyinternational.com/RXUK/RXUK_OceanologyInternational/documents/marine_renewables_ocean_fronts_as_indicator_of_marine_animals_p_miller_pml.pdf</a>	Y	N/A	The work published by Peter Miller has been considered alongside the modelling of MLD (see Figure 35 of <a href="#">Volume A5, Annex 1.1 Marine Processes Technical Report</a> ).
S42_0057_1.2.8	MMO	Section 1.7.11.3 – whilst a quantitative analysis of long-term records of the dynamics of Smithic Bank is not possible, the UKHO (UK Hydrographic Office) have extensive records that may well inform a qualitative assessment (see Figure 1).	Y	N/A	The consideration of long-term morphology of Smithic Bank is not possible with the limited amount of suitable survey data available from UKHO. Additional seabed data was collected in 2019 to support the Environmental Impact Assessment, refine proposals and avoid/minimise/reduce impacts where possible.
S42_0057_1.2.9	MMO	Section 1.11.2.20 – the offshore substations (OSS) at a base width of 150m are very large (212m if orientated at 45 degrees angle to principal tidal axis) and scour aprons of another 50m each side would present a significant disturbance to flow regimes. These need to be assessed on an individual (and cumulative) basis checking transport linkages and sensitive receptors. The scale of impact footprint has not been fully assessed (section 1.11.2.45) and thus the statement in 1.11.2.49 is not supported.	Y	N/A	The Applicant notes this comment and confirms updated modelling to support <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> examines the relevance of large foundations on local flows and supports the conclusions presented in <a href="#">Volume 2, Chapter 1: Marine Geology, Oceanography and Physical Processes</a> .
S42_0057_1.2.10	MMO	Section 1.11.2.40 – What is the justification for 8 cofferdams and Horizontal Directional	Y	N/A	Six offshore export cables require six HDD exit pits plus up to two additional

		Drilling (HDD) pits if only 6 export cables are being installed?			contingency HDD pits. <a href="#">Volume 1, Chapter 4: Project Description</a> has been updated to clarify this.
S42_0057_1.2.11	MMO	Table 1.22 – The cumulative assessment table does not include the 3 potential pipelines as identified above in 1.2.6.	Y	N/A	The cumulative assessment has been updated with the latest information available at the time. <a href="#">Volume 4, Annex 4.1: Offshore Crossing Schedule</a> details all planned crossings. <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> of the Environmental Statement will indicate locations of all relevant pipeline crossings.
S42_0057_1.2.12	MMO	Section 3.1.1.1 – it is noted that the lease is for 35 years – do the landfall cliff erosion rates take account of this 35-year lifespan?	Y	N/A	The cliff recession rates described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> are based on NCREM data, projected over 35 years.
S42_0057_1.2.13	MMO	Section 3.2.3.2 to 3.2.3.7– The retreat distance for a 35-year lifespan is projected to be between 33 and 82m (short/medium terms 50th percentile). Does the design of the beach landing take this into account or will remedial measures be required later in the project?	Y	New Co187	Open cut trenching at landfall has been removed from the project design as described in <a href="#">Volume 1, Chapter 4: Project Description</a> and secured by commitment (Co187) as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> . Horizontal direction drilling will not affect erosion rates. Additional detail is provided in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .  Details of beach access is described in <a href="#">Volume 1, Chapter 4: Project Description</a> .
S42_0057_1.2.14	MMO	Section 3.3.2.10 – Do the wave measurements at L5 and l6 validate the DECC wave modelling?	Y	N/A	Details for L5 and Hornsea DWR (Figure 11) are not sufficiently comparable to offer a direct basis for comparison with the DECC (Figure 10) information. The former provides annual timeseries whereas the latter is a statistical reduction of several years of preceding hindcast.
S42_0057_1.2.15	MMO	Section 3.3.3.12 – If the bank acts as source for sands, is the bank in equilibrium with	Y	N/A	Smithic Sands is a store of sediment rather than a source. There is

		potential inputs of sands? Are there seasonal variations?			insufficient information to quantify any seasonal variation. Further information is provided in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0057_1.2.16	MMO	Section 3.4.2.4 – Please supply 2018 and 2019 (if available) Geophysical survey for review.	Y	N/A	The latest 2018-2019 geophysical survey data is not available to supply at DCO application.
S42_0057_1.2.17	MMO	Table 9 – When calculating volumes of sediment, what levels of contingency and over dredging have been used?	Y	N/A	Details of sandwave clearance is described in <a href="#">Volume 1, Chapter 4: Project Description</a> Further detail sediment volumes is provided in <a href="#">Volume 4, Annex 4.9: Pro-rata Annex</a> . The Applicant confirms that over-dredging has not been considered.
S42_0057_1.2.18	MMO	Figure 14 - It is suggested that the cable crossing with Dogger Bank Export Cable Corridor (ECC) should be shifted east into deeper waters (>20m) as the volume of seabed preparation and cable protection on the flanks of Smithic Bank may impact its form and function.	Y	New Co188, Co189	<p>The importance of Smithic Sands is recognised. Offshore export cable crossings adjacent to Smithic Sands are described in <a href="#">Volume 1, Chapter 4: Project Description</a> which details the assumptions and calculations behind the project's maximum design scenario parameters.</p> <p>The Applicant has committed (Co188 and Co189) to ensure offshore export cable crossings remain clear of Smithic Sands as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>.</p>
S42_0057_1.2.19	MMO	Section 4.3.2.9 – Mixtures of sediment types may take longer to dissipate – can you give time estimates for sands, pure muds, gravels or consolidated clays to disperse/infill?	Y	N/A	The combined and updated 2018-2019 geophysical survey data described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> have been reviewed to offer more detail on likely rates of winnowing and dispersion of any material cast aside.

S42_0057_1.2.20	MMO	Section 4.3.2.10 – From what area around the ducts will sediments be “robbed” to provide infill for the ducts?	Y	N/A	Further information on cable installation techniques is provided in <a href="#">Volume 1, Chapter 4: Project Description</a> and assessed in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0057_1.2.21	MMO	Section 4.3.4.1 – Are newer site-specific surveys from 2018 or 2019 available to characterise the area around the HVAC booster station?	Y	N/A	The combined and updated 2018-2019 geophysical survey data have been presented via the Marine Ecology and Process Evidence Plan process and described in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0057_1.2.22	MMO	Section 4.4.4.16 – Please show the size and orientation of the spring and neap suspended sediment plumes in a figure along with any sensitive receptors.	Y	N/A	Updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> provides the means of establishing sediment plumes for relevant locations.
S42_0057_1.2.23	MMO	Figure 34 – Please add spring tidal ellipse to indicative layout design – are the monopiles aligned with the principal axis of the tide?	Y	N/A	<a href="#">Figure 34</a> of <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> has been updated accordingly.
S42_0057_1.2.24	MMO	Section 4.7.3.2 – An alternative methodology for the formation of suspended sediment plumes on the surface is the resuspension of a benthic boundary layer by some of the vertical turbulence generated by the monopile. Is there any evidence for strong gradients in suspended sediment concentration in the benthic boundary layer?	Y	N/A	Further information is supplied in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> of the Environmental Statement.  The zonal survey evidence includes suspended sediment measurements which will be used to confirm absence of any strong benthic boundary layer with high concentrations of suspended sediments.
S42_0057_1.2.25	MMO	Section 4.9.1.4 – As some disruption to sediment pathways can be expected at Creyke Beck cable crossings on the flanks of Smithic Bank, monitoring of the bank is required to ensure that its form and function are not impaired.	Y	N/A	The importance of Smithic Sands is recognised. Offshore export cable crossings adjacent to Smithic Sands are described in <a href="#">Volume 1, Chapter 4: Project Description</a> which details the assumptions and calculations behind the project’s maximum design scenario parameters.  The Applicant has committed (Co188

					<p>and Co189) to ensure offshore export cable crossings remain clear of Smithic Sands as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>. Therefore, monitoring of Smithic Sands is not proposed necessary.</p>
S42_0057_1.2.26	MMO	Section 8 – Whilst there have been some interesting developments using the wave observations to measure wave impacts, these have not yet come to any firm conclusions. The MMO look forward to further discussions and coming to an agreed set of conclusions.	Y	N/A	The Applicant acknowledges this comment and confirm updated wave modelling is presented in the review of measured waves passing through Hornsea One in <a href="#">Appendix C of Volume 5, Annex 1.1: Marine Processes Technical Report</a> .
S42_0057_1.2.27	MMO	<p><b>Minor Comments</b></p> <p>Marine Geology, Oceanography and Physical Processes (A2.1):</p> <p>Section 1.7.27 – Whilst the MMO agree that this is a bed “partition zone”, it should be noted that sediment transport can be strongly northward or southward and it’s only the averaging over several years that shows separation zone.</p>	Y	N/A	The main sediment transport at this location is expected to be bedload driven by tidal currents and exhibited as sandwave migration. The influence of this feature on local flows and waves has been considered with updated modelling presented in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> . The Environmental Impact Assessment clarifies the influences creating a drift divide.
S42_0057_1.2.28	MMO	<p><a href="#">Marine Processes Technical Report (A5.1.1)</a>:</p> <p>Figure 1 - it would be useful to show other offshore windfarms e.g. Humber Gateway. Also, the GIS PEIR boundary for offshore is not included on the website (ArcGIS Shape file).</p>	Y	N/A	<a href="#">Figure 1</a> of in <a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a> has been updated accordingly.
S42_0057_1.2.29	MMO	Section 3.2.2.7 – Is this a typo and should refer to the section indented on the previous page?	Y	N/A	The Applicant notes this comment.

S42_0057_1.2.30	MMO	<p>Disposal Site Characterisation Report (A4.4.4):</p> <p>The MMO note two disposal sites are proposed - the array and the offshore EEC and temporary works area - however they have not been plotted at this stage. Please note for reference that no open disposal site can overlap with another open site.</p>	Y	N/A	<p><b>Volume 1, Chapter 4: Project Description</b> has been updated to describe the proposed disposal sites. Further clarification has been added to <b>Volume 5, Annex 1.1: Marine Processes Technical Report</b>.</p>
S42_0057_1.2.31	MMO	<p>Section 3.3.4.5 – the MMO agree with the conclusions, however the applicant should continue to investigate alternative uses of the material to be disposed of within the two proposed disposal sites.</p>	Y	N/A	<p>The Applicant notes this comment.</p>
S42_0057_1.2.32	MMO	<p><u>Other Comments</u></p> <p>Between the chapters of Volume 2 and the Annexes, figures regarding the volume of material are confusing. It would be useful in the final ES to have one table breaking down the maximum volume from the array and ECC, with a 'total' at the end for clarity, particularly given that volumes should be stated on DML conditions.</p>	Y	N/A	<p><b>Volume 1, Chapter 4: Project Description</b> has been updated to clearly describe volumes of material. These details will be reviewed in <b>Volume 5, Annex 1.1: Marine Processes Technical Report</b>.</p>

## EIA topic area: Fish and Shellfish Ecology

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0052_I NT 2.3	Natural England	<p><b>Fish and shellfish</b></p> <p>The fish and shellfish section of the PEIR focus on impacts on Atlantic herring and sandeel in particular, however there is insufficient current data to confidently assess the impacts of the project on these two species. This is mostly due to the lack of data</p>	Y	N/A	<p>Additional seabed data was collected in 2019 to inform the baseline, refine proposals and avoid/minimise/reduce impacts where possible. The combined and updated 2018-2019 survey data is presented in <b>Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</b> and all assessments within the</p>



		<p>for the ECC which crosses a main area for herring spawning. Further to this, the WCS has not been assessed since the underwater noise modelling does not take account of simultaneous piling and the Cumulative Effects Assessment (CEA) does not include all relevant projects and needs to be updated. For all the reasons outlined Natural England does not agree with the conclusion of the assessment of no significant impacts on herring and sandeel.</p>			<p>Environmental Statement have been updated in light of this data.</p> <p>Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p> <p>The Cumulative Effects Assessment has been updated to include Dogger Bank Creyke Beck A &amp; B. Assessment and conclusions within <a href="#">Volume 5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> have been updated to reflect all updated maximum design scenarios.</p>
S42_0052_3.27	Natural England	<p><b>Project Parameters</b> <u>Project Definition</u></p> <p>Project parameters clearly defined (Fish and Shellfish Ecology context)</p> <p><u>Worst Case Scenario (WCS)</u></p> <p>Worst case scenarios have not always been assessed, particularly regarding impacts from piling since simultaneous piling has not been modelled. It is also not clear if habitat loss resulting from drilling has been included in the WCS.</p> <p><i>NER: Model and assess simultaneous piling.</i></p> <p><b>Baseline Characterisation</b> <u>Data suitability and baseline characterisation</u></p> <p>The data acquired so far is appropriate however up to date PSA data for the ECC is</p>	Y	New Co190	<p><b>Project Parameters</b></p> <p>Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p> <p>Habitat loss from drilling is of a smaller magnitude than presence of suction bucket caissons and as such this represented the maximum design scenario assessed at PEIR.</p> <p>Gravity base foundations are now considered in the project design described in <a href="#">Volume 1, Chapter 4: Project Description</a> for use on all infrastructure and therefore represent the maximum design scenario for habitat loss.</p> <p><b>Baseline Characterisation</b></p>

still lacking.

*NER: Include PSA data from ECC and update relevant assessments.*

#### Data gaps

Up to date PSA data for the ECC is still lacking.

*NER: Include PSA data from ECC.*

#### Data analysis

Simultaneous piling has not been modelled.

*NER: Model and assess simultaneous piling.*

### **Environmental Impact Assessment**

#### Identified Impacts

Impacts from simultaneous piling have not been assessed.

*NER: Assess simultaneous piling*

#### Methodology

The methodology presented implies that for an impact on a receptor for which sensitivity is high while the magnitude of the impact is minor that the significance of effect is minor or moderate. On all occasion but one when this was the case the applicant concluded minor significance of effects (not significant in EIA terms) and not moderate which in turn would be significant in EIA terms. The precautionary principle would assume otherwise, unless there is evidence to say the contrary, but no further evidence has been presented to support the conclusion of minor

An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. This additional survey data has been utilised to update and inform the environmental baseline presented in [Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report](#). Particle size data has been collected along the offshore export cable corridor, and figures and assessments have been updated in [Volume 2, Chapter 3: Fish and Shellfish Ecology](#) accordingly.

#### **Environmental Impact Assessment**

The Applicant has noted this comment. Cumulative Effects Assessment is updated to include Dogger Bank Creyke Beck A & B.

Assessment and conclusions within [Volume 5, Annex 3.1: Fish and Shellfish Ecology Technical Report](#) have been updated to reflect all updated maximum design scenarios.

Increases in suspended sediment concentrations, smothering and underwater noise have been appropriately assessed, with supporting data and evidence provided in [Volume 2, Chapter 3: Fish and Shellfish Ecology](#). The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction on piling at the booster

significance.

*NER: Provide evidence to why these conclusions have all be assuming the lesser significance or adopt precautionary principle and assume significance of these impacts to be moderate.*

#### Cumulative Effect Assessment (CEA)

Dogger Bank developments have not been included in the CEA although construction periods overlap with Hornsea Four.

*NER: Consider Dogger Bank developments in CEA*

#### Assessment

WCS has not always been assessed and up to date PSA data for the ECC is also required for a robust assessment of impacts.

*NER: Provide all data required for a robust assessment of impacts including PSA data and modelling of simultaneous piling.*

#### Assessment Conclusion

Natural England does not agree at this stage that the data and evidence provided supports the conclusion of no significant effects on herring and sandeel from:

- Increases in SSC and smothering;
- Underwater noise.

*NER: Appropriately assess these impacts and consider further mitigation, including seasonal restrictions on activities during herring spawning season.*

station during herring spawning secured by commitment (Co190) detailed in [Volume A4, Annex 5.2: Commitment Register](#).

S42_0052_4.1	Natural England	Table 3.2 states that no fish and shellfish monitoring for the construction, operation or decommissioning phases of The Applicant is considered necessary. Considering that sufficient evidence to rule out significant impacts on herring and sandeel has not been provided (see comments below) Natural England does not agree that monitoring will not be necessary.	Y	N/A	Updated data and assessment is included in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> to provide additional confidence that no significant effects are predicted (with the inclusion of mitigation where appropriate) and therefore Hornsea Four remain with the provision that no monitoring is required.
S42_0052_4.2	Natural England	Natural England queries why a 10 km buffer surrounding the array area, and a 15 km buffer around the offshore ECC were chosen for fish and shellfish ecology since the size one tidal excursion is approximately 16km.  <i>NER: Clarify why these buffers were chosen or update to 16km buffer all around the development.</i>	Y	N/A	Additional marine processes modelling (as presented within <a href="#">Appendix D of Volume A5, Annex 1.1: Marine Processes Technical Report</a> ) has been undertaken, the results of which have been used to define a study area around both the array area and the offshore ECC in relation to the appropriate tidal cycles to be used.
S42_0052_4.3	Natural England	Table 3.4 states a Project Environmental Management and Monitoring Plan (PEMMP) will be developed and implemented prior to the start of construction. Please see our comment in the benthic chapter regarding the PEMMP in POINT 3.2.  <i>NER: Clarification or amendment needed.</i>	Y	1o Co111	The Marine Pollution Contingency Plan forms part of the wider Project Environmental Management and Mitigation Plan. The relevant commitment (Co111) has been updated to reflect this as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .
S42_0052_4.4	Natural England	Hornsea Four Habitat Classification Report (Gardline, 2019) is detailed as including site specific grab surveys within the Hornsea Four array and ECC with Particle Size Analysis (PSA) conducted. This report however forms part of Volume 5, Annex 2.1 Benthic and Intertidal Ecology Technical Report and samples have only been taken on the array area.  <i>NER: Please clarify when ECC data will be made available and that Gardline, 2019 report only covers the array area.</i>	Y	N/A	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. This additional survey data has been utilised to update and inform the environmental baseline presented in <a href="#">Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> .  The Gardline (2019) report at PEIR only included particle size data from the array, and data along the offshore export cable corridor is included within the GoBe (2019) report. Clarification

					has been made on data coverage in the Gardline (2019) report.
S42_0052_4.5	Natural England	<p>Characterisation of the baseline for herring and sandeel habitats, including nursery and spawning habitat relies on up to date PSA data. Currently PSA data for the ECC is lacking and as a consequence a robust analysis of the suitability of the ECC as a habitat for these species is not possible. This is of particular importance for spawning grounds for herring, since according to IHLS data the ECC crosses an area of high importance for herring.</p> <p><i>NER: Updated PSA data needs to be provided for the ECC to allow a robust assessment of impacts on herring spawning and sandeel.</i></p>	Y	N/A	<p>An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. This additional survey data has been utilised to update and inform the environmental baseline presented in <a href="#">Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a>.</p>
S42_0052_4.6	Natural England	<p>Direct disturbance resulting from maintenance during operation has been scoped out of assessment. Natural England does not necessarily agree with this assessment since depending on the activities, these might have an impact on some receptors, for instance major repairs on the cable corridor during herring spawning season might have an impact.</p> <p>Also the justification for scoping this impact out is that affected species are likely to be mobile and can move away from disturbance. However in the assessment further down it is stated that "Demersal spawners herring and sandeel are considered stationary receptors to account for their spawning behaviours and that Sandeel (&gt;219 dB SELcum) are considered stationary receptors, due to their burrowing nature, substrate dependence, and demersal spawning behaviours, and therefore may have limited capacity to flee the area compared to other Group 1 receptors, and still Due to [...] and the consequential</p>	Y	N/A	<p>Demersal spawners such as herring and sandeel are considered stationary receptors for the purposes of noise modelling due to the current debate around the evidence to demonstrate a consistent fleeing behaviour in fish. The consideration of fish as stationary receptor for noise should not negate the acceptance that fish are known to move short distances to avoid direct disturbance such as that from cable installation ploughs for example. The need for fish to be considered stationary in noise modelling arises from the high fidelity recorded in spawning grounds for which specific sediment types are required and due to the known understanding of herring being less likely to respond to noise when engaged in spawning activity. However, the physical presence of a tool in the water poses a different threat to the fish and is likely to result in a small scale displacement of the fish</p>

		<p>likelihood of herring not fleeing from piling noise when engaged in spawning activity, herring are considered stationary receptors for the sake of this assessment".</p> <p><i>NER: Scope in direct disturbance resulting from maintenance.</i></p>			<p>(which for the purposes of noise modelling would remain stationary as this requires movement over kilometres rather than meters to be considered non-stationary). Therefore, it is still considered likely that fish will move away from disturbance and this does not conflict with fish being considered as a stationary receptor for the purposes of noise modelling.</p>
S42_0052_4.7	Natural England	<p>Accidental pollution events during the construction, operation and decommissioning phases have been scoped out. Our assumption is that this has been agreed because there will be a Marine Pollution Contingency Plan (MPCP) in place however this has not been specified here or on the impacts and effects register so it is not clear.</p> <p><i>NER: Specify why these impacts have been scoped out and link to Co111 (A Marine Pollution Contingency Plan (MPCP) will be developed.)</i></p>	Y	lo Co111	<p>Additional justification has been provided in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> to conclude why these impacts are scoped out and reference to project commitment (Co111) as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p>
S42_0052_4.8	Natural England	<p>The methodology presented implies that for an impact on a receptor for which sensitivity is high while the magnitude of the impact is minor that the significance of effect is minor or moderate (Table 3.13). On all occasion but one (see POINT 4.22) where this combination of sensitivity and magnitude presented itself the applicant has concluded that the significance of the impacts were always minor (not significant in EIA terms) and not moderate which in turn would be significant in EIA terms. The precautionary principle would assume otherwise, unless there is evidence to say the contrary, but no further evidence has been presented to support the conclusion of minor significance. Please see POINTS 4.12, 4.15, 4.17 and 4.20</p>	Y	N/A	<p>Additional justification has been provided in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> to support the significance of effect concluded within the assessment.</p>

		<p>for examples from the Fish and Shellfish chapter when this happened. The approach was the same in other chapters (e.g. Benthic ecology chapter, see POINT 3.16).</p> <p><i>NER: significance of effect could be one or the other.</i></p>			
S42_0052_4.9	Natural England	<p>It is not clear where increases in SSC been predicted.</p> <p><i>NER: Refer to where SSC increase predictions have been made</i></p>	Y	N/A	<p>Additional physical processes modelling (<a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>) provides the evidence of suspended sediment concentration increases, supporting the assessment presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p>
S42_0052_4.10	Natural England	<p>In the case of drilling for monopiles due to the high accumulation of sediment it was considered as habitat loss and supposedly assessed as such. However, the MDS considered in habitat loss does not appear to include drilling for monopiles. It might be the case that the MDS considered another type of foundation which will cause a habitat loss larger than the habitat loss from drilling but this has not been specified or clarified.</p> <p><i>NER: Clarify if habitat loss from drilling monopiles has been considered in the MDS.</i></p>	Y	N/A	<p>Habitat loss from drilling is of a smaller magnitude than presence of suction bucket caissons and as such this represented the maximum design scenario assessed at PEIR.</p> <p>Gravity base foundations are now considered in the project design described in <a href="#">Volume 1, Chapter 4: Project Description</a> for use on all infrastructure and therefore represent the maximum design scenario for habitat loss.</p>
S42_0052_4.11	Natural England	<p>The magnitude of the maximum potential increase in SSC resulting from construction activities is assessed to be within the natural range of SSC (2 to 14 mg/l closer inshore, reducing offshore to around 2 to 3 mg/l.) within the region and that the impact will be short-term, intermittent and of localised extent (within one tidal excursion) and reversible. However the predictions are that the SSC will increase 2mg/l above background (for Seabed preparation for foundation cables, sandwave clearance, cable trenching, drilling for foundations and</p>	Y	N/A	<p>Additional physical processes modelling (<a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>) provides the evidence of suspended sediment concentration increases, supporting the assessment presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p>

		<p>spoil dispersal), and &gt; 10 mg/l above background at the disposal site, with peak concentrations of 500 to 800 mg/l. From this, it is not clear how it has been concluded that the maximum potential increase in SSC is within the natural range.</p>			
S42_0052_4.12	Natural England	<p>Herring sensitivity to increases in SSC and smothering was assessed as high while impact magnitude is minor. It is not clear why the significance of effect is concluded to be minor over moderate (see POINT 4.8). The same logic applies for temporary localised increases in SSC and smothering during operation and maintenance (3.11.2.2 to 3.11.2.9) as well as decommissioning (3.11.3.2 to 3.11.3.3).</p> <p>Furthermore, the ECC crosses a main herring spawning ground off Flamborough Head and increases in SSC and smothering from sediment deposition in that area can occur as a result of a multitude of activities, such as seabed preparation activities, sandwave levelling, cable installation activities, dredging and deposition of dredged materials, foundation installation for the HVAC substation, which might include drilling and deposition of drilled materials. Construction is due to occur over a long period of time and the magnitude of impacts might be greater than minor, particularly if coinciding with the spawning season. This also needs to be assessed in line with up to date PSA data for the ECC (see POINT 4.5). Finally, impacting on areas of herring spawning will have a knock on effect on the surrounding SPAs and the SNS SAC where herring is a key food source.</p> <p><i>NER: Justify why significance of impacts have been chosen to be minor over moderate. Adequately assess impacts of increases in SSC</i></p>	Y	New Co190	<p>Increases in suspended sediment concentrations, smothering and underwater noise have been appropriately assessed, with supporting data and evidence provided in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> to support the significance of effect described. Additional justification has been provided in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> to support the significance of effect concluded within the assessment.</p> <p>The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction at the booster station during herring spawning secured by commitment (Co190) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p>



		and smothering on herring, Consider seasonal restrictions to mitigate impacts to herring from increased SSC and smothering during herring spawning season.			
S42_0052_4.13	Natural England	Herring peak spawning season (October to September). This should be August to October.	Y	N/A	Spawning timings of herring have been updated in <a href="#">Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> in accordance with the ICES Report of the Herring Assessment Working Group (2018), and Coull et al (1998). As discussed in the relevant Evidence Plan process meetings, consideration of the potential impacts on herring spawning will focus on the "peak" spawning period for the Banks stock which runs from September to October.
S42_0052_4.14	Natural England	For the assessment of mortality, injury, behavioural changes and auditory masking arising from noise and vibration, modelling has been conducted for one piling event, however it is anticipated that piling will be occurring simultaneously on up to two locations. As such simultaneous piling needs to be modelled. This might change the outcome of the impact assessment for underwater noise.  Also focus need to be on the assessment of the impacts arising from the MDS since this is the one specified in the DCO/dMLs. The most likely scenario is helpful to provided context only.  <i>NER: Model simultaneous piling and assess MDS.</i>	Y	N/A	Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2 Chapter 3: Fish and Shellfish Ecology</a> .
S42_0052_4.15	Natural England	Similarly to other impacts, Herring was assessed as having High sensitivity to underwater noise during construction, the impact magnitude was minor and the significance of effect on herring was concluded to be of minor significance at both the array and the HVAC booster station (not	Y	N/A	Updated noise modelling and an assessment of simultaneous piling has been undertaken on the Maximum Design Scenario (MDS) and presented in <a href="#">Volume 2 Chapter 3: Fish and Shellfish Ecology</a> .

		<p>significant in EIA terms) over moderate, which according to Table 3.13 (page 46) is also a possibility. Further to this, simultaneous piling has not been modelled so impact magnitude is likely to be higher than assessed. Natural England is not convinced that the impact is of minor significance. Moreover, although in average the primary hotspot for herring spawning is located to the north of the Hornsea Four ECC, annual data show its location is variable and in 2010-2011 data as well as 2011-1012 the actual hotspot did overlap with the cable corridor. As such this needs to be considered the worst-case scenario that the hotspot can overlap with the cable corridor.</p> <p><i>NER: Assess the worst case scenario, including simultaneous piling. Consider mitigation, through seasonal piling restrictions during herring spawning season.</i></p>			
S42_0052_4.16	Natural England	<p>Natural England is also not convinced that impacts on sandeel from underwater noise are minor, again considering simultaneous piling has not been modelled. This also needs to be assessed in line with up to date PSA data for the ECC (see POINT 4.5).</p> <p><i>NER: Assess the worst-case scenario, including simultaneous piling.</i></p>	Y	New Co190	<p>Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2 Chapter 3: Fish and Shellfish Ecology</a>.</p> <p>The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction at the booster station during herring spawning secured by commitment (Co190) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>Particle size data has been collected along the offshore export cable corridor, and figures and assessments have been updated within both <a href="#">Volume 2 Chapter 3: Fish and Shellfish</a></p>

					<a href="#">Ecology</a> and <a href="#">Volume 5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> accordingly.
S42_0052_4.17	Natural England	<p>Sensitivity of both herring and sandeel is deemed to be high to long-term loss of habitat due to the presence of turbine foundations, scour protection and cable protection and Increased hard substrate and structural complexity as a result of the introduction of turbine foundations scour protection and cable protection. The magnitude of both impacts is deemed to be minor and the applicant concluded the significance of the effect to be minor (not significant in EIA terms) over moderate without further justification. Natural England again queries why the lowest effect option is systematically chosen without further justification. Also please note that it is not clear if habitat loss from drilling of monopiles has been included in habitat loss (see POINT 4.10)</p> <p><i>NER: Justify why significance of impacts have been chosen to be minor over moderate.</i></p>	Y	N/A	<p>Additional justification has been provided with supporting data and evidence in <a href="#">Volume 2 Chapter 3: Fish and Shellfish Ecology</a> to support the significance of effect.</p> <p>Habitat loss from drilling is of a smaller magnitude than presence of suction bucket caissons and as such this represented the maximum design scenario assessed at PEIR.</p> <p>Gravity base foundations are now considered in the project design described in <a href="#">Volume 1, Chapter 4: Project Description</a> for use on all infrastructure and therefore represent the maximum design scenario for habitat loss.</p>
S42_0052_4.18	Natural England	<p>For the cumulative assessment of underwater noise Sofia has been screened in but not Dogger Bank Creyke Beck A and Creyke Beck B. It is not clear why these two projects have not been screened in since the construction period of these two projects overlaps with the construction period of Hornsea Four. Further to this Creyke Beck A and B cable corridor also crosses the area of high intensity for herring spawning and if there is piling due to occur in the cable corridor, for any offshore sub-stations, these would have a cumulative effect with piling for the HVAC station if these were to occur at the same time. Please note that this can also be the case for Sofia and Teesside A</p>	Y	N/A	<p>Due to the potential for overlapping construction periods, Dogger Bank Creyke Beck A &amp; B are screened-in to the Cumulative Effects Assessment described in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p>

		<p>cable corridor.</p> <p><i>NER: Either clarify the reasoning for excluding these two projects or include them in the CEA. Also considering pilling in the cable corridors of all Dogger Bank projects if offshore sub-stations are planned for any of these four projects.</i></p>			
S42_0052_4.19	Natural England	<p>Natural England does not necessarily agree with the lack of significant effects from SSC (see POINT 4.12) so that assumption alone does not justify the lack of cumulative impacts.</p>	Y	N/A	<p>Particle size data has been collected along the offshore export cable corridor, and figures and assessments have been updated within both <a href="#">Volume 2 Chapter 3: Fish and Shellfish Ecology</a> and <a href="#">Volume 5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> accordingly.</p> <p>Additional physical processes modelling (<a href="#">Volume 5, Annex 1.1: Marine Processes Technical Report</a>) provides the evidence of suspended sediment concentration increases, supporting the assessment presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p>
S42_0052_4.20	Natural England	<p>Sensitivity of both herring and sandeel was assessed to be high to mortality, injury, behavioural changes and auditory masking arising from noise and vibration. The magnitude of the impact is deemed to be minor and the applicant concluded the significance of the effect to be minor (not significant in EIA terms) over moderate without further justification.</p> <p>Within the cumulative assessment this was also the case for Long term loss of habitat due to the presence of turbine foundations, scour protection and cable protection (3.12.3.7 to 3.12.3.11) and Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable</p>	Y	N/A	<p>As detailed within the assessment methodology, classification of effect is determined by expert judgement. <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> has been updated to ensure sufficient evidence is provided to support all conclusions.</p>

		<p>protection (3.12.3.12 to 3.12.3.19). Natural England again queries why the lowest effect option is systematically chosen without further justification.</p> <p><i>NER: Justify why significance of impacts have been chosen to be minor over moderate.</i></p>			
S42_0052_4.21	Natural England	<p>The cumulative long-term habitat loss assessment is made against those receptors of low and medium sensitivity, however herring and sandeel are deemed to have high sensitivity which would have resulted in a significance of minor or moderate.</p> <p><i>NER: Update assessment to reflect receptor sensitivity.</i></p>	Y	N/A	The Applicant has noted this comment. The Cumulative Effects Assessment is updated within <b>Volume 2, Chapter 3: Fish and Shellfish Ecology</b> to reflect the sensitivity of the receptor.
S42_0052_4.22	Natural England	<p>Transboundary effects: In this case sensitivity of fish and shellfish receptors to underwater noise levels were assessed as low to high (herring) and the magnitude predicted to be minor adverse. The effect was therefore considered to be a maximum of moderate significance. Not minor as in all previous cases, this was the only instance when this was concluded to be a maximum of moderate significance for a combination of high sensitivity versus minor magnitude.</p>	Y	N/A	<p><b>Volume 2, Chapter 3: Fish and Shellfish Ecology</b> has been updated to ensure additional justification for the significance of effect is provided to support all conclusions.</p>
S42_0052_4.23	Natural England	<p>Natural England does not agree that all impacts were of negligible or minor significance (e.g. POINTS 4.12, 4.14 and 4.15)</p> <p><i>NER: Amend if necessary</i></p>	Y	N/A	
S42_0052_9.1	Natural England	<p>In this table it is stated that receptor sensitivity to temporary localised increases in SSC and smothering is medium, referring back to <b>Volume 2, Chapter 3: Fish and Shellfish Ecology</b>. In this chapter sensitivity of herring to temporary localised increases in SSC and smothering was considered to be high due to high intensity spawning sites for herring occurring in the vicinity of the HVAC</p>	I	N/A	The conclusion has been updated based on the final assessment presented in <b>Volume A2, Chapter 3: Fish and Shellfish Ecology</b> .

		<p>booster station. Furthermore, Natural England does not agree that the conclusion of the significance of this effect to be minor (see POINT 4.1.2).</p> <p><i>NER: Update table accordingly and assess if the significance of effect is minor or moderate.</i></p>			
S42_0057_1.4.1	MMO	<p><b>Fish Ecology</b></p> <p><b>Major Comments</b></p> <p>1.4.1 The coverage of site-specific PSA data along the ECC is currently poor and it is not possible to carry out a robust assessment of potential herring spawning or sandeel habitat for the ECC because there is little PSA data for this area. The MMO understand that further PSA data was to be obtained during site-specific grab sampling during 2019 and assume this data was not available at the time of writing the PEIR. However, it would be useful to know if any additional survey data will be included in the ES which will provide greater sampling coverage of the ECC and therefore a more robust habitat assessment for sandeel and spawning herring. The ECC crosses the main Banks herring spawning ground at Flamborough Head, therefore disturbances to and loss of herring spawning habitat in this area from activities such as seabed preparation, cable laying, installation of OWF infrastructure and piling should be adequately assessed. This cannot be done without a detailed understanding of the sediment properties in the ECC using site-specific data.</p>	Y	N/A	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. This additional survey data has been utilised to update and inform the environmental baseline presented in <a href="#">Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> .
S42_0057_1.4.2	MMO	<p>Temporary localised increases in suspended sediment concentration (SSC) and smothering:</p>	Y	New Co190	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019,

Sediment deposition arising from foundation and cable installation works, seabed preparation works including sandwave clearance and in disposal site locations has the potential to impact spawning herring. Herring require a specific substrate on which to spawn, consisting of gravel or similar habitats with a low proportion of fine sediment and well-oxygenated water. Herring eggs and larvae can be put at risk if the spawning beds are smothered e.g. from dredging activity. If there is a large proportion of fine material (<63 micron) in the sample, then it is unlikely to allow sufficient water circulation and it will not be suitable as a herring spawning ground (Rogers 2000). In the case of offshore disposal sites, the re-deposition of fine sediment from the sediment plumes may smother eggs laid on the bottom (De Groot, 1996). Accordingly, it is important to manage herring spawning areas by ensuring that the physical properties of the substrate remain the same. Therefore, it is unclear why the magnitude of impact has been assessed as 'minor' for herring at the array area and HVAC booster station, and the significance of effect is deemed as 'minor' (not significant in EIA terms) for herring, despite the sensitivity of herring being assessed as 'high' in the assessment.

This is of particular concern when considering construction activities taking place along the ECC which, as acknowledged in the PEIR, crosses the main Banks herring spawning ground at Flamborough Head. As noted, there are currently insufficient PSA data to inform a robust assessment of impacts to herring spawning grounds along the ECC. Based on knowledge of the area as the main

including the collection of particle size data. Additional marine processes modelling and updated noise modelling of simultaneous piling has also been undertaken. The combined and updated 2018-2019 survey data enables a robust assessment of impacts to potential herring spawning grounds and sandeel habitats, as described in [Volume 2, Chapter 3: Fish and Shellfish Ecology](#).

The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction at the booster station during herring spawning secured by commitment (Co190) detailed in [Volume A4, Annex 5.2: Commitment Register](#).

		Banks herring spawning ground, it may be necessary for seasonal restrictions to be implemented to mitigate the impacts to herring from increases in SSC and smothering during the herring spawning season. If appropriate, further formal recommendations will be made on review of the PSA data and assessments in the ES.			
S42_0057_1.4.3	MMO	<p>Mortality, injury, behavioural changes and auditory masking arising from noise and vibration:</p> <p>The non-technical summary states that the number of foundations that could be installed at any one time will be restricted to two, in order to reduce underwater noise impacts. However, the noise modelling undertaken to inform the assessment has not included the scenario of simultaneous piling, therefore the 'worst-case' scenario for impacts to fish has not been assessed. The MMO recommend that the ES presents the underwater noise modelling for this scenario for a stationary receptor.</p>	Y		Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> .
S42_0057_1.4.4	MMO	<p>Modelled noise contours from a single monopile at 5000kJ show that there is an overlap with areas of herring spawning ground (as depicted by the IHLS data). Additionally, modelled noise contours from a single monopile at 5000kJ for the HVAC monopile on the ECC show an even greater overlap with herring spawning grounds where larval densities are much higher. The assessment concludes that the impact to herring will be of 'minor' significance, despite herring being assessed as having 'high' sensitivity. The MMO disagree with this conclusion, especially as a) modelling of simultaneous piling has not been presented, and b) the noise contours do not consider the behavioural impacts that could occur over</p>	Y	New Co190	<p>Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>.</p> <p>The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction at the booster station during herring spawning secured by commitment (Co190) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p>



		larger distances. Based on the existing modelling and assessment, which is not the worst-case scenario, the MMO anticipate it may be necessary to recommend a seasonal piling restriction during the herring spawning season to protect the Banks herring population that spawn near Flamborough Head. However, at this stage the MMO are not able to formally make a recommendation on the need for a piling restriction until modelling of simultaneous piling has been presented.			
S42_0057_1.4.5	MMO	As acknowledged in the Fish and Shellfish Ecology report, injury and disturbance effects from UXO will impact a progressively larger area than piling with Temporary Threshold Shift (TTS) and disturbance effects potentially reaching tens of kilometres from the UXO location. Whilst it is recognised that UXO events are discrete events rather than continuous ones, the MMO have concerns regarding UXO events taking place during the herring spawning months of August to October. At this stage, a full assessment of the potential impacts from UXO clearance works has not been undertaken and the number of potential UXO and the likely sizes of these UXO are currently unknown. The MMO encourage Ørsted to consider the use of bubble curtains for UXO clearance (and piling) events in order to reduce the impacts of noise and vibration on all fish species, but particularly herring, as and when the UXO impact assessment is undertaken	Y	N/A	<p>UXO clearance is recognised as an activity within <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> and as such has been considered within the assessment. However, it is not proposed to licence UXO clearance as part of this DCO application. Therefore, the need for specific mitigation measures is not considered within this assessment.</p> <p>The assessment within <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> has been updated to include reference to mitigation options for UXO clearance works, to be agreed with the regulator at the relevant time.</p>
S42_0057_1.4.6	MMO	For the cumulative impact assessment 'assessment matrices' are presented which list the offshore activities in the planning, consented, construction, operational and decommissioning stages. Overlapping construction programs have the potential to cause cumulative noise and vibration	Y	N/A	Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> . This is considered within the Cumulative Effects Assessment section

		impacts for fish if piling at more than one site is occurring concurrently. As per comments above regarding the need for modelling of simultaneous piling, it may be necessary for additional offshore developments with coinciding construction stages to be screened into the cumulative impact assessment, if the noise from simultaneous piling is predicted to propagate further (i.e. beyond the 100 km buffer) under this scenario.			of <a href="#">Volume A2, Chapter 3: Fish and Shellfish Ecology</a> .
S42_0057_1.4.7	MMO	The impact assessment has concluded impacts of minor significance for fish; therefore, no mitigation measures have been proposed apart from embedded mitigation in the form of a soft-start procedure. The MMO do not agree with the assessment of impacts to herring from underwater noise and disturbance to herring spawning grounds caused by construction activities along the ECC. Given the sensitivity of herring to noise and the overlap of noise contours depicted in the noise modelling figures, the soft-start mitigation measure proposed is not adequate to protect spawning herring from the effects of piling. As noted, without improved coverage of PSA across the ECC, a robust assessment of disturbance and loss of herring spawning habitat cannot be undertaken. Based on the information presented in the PEIR documents, further mitigation measures to protect spawning herring and their habitat may be required, but formal recommendations can only be made upon review of the ES taking the comments outlined above into account.	Y	New Co190	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. Additional marine processes modelling and an updated noise modelling assessment of simultaneous piling. The combined and updated 2018-2019 survey data enables a robust assessment of impacts to potential herring spawning grounds and sandeel habitats, as described in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> .  The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction at the booster station during herring spawning secured by commitment (Co190) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .
S42_0057_1.4.8	MMO	<b>Minor Comments</b>  Otter trawls or epibenthic beam trawls do not adequately target all species e.g. sandeels and sole. Therefore, data resulting	Y	N/A	The environmental baseline presented in <a href="#">Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> has used the data from historic surveys within the former Hornsea Zone,

		from the fishing methods used cannot be used to accurately describe species abundance. The MMO recommends that fisheries survey catch data should be discussed and presented in the ES in standardised units e.g. Catch Per Unit Effort (CPUE) rather than 'abundance'.			combined with information from wider survey work, including that in published literature, in order to identify the presence or absence of species within the locality of Hornsea Four, rather than attempting to use this data to quantify the abundances of the relevant species. This information therefore clearly identifies whether species of concern are present in the area and have the potential to be affected by the works (and therefore required to be considered in the assessment), rather than potentially not being deemed as important if they are only recorded in low abundances through the use of less suitable survey methodologies for that species.
S42_0057_1.4.9	MMO	The inclusion of Tables 4-6 (Vol.5 Annex 3.1) that present the distances of the Hornsea Four area to spawning and nursery grounds and the spawning timings of relevant fish species are a useful and welcome inclusion. However, spawning for the Banks/Dogger herring population in the North Sea occurs from August to October inclusive, rather than September to October inclusive. This should be corrected in Table 6. Additionally, Banks/Dogger herring do not spawn between February and April (as indicated on Table 6). Whilst there are some populations of herring that are spring spawners (e.g. Thames/Blackwater herring) these are considered a separate sub-stock from the main North Sea population.	Y	N/A	Spawning timings of herring have been updated in <a href="#">Volume 5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> in accordance with the ICES Report of the Herring Assessment Working Group (2018), and Coull et al (1998).
S42_0057_1.4.10	MMO	Although the noise contours presented in the Fish and Shellfish Ecology Report show values that appear consistent with unweighted metrics, the unit shown in the key is dBht. This should be corrected or explained.	Y	N/A	The Applicant acknowledge the labelling error in <a href="#">Volume 5, Annex 3.1: Fish and Shellfish Ecology Technical Report</a> but can confirm that the noise contours shown were the unweighted metrics based on Popper et al. (2014).

S42_0057_1.4.11-12	MMO	<p><b>Limited details are provided regarding shellfish species within the preliminary ecology assessment. Please include details of the following within the shellfish ecology assessment in the Environmental Statement:</b></p>	Y	N/A	<p>The information provided has been incorporated into the environmental baseline as presented in <a href="#">Section 3.5 of Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report.</a></p>
S42_0057_1.4.13	MMO	<p>Scallops are currently considered the highest value shellfish species in the UK and the Fish and Shellfish Technical Report (item 9) highlights that the ECC runs through one of two key Pecten maximus beds within the region (a chart would be a useful visual aid to demonstrate the degree of overlap). It is noted that this area is fished for scallop and is therefore subject to disturbance under normal circumstances. Activities such as cable trenching etc. may affect the habitat suitability for this species (preference is clean</p>	Y	N/A	<p>The information provided has been incorporated into the environmental baseline as presented in <a href="#">Section 3.5 of Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report.</a></p>

# Hornsea 4



		sand/gravel) and individuals may suffer direct injury or mortality. Scallop undertake limited swimming, although this is likely to be at a high energy cost and generally associated with escape scenarios, therefore are not expected to be able to travel large distances to avoid disturbance over large areas.		
S42_0057_1.4.14	MMO	Nephrops norvegicus were found in the east of the area with 13 berried females reported. This species constructs and inhabits complex burrows in environs characterised by stable mud. As with C. pagurus, berried females tend to be considered largely sedentary whilst brooding eggs, generally remaining within their burrows to overwinter. During this time, females are more vulnerable to disturbance, injury or mortality through activities such as piling, cable trenching and debris/UXO clearance. Furthermore, this species does not generally undertake large migrations and remains in the same area during settled stages.	Y	N/A
S42_0057_1.4.15	MMO	The impacts to Nephrops are largely dependent upon the density of individuals. Stock assessments tend to utilise burrow counts/density as a proxy for population size; this information can be obtained through review of scaled seabed video footage which may have been collected for habitat assessment/benthic ecology. Preliminary assessments have also been undertaken for the Botney Gut functional unit (FU). Given the generally high abundances of this species in the east of the Hornsea Four array area and the distribution of this species outside of the project area from historical literature, the magnitude of impact through operations such as piling and inter-array cable trenching is expected to be low (project footprint and duration), and the sensitivity is considered high for individuals within the project	Y	N/A

		footprint. The overall impact is expected to be minor negative.			
S42_0057_1.4.16	MMO	The ecology assessment is largely focussed on herring and sandeel. In light of the fish and shellfish ecology technical report and despite the low likelihood of significant impacts to shellfish species, due consideration should be given to the species mentioned in 1.4.12-1.4.15 to document the process of eliminating these receptors from further in depth assessment in the ES.	Y	N/A	
S42_0057_1.4.17	MMO	Certain shellfish species show higher vulnerability during specific life stages or seasons (i.e. C. pagurus and N. norvegicus) and this should be given due consideration in the ES.	Y	N/A	
S42_0057_1.4.18	MMO	Due to the high commercial value and importance of scallop, the extent of overlap of one of two key scallop beds with the ECC should be presented (visually) and assessed on the basis of potential loss of ground/habitat, and potential for injury/mortality through operational activities. It is noted that this area is fished for scallop and is therefore subject to disturbance under normal circumstances, however due consideration should be given for the impacts of the export cable installation, operation and maintenance.	Y	N/A	
S42_0057_1.4.19	MMO	<p><b>Minor Comments</b></p> <p>Post-construction benthic surveys including underwater video/stills acquisition and particle size analysis (typically at intervals of 1, 3 and 5 years or 1, 5 and 10 years post-construction) would be useful in determining the continued habitat suitability (and recovery) for Nephrops and for detecting any major changes in the habitat structure within the scallop bed situated along the ECC. This would not require additional data collection</p>	Y	N/A	Updated data and assessment is included in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a> to provide additional confidence that no significant effects are predicted (with the inclusion of mitigation where appropriate) and therefore Hornsea Four remain of the position that no monitoring is required. As a result of EIA findings and confirmation from CEFAS regarding a lack of significant effects on Nephrops, the applicant considers

		but utilisation of benthic survey data to meet additional monitoring objectives.			targeted Nephrops monitoring to be neither justified nor appropriate.
S42_0057_1.5.1	MMO	Proposed works are likely to have an impact on the fish and shellfish stocks within the area. It is important that fishermen local to this area are consulted regarding proposed works, in order to determine whether or not any key fishing grounds are likely to be affected.	Y	N/A	<p>The Applicant notes this comment and confirms the fishing industry and representative organisations have been fully engaged in the development proposals for Hornsea Four as described in <a href="#">Volume 5, Chapter 6: Commercial Fisheries</a>.</p> <p>Extensive and constructive consultation with the National Federation of Fishermen's Organisations (NFFO), the Holderness Fishing Industry Group (HFIG) and individual fishers has taken place and will continue to do so. The Applicant is committed to ensuring commercial fishing interests are fully considered going forward.</p>
S42_0057_1.5.2	MMO	The waters around the proposed area have been found to support species including Nephrops, cod, lemon sole, herring, mackerel, sprat, whiting, sandeel, plaice and anglerfish. Given that disturbance of the seabed can significantly alter nursery and spawning grounds, it is recommended that works commence at a time that would be least detrimental to the least number of species.	Y	N/A	<p>The relevant statutory stakeholders were consulted via the Marine Ecology &amp; Processes Evidence Planning process and it was agreed the focus of fish and shellfish assessment, as detailed in <a href="#">Volume 2, Chapter 3: Fish and Shellfish Ecology</a>, would be primarily on herring and sandeel, as these species are considered to be the most sensitive receptors in the region.</p> <p>Notwithstanding the above, impacts on the spawning activity of other recorded fish and shellfish species have been fully assessed, with no significant effects from construction works on these other species identified and therefore no seasonal restrictions are required.</p>
S42_0057_1.5.3	MMO	Potting for lobster and crab predominantly takes place during summer and autumn seasons, however this can be extended in settled weather. There is a winter cod fishery	Y	N/A	The Applicant acknowledges this recommendation and confirms the <a href="#">Volume 5, Annex 6.1: Commercial Fisheries Technical Report</a> provides

		from around October until March. Some fishing for whiting, rays and skates may also take place. Vessels north of the Humber will pot for crab and lobster, whereas vessels south of the Humber tend to pot for whelk, crab, and lobster. Works may possibly affect the above fisheries. Advice should be sought via the FLO when the timetable of works is known so that the local industry can provide real-time advice.			seasonal landings for the key commercial species. Consultation with the potting industry has provided clarification to the seasonality of crab and lobster fisheries. Details of the Fisheries Liaison Officer roles and responsibilities are included within <a href="#">Volume 2, Annex 9: Outline Fisheries Coexistence and Liaison Plan</a> .
S42_0057_1.6.2	MMO	Volume 2, Chapter 3 Fish and Shellfish Ecology (A2.3):  In order to protect spawning herring during this critical life stage and to reduce the risk of significant impact, the MMO recommend that piling operations do not take place during the herring spawning season.	Y	New Co190	The Applicant has considered further mitigation options through the Evidence Plan process and commits to including a seasonal piling restriction for the booster station(s) during herring spawning secured by commitment (Co190) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .
S42_0057_1.6.2.1	MMO	Para 3.7.1.9 of the Fish and Shellfish Ecology chapter states that the study area was primarily characterised by four commercial species: brown crab, European lobster, Nephrops and common whelk. An adequate assessment of the potential impacts of underwater noise on marine invertebrate species has not been undertaken. Of relevance, paragraph 3.11.1.59 states the following: "there are no specific criteria currently published in respect of shellfish species, however studies on lobsters have shown no effect on mortality, appendage loss or the ability of animals to regain normal posture after exposure to very high sound levels (>220 dB) (Payne et al. 2007). Similarly, studies of marine bivalves (e.g. mussels Mytilus edulis and periwinkles Littorina spa) exposed to a single airgun at a distance of 0.5 m have shown no effects after exposure (Kosheleva 1992). All other fish and shellfish VERs within the study area are deemed to be of low vulnerability, medium recoverability	Y	N/A	Further evidence to support the assessment of noise impacts on marine invertebrates has been sourced from peer reviewed literature, and an updated assessment provided in <a href="#">Volume 2, Chapter 3 Fish and Shellfish Ecology</a> .



and of local to international importance. The sensitivity of these receptors is therefore considered to be medium. Given that there are currently no noise exposure criteria for marine invertebrates, conclusions should be derived from the peer-reviewed literature.

## EIA topic area: Marine Mammals

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0049_001	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><b>Impacts and Effects Register (marine mammals)</b></p> <p>TWT would like to question if PTS and disturbance impacts from piling noise have accidentally been assigned as a 'simple assessment'. The assessment undertaken in the marine mammal chapter appears to be a detailed assessment. Due to the potential PTS and disturbance impacts on marine mammals from UXO clearance, a detailed assessment is required. There is potential for an adverse effect on marine mammals from UXO clearance which we provide more detail on later within this document. The table in appendix A of 'How to read this PEIR' supports the need for a detailed assessment. For example, quantitative underwater noise modelling and in depth understanding of the environmental consequences of UXO clearance are required. We would welcome a discussion regarding this at the next Marine Mammal Technical Panel meeting.</p>	Y	N/A	<p>Both permanent threshold shift and disturbance impacts from pile driving have undergone a detailed environmental impact assessment. The Impacts Register has been updated as appropriate (<a href="#">Volume A4, Annex 5.1: Impacts Register</a>).</p> <p>The Applicant has engaged with The Wildlife Trusts through the Evidence Plan process. The Applicant is not applying to licence UXO within the DCO application and as such will be applied for separately prior to such activities commencing. However, a detailed assessment will be undertaken as requested</p>

					in <a href="#">Volume A2, Chapter 4: Marine Mammals.</a>
S42_0049_002	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><b>Commitments Register</b></p> <p>TWT welcomes the commitments in Co33, Co45 and Co86 for cable routes to avoid Marine Protected Areas. We also welcome commitment Co110. However, we highlight guidance to support the production of the piling MMMP is out of date and therefore not fit for purpose. There are no commitments within the register to a MMMP for UXO clearance. We provide further comments within our response on why this commitment must be made. We note that no commitments have been made in the register for disturbance impacts on marine mammals or the Southern North Sea SAC. Although we appreciate that the Commitments Register currently only applies to the EIA, mitigation documents to be produced for the HRA, for example the Site Integrity Plan for the Southern North Sea SAC, are likely to be relevant to managing cumulative disturbance impacts assessed in the marine mammals chapter. Therefore, we suggest documents such as these should be included in the Commitments Register.</p>	Y	Change Co110	<p>The Applicant acknowledges comments regarding the Commitments Register detailed in Volume A4, Annex 5.2: Commitment Register. At the point of DCO application the JNCC piling mitigation guidance remains the only publicly available guidance document. Commitment Co110 has been adjusted to reflect the use of best practice, rather than reliance on JNCC (2010) guidance.</p> <p>The Applicant has committed to a piling Marine Mammal Mitigation Protocol (MMMP) to be developed in accordance with the Outline MMMP and implemented during construction. The piling MMMP will include measures to ensure the risk of instantaneous permanent threshold shift (PTS) to marine mammals is negligible and will be in line with the latest relevant available guidance. This is considered a project commitment (Co110)</p>

					<p>detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>The Applicant is not applying to license UXO clearance at this stage. Therefore, no commitment to UXO clearance activities are included in <a href="#">Volume A4, Annex 5.2: Commitment Register of the Environmental Statement</a>.</p>
S42_0049_3.1	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><b><u>Marine Mammals Chapter</u></b></p> <p><u>Data</u></p> <p>TWT would like to highlight that recent sighting data has shown an increase in bottlenose dolphin activity along the Yorkshire coast.</p>	Y	N/A	<p>The Applicant acknowledges this comment and has updated the baseline description as appropriate (<a href="#">Volume 5, Annex 4.1: Marine Mammals Technical Report</a>). Bottlenose dolphins have been included in the ES impact assessment and is presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a>.</p>
S42_0049_3.2.1	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Assessment</u></p> <p><u>Maximum vs most likely design scenario</u></p> <p>Whilst we appreciate that data from previous offshore wind farm installations indicates that actual hammer energies used may be less than the maximum design scenario parameters, the application assessment must be based upon the worst case scenario, unless conditions are to be implemented within the Development Consent Order (DCO) which would limit the use of the maximum design scenario hammer energy.</p>	Y	N/A	<p>A full and quantitative assessment of the maximum design parameters for percussive piling is presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a>. Impact noise modelling to inform the assessment is provided in <a href="#">Volume A4, Annex 4.5:</a></p>

					<a href="#">Subsea Noise Technical Report.</a>
S42_0049_3.2.2	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Use of dose response curves</u></p> <p>The use of dose response curves in assessing UK offshore wind farm construction impacts on harbour porpoise populations is a fairly new approach. Because of this, we suggest that monitoring should take place during construction to verify the predictions of this model.</p>	Y	N/A	This comment is noted by the Applicant and that the use of a dose-response curve is now common practice, based on good empirical data (for some species) from German and Scottish offshore windfarms.
S42_0049_3.2.3	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Use of expert elicitation</u></p> <p>TWT would like to discuss with the Marine Mammals Technical Panel the use of the Expert Elicitation papers<sup>12</sup>. TWT suggests the information used within these reports used as context only until stronger evidence is available.</p>	Y	N/A	Sensitivity scores used in the Preliminary Environmental Information Report weren't based purely on the expert elicitation results, but included the evidence supporting said expert elicitation. The sections on marine mammal sensitivity to PTS and disturbance have been revised to clarify this ( <a href="#">Volume A2, Chapter 4: Marine Mammals</a> ).
S42_0049_3.2.4	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Impulsive and non-impulsive noise</u></p> <p>Paragraph 4.10.5.5 outlines how noise changes from impulsive to non-impulsive with distance from source and the use of new evidence regarding this change in the assessment. TWT would like to discuss the use of this approach in the assessment including the confidence in the underpinning evidence.</p>	Y	N/A	The Applicant confirms it was agreed through the Evidence Planning process that this information would be presented for illustration only, and the impact assessment has been based upon the PTS ranges from fully impulsive noise. Agreements made with consultees within the Evidence Plan process are set out in the topic specific Evidence Plan Logs which

					are appendices to the <a href="#">Hornsea Four Evidence Plan (Volume B1, Annex 1.1: Evidence Plan)</a> , an annex of the Hornsea Four Consultation Report ( <a href="#">Volume B1, Chapter 1: Consultation Report</a> ).
S42_0049_3.2.5	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Assessment of UXO impacts</u></p> <p>We question why only UXO clearance up to a 263kg charge weight has been assessed within the marine mammal's chapter. UXOs of greater weight than this are found within the North Sea, and this must be taken into account within the assessment. We have provided further comments on UXO clearance in section 5.</p>	Y	N/A	The Applicant has engaged with The Wildlife Trusts through the Evidence Plan process. The Applicant is not applying to licence UXO within the DCO application and as such will be applied for separately prior to such activities commencing. However, a detailed assessment will be undertaken as requested in <a href="#">Volume A2, Chapter 4: Marine Mammals</a> .
S42_0049_3.2.6	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Cumulative impact assessment</u></p> <p>Although we appreciate the difficulties in undertaking quantitative cumulative impact assessments, we would expect more detail to be included in the final marine mammals' chapter. It would be useful to display quantitative information within a table to understand the data used to assess cumulative impacts.</p>	Y	N/A	This comment is noted by the Applicant and has updated cumulative tables for further clarity as appropriate ( <a href="#">Volume A2, Chapter 4: Marine Mammals</a> ).
S42_0049_004	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><u>Report to Inform the Appropriate Assessment – Southern North Sea SAC</u></p> <p>TWT agrees that to ensure no adverse effect on the Southern North Sea SAC from in-combination underwater noise disturbance impacts, that mitigation is required. TWT supports the use of a Site Integrity Plan (SIP). We expect the in-principle SIP to be produced for Hornsea Four to provide information on the effectiveness of proposed mitigation and the inclusion of</p>	Y		The draft <a href="#">Report to Inform Appropriate Assessment (RIAA)</a> (see <a href="#">Volume B2, Chapter 2</a> ) identified that there is the need to address uncertainty with regard to potential in-combination impacts from multiple

		<p>referenced examples of how the implementation of mitigation will reduce underwater noise disturbance impacts within the Southern North Sea SAC. Noise modelling should also be undertaken to demonstrate the degree of noise reduction which could be achieved through mitigation.</p> <p>TWT expects that the in-principle SIP would also include mitigation measures to manage the in-combination effects of UXO clearance. As such, we would expect the DCO to make reference for the need for the SIP for both in-combination piling and UXO disturbance impacts.</p> <p>Although we appreciate it is outside the control of Hornsea Four, TWT cannot conclude no adverse effect on the Southern North Sea SAC due to the lack of regulatory mechanism to manage in-combination underwater noise impacts. Defra and the Southern North Sea Regulators Working Group are taking positive steps to develop effective management for in-combination underwater noise impacts and TWT will continue to work closely with all stakeholders on this.</p>		<p>projects, which may or may not have a construction timetable which overlaps with Hornsea Four.</p> <p>An Outline Site Integrity Plan (SIP) (<a href="#">Volume F2, Annex 1.1</a>) has been secured as a condition in the draft Development Consent Order (DCO) (C1.1: Draft DCO Including Draft DML). The SIP identifies a number of mitigation measures with a commentary on the relative efficacy of each measure provided. Which of these mitigation measure(s) is ultimately chosen (if indeed any are required) to ensure the conclusion of no AEoI is maintained, will be determined through the drafting of the final SIP prior to the construction of Hornsea Four and will be a function of the final construction methodology and schedule of individual plans and projects (including Hornsea Four).</p> <p>The clearance of UXO prior to offshore construction is not included as a matter permitted under the DCO Application and will be</p>
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					subject to a separate Marine Licence application once future surveys have taken place to determine the likely number and nature of UXO present that will require clearance. The separate Marine Licence application will include due consideration of the SNS SAC, including the need for a SIP in relation specifically to UXO clearance activities if required.
S42_0049_005	The Wildlife Trusts and Yorkshire Wildlife Trust	<p><b><u>UXO clearance – Marine mammals’ chapter and the Report to Inform the Appropriate Assessment</u></b></p> <p>If unmitigated, UXO clearance activities may have an adverse effect of marine mammals as European Protected Species (EPS) and on the favourable condition of the Southern North Sea SAC. Evidence suggests the cumulative impact of UXO clearance on marine mammals could affect hundreds of harbour porpoise in the southern North Sea.</p> <p>Paragraph 4.10.5.11 in the marine mammal’s chapter outlines that a separate marine licence for UXO clearance would be developed at a later date. Paragraph 11.3.3.96 within the Report to Inform the Appropriate Assessment also outlines that a UXO MMMP will be required to provide appropriate mitigation to minimise the risk of injury and mortality to ensure no adverse effect on the Southern North Sea SAC.</p> <p>UXOs are likely to be encountered during the construction of Hornsea Four which will require clearance. If there is a risk of adverse effect to the Southern North Sea SAC or EPS, any mitigation must be secured as part of the DCO to ensure no adverse effect. Therefore, TWT suggests that a licence for UXO clearance alongside any supporting mitigation documents should be included within the DCO application</p>	Y	N/A	The Applicant has engaged with The Wildlife Trusts through the Evidence Plan process. The Applicant is not applying to licence UXO within the DCO application and as such will be applied for separately prior to such activities commencing. However, a detailed assessment will be undertaken as requested in <a href="#">Volume A2, Chapter 4: Marine Mammals.</a>

		<p>We welcome that an assessment of UXO clearance impacts has been undertaken within the PEIR using an estimate of the number of clearances required. At Technical Panel meetings, TWT has discussed the need for surveys to be undertaken to obtain a better understanding of the location and type of UXOs which may be encountered within the array and cable area. We recommend that a risk assessment report of UXO impacts should be undertaken as per guidance in the CIRIA PSG5 report<sup>4</sup>. This, alongside modelling of UXO impacts, should be used to inform the impact assessment on marine mammals and the Southern North Sea SAC.</p> <p>We would also like to raise that a great deal of uncertainty surrounds the effectiveness of mitigation for PTS impacts on harbour porpoise from UXO clearance. The use of updated noise thresholds<sup>5</sup> has increased PTS impacts for large UXO clearances to over 10km. Current scientific literature indicates the effectiveness of mitigation, such as ADDs, up to 7.5km and reduced harbour porpoise density beyond this<sup>6</sup>. However, the literature does not prove beyond reasonable scientific doubt that the proposed mitigation will be effective.</p>			
S42_0052_I NT 2.5	Natural England	<p><b>Impacts to Marine Mammals</b></p> <p>Natural England recognises that the project is anticipating that the MDS will only be the case for a small portion of the time, compared with the most likely design scenario. However, the focus of the assessment still needs to be in assessing the WCS. The assessment of a combined, maximum / most likely design scenario would require more evidence to clearly justify the different proportions of both scenarios and a well-defined timeline, and would need to be reflected in the DCO/dML in a way that would be enforceable. Further to this the WCS as defined, does not include simultaneous piling which is proposed for Hornsea Four. The WCS need to be adequately assessed taking account of these comments before Natural England can reach a fully informed determination of the impacts of this project on marine mammals.</p>	Y	N/A	<p>All maximum design scenarios presented in <a href="#">Volume A1, Chapter 4: Project Description and Volume A4, Annex 5.1: Impacts Register</a> have been reviewed and updated where required. Detail concerning piling ramp-up and durations has been clarified in <a href="#">Volume 2, Chapter 4: Marine Mammals</a>. A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has</p>



					been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 4, Annex 4.5: Subsea Noise Technical Report</a> .
S42_0052_1.7	Natural England	<p>In 4.8.4.25 it is stated that the soft start will commence at 15% of max hammer energy – i.e. 750kJ, but in 4.8.4.30 it is stated that the soft start will commence at 20% of maximum – so clarification is required on the starting percentage of the soft start.</p> <p>This figure feels high in terms of initial noise impact. Natural England would need evidence that animals can be outside of the initial PTS Zone (570m for harbour porpoise) with mitigation.</p> <p><i>NE Recommends: Clarification of the initial hammer energy is required, and this needs to be consistently applied throughout the ES.</i></p> <p><i>Further evidence to support the assumption that animals will be outside of the PTS zone with mitigation is required.</i></p>	Y	N/A	All maximum design scenarios presented in <a href="#">Volume A1, Chapter 4: Project Description and Volume A4, Annex 5.1: Impacts Register</a> have been reviewed and updated where required. Detail concerning piling ramp-up and durations has been clarified in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> .
S42_0052_1.8	Natural England	<p>Natural England queries whether 5000kJ will be sufficient to pile a 1.5m monopile, when other developments have needed to raise their hammer energies to 5000kJ based on much smaller pile diameters. Further evidence would be required to demonstrate the appropriateness of this WCS.</p> <p><i>NE Recommends: Clarification needed or further evidence on MDS appropriateness provided.</i></p>	N	N/A	The Applicant confirms a maximum hammer energy of 5,000 kJ is currently assumed sufficient to install a 1.5 m diameter monopile.
S42_0052_1.77	Natural England	<p>Some of the commitments relevant to marine mammals (Co85, Co111, Co181) are not referred to in the marine mammal section of the impacts register.</p> <p><i>NER: Cross check required between impacts and commitments registers</i></p>	I	N/A	The Applicant notes this comment.
S42_0052_1.79	Natural England	<p>These two commitments regarding production of a piling and a decommission Marine Mammal Mitigation Protocol (MMMP) were previously to be approved by the MMO in consultation</p>	I	Change Co110	The Applicant notes that Co110 is in relation to construction and not

		<p>with Natural England. Natural England queries why this is no longer the case</p> <p><i>NER: Clarify why these commitments no longer need the MMO approval and consultation with Natural England</i></p>			<p>decommissioning. This commitment is secured via conditions within the Deemed Marine Licences (DMLs) which state that a Piling MMMP will be agreed by the MMO in consultation with Natural England. The Applicant has provided clarification by the inclusion of commitment Co113 within <a href="#">Volume A4, Annex 5.2: Commitment Register</a>, to ensure that a decommissioning MMMP is approved by the MMO in consultation with Natural England.</p>
S42_0052_1.80	Natural England	<p>Whilst Co113 states latest evidence will be used to prevent injury, Co110 omits this statement. This statement should be added to Co110.</p> <p>Natural England notes that while the JNCC piling guidelines should be used, these should always be considered along with the latest evidence (e.g. it is not simply a 500m mitigation zone any more, but this zone is tailored to the PTS area of impact).</p> <p><i>NER: Commitment to be updated and reflected in DCO/dML conditions / MMMP as appropriate</i></p>	I	Change	<p>The Applicant has clarified the wording of Co110 to ensure that the latest available evidence is considered. See <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p>
S42_0052_5.1	Natural England	<p>Natural England does not manage EPS licensing below MHWS – these areas (i.e. marine areas) are managed by the MMO.</p>	Y	N/A	<p>The Applicant has noted this comment.</p>
S42_0052_5.2	Natural England	<p>The marine mammal densities taken forward into the assessment do not include the use of the JCP outputs. The technical panel meeting 5, 26th June made reference to the difficulties with use of the JCP and noted that there was going to be a review of the paper and an update.</p>	Y	N/A	<p>Detail concerning marine mammal density and JCP outputs is described in <a href="#">Volume 5, Annex 4.1: Marine Mammal Technical Report</a>.</p>
S42_0052_5.3	Natural England	<p>Favourable conservation status (FCS) reports.</p>	Y	N/A	<p>Detail concerning favourable conservation</p>

		NER: The updated FCS reports will be released in September 2019; therefore, these results should be used for the final ES.			status reports is described in <a href="#">Volume 5, Annex 4.1: Marine Mammal Technical Report</a> .
S42_0052_5.4	Natural England	<p>The MDS states the same maximum and most likely values for monopiles and pin piles concerning the piling duration (4 hours and 127.5min respectively) and ramp up (30min and 52.2min respectively). Natural England would like confirmation that this is correct.</p> <p>In addition, the MDS states four hours per pile. Natural England request further evidence to support this as a WCS, and clarification as to what would happen, if during construction, this should prove to be insufficient.</p> <p><i>NER: Clarification sought as to whether the monopiles and pin piles will take the same amount of time.</i></p> <p><i>Discussion welcomed with the applicant and the MMO concerning piling over the four hours assessed as MDS and how this might be controlled.</i></p>	Y	N/A	The Maximum Design Scenario (MDS) for impact piling is set out in <a href="#">Volume 1, Chapter 4: Project Description</a> . Further, detail concerning piling ramp-up and durations has been clarified in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> .
S42_0052_5.5	Natural England	<p>Vessel collision risk and disturbance from vessels – Wind turbine foundation installation. This section does not include 360 return trips from two vessels that are anchored – as detailed in Table 4.7, P60 of the project description.</p> <p><i>NER: Missing trips to be added in, or an explanation provided as to why they shouldn't be added in.</i></p>	Y	N/A	<a href="#">Volume 2, Chapter 4: Marine Mammals</a> updated in line with <a href="#">Volume 1, Chapter 4: Project Description</a> .
S42_0052_5.6	Natural England	<p>The assessment presented appears to be based on the 'most likely' scenario of up to 4000kJ and just over two hours of piling. Paragraphs 4.10.3.2 and 3 state that the most likely design scenario will take place for only ~70% of the WTG and the maximum design scenario (MDS) will take place at ~30% of locations.</p> <p>The Applicant is required to assess the MDS (i.e. 5,000kJ for 4h (subject to comments above). This should form the basis of the assessment in terms of both the EIA and RIAA.</p> <p>If the applicant wants to assess a combination of scenarios (i.e. 70% 'Most likely' and 30% 'worst case') they would need to provide evidence to support this proportion and to propose a viable way of assessing it, ensuring that the WCS is presented throughout the whole of the construction period.</p> <p>At this point in is not clear how this could be achieved without a</p>	Y	N/A	<p>The Maximum Design Scenario (MDS) for impact piling is set out in <a href="#">Volume 1, Chapter 4: Project Description</a>.</p> <p>Detail concerning piling ramp-up and durations has been clarified in <a href="#">Volume 2, Chapter 4: Marine Mammals</a>.</p> <p>A full and quantitative assessment of maximum design scenario piling</p>

		<p>detailed piling plan informed by extensive geophysical/ geotechnical investigations. Furthermore, it is not clear how this could be secured through the DCO/dML and monitored.</p> <p><i>NER: Assessment should be based on the WCS.</i></p>			<p>parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 4, Annex 4.5: Subsea Noise Technical Report</a>.</p>
S42_0052_5.7	Natural England	<p>Kastelein et al. (2017) references pile driving manifesting itself in the 2-10kHz range. Natural England's understanding is that most pile driving energy is at a lower frequency than this.</p> <p><i>NER: Provide more explanation please</i></p>	Y	N/A	<p>Clarification text has been added to <a href="#">Volume A2, Chapter 4: Marine Mammals</a>. For piling noise, most energy is between ~30 Hz- 500 Hz, with a peak usually between 100 – 300 Hz and energy extending above 2 kHz (e.g. Kastelein et al. 2015a, Kastelein et al. 2016). Studies have shown that exposure to impulsive pile driving noise induces TTS in a relatively narrow frequency band in harbour porpoise and harbour seals (reviewed in Finneran 2015), with statistically significant TTS occurring at 4 and 8 kHz (Kastelein et al 2016) and centred at 4 kHz (Kastelein et al 2013, Kastelein et al 2017, Kastelein et al 2012a and 2012b, Kastelein et al 2013).</p>
S42_0052_5.8	Natural England	<p>Receptor sensitivity in Table 4.11, defines medium as an ability for the animal to recover. This is not the case for PTS; therefore, Natural England does not agree that sensitivity to PTS is medium for cetaceans.</p>	Y	N/A	<p>Definition of sensitivity has been revised in <a href="#">Volume A2, Chapter 4: Marine</a></p>

		<i>NER: Discussion required between all parties in the EWG in terms of the receptor sensitivity.</i>			<b>Mammals</b> to justify the sensitivity score.
S42_0052_5.9	Natural England	<p>It is unclear why in 4.10.4.14 would it take &gt;300 days of repeated disturbance to have an impact on fertility of harbour porpoises (assessed as having a medium sensitivity), but only ~185 days of disturbance to impact fertility of grey seals (assessed as low sensitivity).</p> <p>Natural England seek further clarification on this point, and would like to understand the impact of this in terms of the expert elicitation conclusions for harbour porpoise.</p>	Y	N/A	<p>Clarification text added to <b>Volume 2, Chapter 4: Marine Mammals</b> to justify the sensitivity score.</p> <p>Sensitivity scores used in the Preliminary Environmental Information Report weren't based purely on the expert elicitation results, but included the evidence supporting said expert elicitations. The sections on marine mammal sensitivity to PTS and disturbance have been revised to clarify this (<b>Volume 2, Chapter 4: Marine Mammals</b>).</p>
S42_0052_5.10	Natural England	<p>The Hastie et al. (2019) paper is referenced in this paragraph, stating that an assessment will be provided based on impulsive PTS ranges not extending past 2-5km. From reading the Hastie et al. (2019) paper, it appears that it is not known which of the characteristics measured were most important in determining an impulsive sound, and the various criteria measured gave varying results, with some impulsive characteristics still being present up to 10 km distant from the piling. Given that these findings represent a first step in defining the change from an impulsive to non-impulsive noise, and that there is likely to be other parameters that impact and interact with the changing of a sound from impulsive to non-impulsive that were not accounted for, this distance should be the greatest mentioned in the paper and be modelled with an upper transition zone boundary of 10km.</p> <p>In addition, with regards to Appendix A – the results from the two wind farms show very different results and distances, again perhaps showing that precaution is needed, as results from the</p>	Y	N/A	<p>Clarification text added to <b>Volume 2, Chapter 4: Marine Mammals</b> to note the results from Hastie et al. (2019) are only initial findings, and a precautionary stance using the larger distances reported (10 km) have been referenced, noting the value given is not relied upon for assessment purposes .</p>

		<p>Hornsea Four area could be different again.</p> <p><i>NER: As the full impulsive PTS range has been calculated, the addition of the 2-5km range is useful as context, but does not change the overall assessment. However, while useful, the results from the Hastie et al. (2019) paper are only initial findings, therefore Natural England believes a precautionary stance should be taken, and use the larger distances reported in the paper (10km). Natural England are happy to discuss this during a technical panel meeting.</i></p>			
S42_0052_5.11	Natural England	<p>There is an assumption here that the same animals return (and this happens for harbour porpoise too when we talk about them returning after a certain number of hours or days). The text needs to be specific – if it is the same animals – explain how this was known, otherwise, it could just be another animal moving into the area.</p> <p><i>NER: Further clarification/ evidence required to support the assumption that the same animals are returning. For example - was there photo-identification to show that the individuals that were seen 10-15 minutes after playback of the ADD were the same animals who were initially disturbed?</i></p>	Y	N/A	Clarification text has been added to <a href="#">Volume A2, Chapter 4: Marine Mammals</a> to support assumptions.
S42_0052_5.12	Natural England	<p>The project design states that two piling events may take place simultaneously - however simultaneous piling has not been assessed within the EIA or CEA. Furthermore, the project description (4.8.4.33) indicated that up to 4 piles could be drilled simultaneously.</p> <p><i>NER: The number of piles that could be piled simultaneously needs to be clarified and consistently presented throughout the ES and accompanying documents. The impact of this MDS must be assessed.</i></p>	Y	N/A	<p>Section 4.8.4: Foundations defines the Maximum Design Scenario (MDS) for piled and drilled foundations (see <a href="#">Volume 1, Chapter 4: Project Description</a>).</p> <p>A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> and <a href="#">Volume 5,</a></p>

					<a href="#">Annex 4.5: Subsea Noise Technical Report.</a>
S42_0052_5.13	Natural England	<p>Natural England would like further clarification on the monopile values for SELcum since it appears strange that instantaneous PTS is up to 2.5 km, but SELcum is under 100 m.</p> <p>Natural England also seek clarification as to how the porpoise numbers have been calculated since the table states both the acoustic surveys and SCANS III or both aerial and SCANS III have been used to calculate the numbers, i.e. how two different densities have been used to calculate a single number.</p> <p><i>NER: Natural England would like further clarification on these values. The method of calculation should be specified.</i></p>	Y	N/A	<p>Clarification text added to <a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 5, Annex 4.5: Subsea Noise Technical Report</a> to support impact ranges and detail on how porpoise numbers have been calculated.</p>
S42_0052_5.14	Natural England	<p>Natural England do not agree with this paragraph. The Hastie et al. (2019) paper reports initial findings with large uncertainties. Therefore, it is not appropriate to state that this PTS range of 5.8 km for minke whales is an overestimate. Same comment for paragraph 4.11.1.19.</p> <p><i>NER: Text should be amended to appropriately caveat the Hastie et al. (2019) results, or the sentence concerning the PTS impact range of 5.8 km being an overestimate should be removed completely.</i></p>	Y	N/A	
S42_0052_5.15	Natural England	<p>It is unclear why the non-impulsive PTS ranges have been calculated from the source, rather than from 2-5km (or even 10km given POINT 5.10 on the Hastie et al. (2019) paper above). There will be impulsive noise up to a certain distance – so non-impulsive noise should be assessed from this agreed distance from source (2-5km or 10 km).</p>	Y	N/A	
S42_0052_5.16	Natural England	<p>Table 4.22 shows values of 11km for minke whale as the max range, whereas Table 15 in Volume 4, Annex 4.5 Subsea Noise Technical Report has this value as 13km (in the E direction). Similarly, table 4.22 has the max value for harbour porpoise as 9.7km, while Table 23 in Volume 4, Annex 4.5 Subsea Noise Technical Report has this value as 10km (again in the E direction). These inconsistencies need to be rectified.</p> <p><i>NER: Values need to be cross checked and table updated accordingly (including numbers of animals affected).</i></p>	Y	N/A	

					<a href="#">Annex 4.5: Subsea Noise Technical Report.</a>
S42_0052_5.17	Natural England	<p>Table 4.22 doesn't show the max design scenario in terms of the first strike. This should be added to the table, especially if the MDS will be used at 30% of the foundation locations.</p> <p><i>NER: These values to be added in to inform the mitigation zone.</i></p>	Y	N/A	<p>A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> and <a href="#">Volume 5, Annex 4.5: Subsea Noise Technical Report.</a></p>
S42_0052_5.18	Natural England	<p>Table 4.22 has distances of 9.7km and 11km (or 10km and 13km respectively from the underwater noise technical report, see POINT 5.16). As both species are EPS, potentially if the noise cannot be mitigated, a licence for injury may be required.</p> <p><i>NER: EPS licence for injury as well as disturbance may be required. Discussion welcomed at the Technical Panel.</i></p>	Y	N/A	<p>The Applicant has noted this comment.</p>
S42_0052_5.19	Natural England	<p>Although Natural England would like to reinforce the need to assess the MDS in order to be compliant with the legislation, we would like to point out that there seems to be a big difference in the ranges calculated for most likely (e.g. 1.9km for harbour porpoise) vs max design scenarios (9.7km for harbour porpoise), especially when the most likely scenario isn't that much lower in terms of hammer energies. There is not such a big difference for the disturbance numbers (e.g. tables 4.24 and 4.30) between the most likely and worst-case scenarios. Natural England would like further clarification to understand why this is the case.</p> <p><i>NER: The assessment must be undertaken against the Maximum Design Scenario. Natural England would however, welcome a discussion at the Technical Panel meeting of the figures presented.</i></p>	Y	N/A	<p>A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> and <a href="#">Volume 5, Annex 4.5: Subsea Noise Technical Report.</a></p> <p>The key difference in PTS ranges are driven by significantly different ramp-up regimes between most likely and worst-case design scenarios. These have been revised in</p>



					<a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 5, Annex 4.5: Subsea Noise Technical Report.</a>
S42_0052_5.20	Natural England	Natural England's interpretation is that the values in this table are for pin piling for harbour porpoise and monopiling for minke whale, however, this is not clear.	Y	N/A	Clarification text added to <a href="#">Volume 2, Chapter 4: Marine Mammals.</a>
S42_0052_5.21	Natural England	Additional text is required at the end of this paragraph to reflect that the conclusion of no significant effect is achieved based on mitigation secured through Co110 and the production of a MMMP to ensure animals are out of the PTS zone.	Y	Change Co110	Clarification text is added to <a href="#">Volume 2, Chapter 4: Marine Mammals.</a> The Applicant has committed to a piling Marine Mammal Mitigation Protocol (MMMP) to be developed in accordance with the Outline MMMP and implemented during construction. The piling MMMP will include measures to ensure the risk of instantaneous permanent threshold shift (PTS) to marine mammals is negligible and will be in line with the latest relevant available guidance. This is considered a project commitment (Co110) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register.</a>
S42_0052_5.22	Natural England	From the text it is unclear how the maximum hammer energy duration has been calculated. This requires further explanation.  In addition Natural England would like to reinforce the need to assess the MDS in order to be compliant with the legislation and therefore question why the maximum design scenario is not looking at 100% of days for the maximum hammer energy.	Y	N/A	A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2,</a>

		<p>As per POINT 5.6, it is not clear how the most likely and maximum design scenarios can be combined for an overall assessment which adequately covers the complete duration of the construction works.</p> <p><i>NER: Additional explanation of the worst case, maximum design piling scenario required. Discussion with the Technical Panel welcomed.</i></p>			<p><b>Chapter 4: Marine Mammals and Volume 5, Annex 4.5: Subsea Noise Technical Report.</b></p>
S42_0052_5.23	Natural England	<p>Concerning worst case disturbance in 4.11.1.53 it is stated a Not Significant impact for grey seal, when the same combination of sensitivity and magnitude was minor adverse in the most likely scenario (4.11.1.49).</p> <p><i>NER: Checking of significance categories required.</i></p>	Y	N/A	<p>Sensitivity and magnitude scores have been amended in <b>Volume 2, Chapter 4: Marine Mammals.</b></p>
S42_0052_5.24	Natural England	<p>TTS – As discussed at the technical panel meetings, Natural England expect summary information to be presented in the marine mammal chapter (e.g. table of ranges), with contextual information concerning what these ranges mean (similar to the type of information provided earlier in the chapter when it was explained why TTS numbers were not going to be used).</p> <p><i>NER: Additional text required.</i></p>	Y	N/A	<p>The tables of impact ranges from temporary threshold shift are included in both <b>Volume 2, Chapter 4: Marine Mammals and Volume 5, Annex 4.5: Subsea Noise Technical Report.</b></p>
S42_0052_5.25	Natural England	<p>Natural England does not disagree with this paragraph, but feels an additional sentence is needed to put the CSIP results in context. While the CSIP work is incredibly useful, we do not know what percentage of bodies sink once hit by a vessel (or by other causes of death) – so it needs to be noted that while the data provides a picture of CoD, it is biased data and probably under represents certain CoD.</p> <p><i>NER: Additional text required.</i></p>	Y	N/A	<p>Clarification text added to <b>Volume 2, Chapter 4: Marine Mammals</b> to outline the caveats of using stranding's data.</p>
S42_0052_5.26	Natural England	<p>Natural England believe that the sensitivity of marine mammals to vessel collision should be high, given the fact they will either die, or be seriously injured. However, this shouldn't change the overall significance of the effect, as the magnitude is minor. There are two categories in this combination of high sensitivity and low magnitude and Natural England would agree with the overall significance being minor. Same comment for the operational and maintenance section (4.11.2.15).</p> <p><i>NER: Natural England suggests the sensitivity rating is amended.</i></p>	Y	N/A	

S42_0052_5.27	Natural England	The text requires clarification concerning the detonation period being determined by the numbers of UXOs detonated per day. In Volume 1 Chapter 4 Project Description it is stated that only one UXO per 24 hours would be detonated (4.8.8.4).	Y	N/A	<b>Volume 2, Chapter 4: Marine Mammals</b> updated in line with <b>Volume 1, Chapter 4: Project Description</b> .
S42_0052_5.28	Natural England	Natural England does not agree with paragraph 4.11.1.85. We suggest the same approach as for the noise modelling is used in terms of densities (aerial or acoustic plus SCANS III). Same comment for paragraph 4.11.1.87 concerning disturbance.  This may (or may not) require the magnitude of impact paragraphs for both PTS and disturbance to change.  <i>NER: NE suggest that the calculations are undertaken using aerial or acoustic plus SCANS III densities, not just SCANS III densities.</i>  <i>Magnitude of impact tables and paragraphs may also require amendment.</i>	Y	N/A	Aerial survey data densities are included alongside SCANS III densities in the assessment of UXOs within <b>Volume 2, Chapter 4: Marine Mammals</b> .
S42_0052_5.29	Natural England	The magnitude of the impact on harbour porpoises is not just negligible as stated in this paragraph, but also minor (see Table 4.33).	Y	N/A	Impact score has been amended in <b>Volume 2, Chapter 4: Marine Mammals</b> .
S42_0052_5.30	Natural England	Paragraphs 4.11.2.12 and 13 appear unfinished.	Y	N/A	Formatting issues have been corrected in <b>Volume 2, Chapter 4: Marine Mammals</b> .
S42_0052_5.31	Natural England	It is unclear why the construction phase of Neart na Gaoithe has been included in the CEA since a number of Tier 2 projects (EA3, Inch Cape, Seagreen A and B) have the same construction timetable and are noted as operational impacts only.  Natural England also suggest that the projects in each tier are re-visited and updated (if required) prior to application submission.  <i>NER: Table to be checked.</i>	Y	N/A	Projects included in each tier have been revised in <b>Volume 2, Chapter 4: Marine Mammals</b> according to most up to date information on construction timelines at the point of application.
S42_0052_5.32	Natural England	Natural England does not agree with the statement that the assessment based on previous ESs is conservative. Most of these ESs used the Southall et al. (2007) criteria, meaning certain impacts were underestimated compared to values	Y	N/A	Additional text included <b>Volume 2, Chapter 4: Marine Mammals</b> to contextualise change in

		<p>calculated when using the updated NMFS (2018) and Southall et al. (2019) criteria.</p> <p><i>NER: Text to be amended, or some extra text to place context around the change in criteria to be added</i></p>			<p>criteria, noting this change in criteria only applies to PTS predictions.</p>
S42_0052_5.33	Natural England	<p>It is not clear why in Figures 4.6 and 4.7, the construction timelines are different when looking at harbour porpoise and grey seal disturbance. E.g. Teesside A in Figure 4.6 is spread over four years, while in Figure 4.7 takes place over 6 months in 2023.</p> <p><i>NER: Natural England would welcome explanation and discussion during a Technical Panel meeting.</i></p>	Y	N/A	<p>Timelines are equivalent but appear different due to the scale of the figure axes relative to the number of animals. The addition of tables of data in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> of the Environmental Statement will help to clarify this issue.</p>
S42_0052_5.34	Natural England	<p>In relation to paragraphs 4.12.2.17 onwards, Natural England disagrees that the noise impact of Tiers 3 and 4 are of minor magnitude. Piling is predicted to continue over multiple years, with multiple wind farms, it is not necessarily intermittent in combination with other impulsive noisy activities, and as stated is of medium term and of regional spatial extent. Taking the definitions of minor (short term / intermittent) and moderate, Natural England advise that a moderate magnitude is more appropriate. Raising the magnitude would change the overall significance of the impact. This can be addressed by securing adequate mitigation through the production of a SIP.</p> <p><i>NER: In addition, it would be useful to reassess the CEA for the ES, once the results of the CfD are published in the Autumn as the results may change the in combination assessment.</i></p>	Y	N/A	<p>The Applicant notes this comment and has submitted <a href="#">Volume F2, Annex 11: Site Integrity Plan (SIP)</a> with the DCO application.</p> <p>The cumulative assessment has been updated in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> and Volume 4 in light of updates to the project MDS, timelines and results of the CfD round. The magnitude definitions for marine mammals do not contain a temporal component, and instead are ranked by the potential to change behaviour, distribution, favourable conservation status and long-term population trajectory. The</p>

					duration of disturbance from impulsive noise from Tiers 3 and 4 will still be considered intermittent (not every day and not for all day everyday) and short term relative to marine mammal generational scales.
S42_0052_5.35	Natural England	<p>This paragraph considers Hornsea Four to be most similar to the Moray Firth, but the Moray Firth development used pin piles. Natural England seek further information on the effect this could have had on the transition zone</p> <p><i>NER: Explanation required</i></p>	Y	N/A	<p>The Applicant notes this comment.</p> <p>With reference to water depth and substrate type, the Hornsea Four site is more similar to the Moray Firth site than to The Wash.</p> <p>As agreed at the Evidence Plan Technical Panel meeting, this information is only presented for illustration purposes; the impact assessment is based upon the PTS ranges from fully impulsive noise.</p>
S42_0052_5.36	Natural England	<p>It is unclear why a benchmark of 80% probability used.</p> <p><i>NER: Explanation required</i></p>	Y	N/A	<p>The Applicant notes this comment.</p> <p>A value of 80% probability threshold was selected as it was similar to the threshold used by Southall - where only 18-19% of animals are predicted to actually experience PTS at the PTS onset threshold level.</p>

					As agreed at the Evidence Plan Technical Panel meeting, this information is only presented for illustration purposes; the impact assessment is based upon the PTS ranges from fully impulsive noise.
S42_0052_5.37	Natural England	Disturbance modelling is not presented in the report – as suggested by the marine mammal chapter paragraph 4.1.1.1.22 onwards.  <i>NER: Full details of the disturbance modelling needs to be presented.</i>	Y	N/A	The assessment of behavioural disturbance in the marine mammal chapter is based on 5dB increment modelling (as presented in Figures 7 to 14), which is utilised in [the Marine Mammal chapter/report]. Additional text has been added to <a href="#">paragraph 5.2.2.2 in Volume 4, Annex 4.5: Subsea Noise Technical Report.</a>
S42_0052_5.38	Natural England	Figures 7 and 8 (mono piling and pin piling respectively), look almost identical. Natural England queries if these figures are correct. This query also applies to the other locations.  <i>NER: Clarification required</i>	Y	N/A	Figures checked and updated in <a href="#">Volume 4, Annex 4.5: Subsea Noise Technical Report.</a>
S42_0052_5.39	Natural England	Natural England believe that some of the text relating to the predominate sea state should be placed into the marine mammal chapter. 51% of the survey was conducted in a SS4 (~55% SS 4-6), which is higher than the sea state cut off point for calculating boat-based estimates of harbour porpoise density. While Natural England realises that the impact of sea state is likely to be different and potentially have less of an effect from a plane, the text rightly states (2.4.1.3 and 2.4.1.6) that there is no analysis that can evidence this assumption. As such, there is the possibility that the aerial density estimate has been underestimated.	Y	N/A	Summary text on sea state during aerial surveys has been added to <a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 5, Annex 4.1: Marine Mammal Technical Report.</a>

		<i>NER: Add in text concerning the aerial surveys possibly being underestimate due to predominate sea state.</i>			
S42_0052_5.40	Natural England	Paragraph 1.2.1.3 states that the Southern North Sea is a SCI, it is now a fully designated SAC.  <i>NER: Text to be limited</i>	Y	N/A	Text amended in <a href="#">Volume 2, Annex 5: Outline Marine Mammal Mitigation Protocol</a> .
S42_0052_5.41	Natural England	Paragraph 4.7.1.2 discusses the mitigation zone as being different from the instantaneous injury zone. These zones should be the same. The maximum distance predicted for instantaneous PTS (for the MDS) becomes the mitigation zone that animals need to be out of <b>before</b> the soft start commences. If the ADD has been operational during this time, operations should also be halted while the ADD is checked to ensure it is fully operational and working as expected.  <i>NER: Text to be amended</i>	Y	N/A	The mitigation zone is considered to be the same as the instantaneous PTS impact zone. Text amended in <a href="#">Volume 2, Annex 5: Outline Marine Mammal Mitigation Protocol</a> .
S42_0057_1.3.1	MMO	<b>Major Comments</b> <b><u>Volume 2, Chapter 2 Benthic and Intertidal Ecology:</u></b>  1.3.1 Whilst most of the potential impacts have been considered, there are two that have not:  1.3.2 Temporary habitat loss due to foundation drilling deposits should be assessed;  1.3.3 Impacts on the habitats outside the array and cable corridor should be assessed in relation to increased suspended sediment. Currently only habitats within the boundaries and those specific to the Holderness Marine Conservation Zone (MCZ) and Flamborough Head Special Area of Conservation (SAC) have been considered. There seems to be data available to undertake this assessment (according to Figure 2 and Figure 9 of Annex 5 Benthic and Intertidal Ecology Technical report). This should be considered in the final ES.	Y	N/A	<a href="#">Volume 2, Chapter 2: Benthic and Intertidal Ecology</a> and <a href="#">Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</a> have been updated to include the assessment of these impacts.
S42_0052_1.3.4	MMO	Table 2.13 – the operational phase of the development considers long term loss/change from the presence of foundations, scour and cable protection. There is uncertainty regarding the capacity for scour and rock protection to be removed following decommissioning of the wind farm. The MMO queries whether these should be considered as permanent loss of habitat. Furthermore, the decommissioning	Y	N/A	Rock protection has been assessed as permanent habitat loss in <a href="#">Volume 2, Chapter 2: Benthic and Intertidal Ecology</a> based on the assumption that cable protection is left in-

		phase assessment states that cable protection will be left in-situ.			situ as described in decommissioning phase assessment.
S42_0052_1.3.5	MMO	Section 2.11.1.2–2.11.1.4 – As noted in 1.3.4, if cable & scour protection is to remain in-situ post-decommissioning, impacts would be permanent not temporary and should be assessed as such. What is the predicted Maximum Design Scenario (MDS) for cable and scour protection area of permanent habitat loss and area of temporary disturbance for construction activities?	Y	N/A	
S42_0052_1.3.6	MMO	<u>Benthic and Intertidal Ecology Technical Report:</u>  Figure 5 shows the location of the Particle Size Analysis (PSA) samples from the array, but not from the ECC. This information should also be visually represented. For the array, spatially the samples appear representative.	Y	N/A	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data. <a href="#">Figure 2-2 of Volume A2, Chapter 2: Benthic Intertidal and Subtidal Ecology</a> representing site specific survey locations has been updated to reflect this. The combined and updated 2018-2019 survey data is described in <a href="#">Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</a> and all assessments within the Environmental Statement have been undertaken in light of this updated data.
S42_0052_1.3.7	MMO	The MMO note that 21 samples are stated to have been analysed for chemical composition in the array area and further sample collection is due in 2019 for the ECC. As above, these should be represented on a map preferably with the coordinates provided.	Y	N/A	An additional comprehensive seabed survey of the offshore export cable corridor was undertaken in June 2019, including the collection of particle size data and chemical analyses. <a href="#">Figure 2-2 of Volume A2,</a>



					<p><b>Chapter 2: Benthic Intertidal and Subtidal Ecology</b> representing site specific survey locations has been updated to reflect this. The combined and updated 2018-2019 survey data is described in <b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> and all assessments within the Environmental Statement have been undertaken in light of this updated data.</p>
S42_0052_1.3.8	MMO	The MMO has not been able to determine if the chemical analyses were carried out in line with MMO guidance, please clarify. Nonetheless, the results appear low which is not unexpected due to the coarse nature of the material and offshore location of majority of samples.	Y	N/A	<p><b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> has been updated to clarify that chemical analyses were carried out in line with MMO guidance.</p>
S42_0052_1.3.9	MMO	All results should be submitted in the MMO template to allow for easy submission for the annual returns for OSPAR and London Convention/London Protocol which is an obligation on the MMO.	Y	N/A	The Applicant confirms all annual returns for OSPAR and London Convention/London Protocol will be submitted as requested in the MMO template.
S42_0052_1.3.10	MMO	<p><u>Minor Comments</u></p> <p>It is not clear how the Hornsea Zonal data and data from Hornsea Two have been used in the benthic habitat model predictions. The results appear to represent the distribution of the communities identified in the 2018 survey. How do the data from previous surveys within the Array compare with the modelled predictions?</p>	Y	N/A	<p><b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> has been updated to clarify how Hornsea zonal data and data from Hornsea Project Two were used in the benthic habitat model predictions. By comparing <b>Figures 13-15 of Volume A5, Annex 2.1:</b></p>

					<p><b>Benthic Subtidal and Intertidal Ecology Technical Report</b>, previous surveys within the array area can be compared with modelled predictions.</p>
S42_0052_1.3.11	MMO	Contaminants data should be assessed against OSPAR background levels and Cefas Action Levels.	Y	N/A	<p><b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> has been updated to include an assessment against both OSPAR background levels and Cefas Action Levels.</p>
S42_0052_1.3.12	MMO	Please insert full reference details for the Cefas (2015) and Cefas (2019) reports.	Y	N/A	<p><b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> has been updated to fully reference said Cefas reports.</p>
S42_0052_1.3.13	MMO	Figure 9 of Annex 5 Benthic and Intertidal Ecology Technical Report presents the location of all sediment samples used in creating the predictive habitat model but does not provide any information on which data points relate to which source. Please include this information in the ES.	Y	N/A	<p>Information relating to data sources is provided within <b>Figure 9 of Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b>.</p>
S42_0052_1.3.14	MMO	The report acknowledges the lack of certainty around the spread of invasive non-native species (INNS) with respect to OWFs. This suggests that foundation monitoring should be undertaken.	Y	N/A	<p>The spread of marine invasive non-native species (MINNS) has not been attributed to any existing offshore wind farm. As described in <b>Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report</b> provisions will be put into place to prevent the spread of MINNS. It is not therefore considered appropriate to include</p>

					foundation monitoring at Hornsea Four.
S42_0052_1.3.15	MMO	No monitoring is proposed for Benthic Ecology. The MMO is satisfied that no monitoring is required of the wider area. Localised monitoring of the habitats around selected turbines and cable crossings would however be beneficial to provide the necessary data with which to test the predictions made in the ES.	Y	N/A	Pre- and post-construction monitoring surveys will be undertaken to determine the location, extent and composition of any biogenic or geogenic reef features, as set out within the <a href="#">Volume 2, Annex 7: In Principle Monitoring Plan</a> .
S42_0052_1.6.3	MMO	It is noted that a mitigation zone, based on the maximum possible Potential Threshold Shift (PTS) impact ranges will be established, which is appropriate. Mitigation measures would aim to remove marine mammals from the mitigation zone prior to the start of piling to reduce the risk of any physical or auditory injury (paragraph 4.2.11 of the Outline MMMP). It is proposed to primarily use (i) an Acoustic Deterrent Device (ADD) to deter animals, (ii) have marine mammal observers in place, and (iii) implement soft start procedures. The MMO recommend that the mitigation zone is based on the maximum potential PTS impact ranges predicted under the worst-case piling scenario, and not the 'most likely' scenario.	Y	N/A	<a href="#">Volume 2, Chapter 5: Outline Marine Mammal Mitigation Protocol</a> has been updated to include a mitigation zone based on the maximum potential PTS impact ranges predicted under the maximum design scenario piling parameters.
S42_0052_1.6.4	MMO	<b>Outline Marine Mammal Mitigation Protocol (MMMP) (F2.5):</b>  Paragraph 3.1.1.2 of the Outline MMMP states that “the maximum instantaneous and cumulative (the potential for PTS as a result of exposure to piling noise over a 24-hour period) PTS impact ranges...are shown”. The cumulative assessment only considers the installation of a single pile or pin piles being installed over a 4-hour duration. If more than one pile is anticipated to be installed per 24 hours, then the cumulative assessment should reflect this. As the report states, the cumulative assessment should take into account the exposure to piling noise over a 24-hour period. It is also noted that there will be a maximum of up to two piling operations at any one time. The potential effects of concurrent piling should also be considered.	Y	N/A	Updated noise modelling and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 5: Outline Marine Mammal Mitigation Protocol</a> in order to inform mitigation zones.
S42_0052_1.6.5	MMO	The most direct and comprehensive way to mitigate the risk of acoustic impact on marine species is to reduce the amount of noise pollution emitted at source (noise abatement). For pile	Y	N/A	The Applicant acknowledges this recommendation. The

		driving, there are now noise reduction technologies available, such as big bubble curtains and acoustic barriers that are integrated into the piling rig (e.g. IHC Noise Mitigation System), which are routinely deployed in German waters (see Merchant, 2019). The MMO may recommend that noise abatement measures are required as part of the DML conditions as the primary means of reducing the potential acoustic impact of pile driving operations. At this stage, the MMO strongly encourage Ørsted to consider use of such measures.			revised noise modelling presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> does not result in any significant PTS or disturbance impacts on marine mammals.
S42_0052_1.6.6	MMO	Please note the assessment and assessment conclusions should primarily be based on the worst-case (maximum design scenario) and not the most likely scenario.	Y	N/A	A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 5, Annex 4.5: Subsea Noise Technical Report</a> .
S42_0052_1.6.7	MMO	In future reporting please give due consideration to the potential impact of TTS which should not be overlooked given large cumulative impact ranges are predicted, particularly for low-frequency and high-frequency cetaceans.	Y	N/A	The approach presented was agreed in consultation with the Marine Mammals Technical Panel via the Evidence Planning process. Impact ranges for TTS are presented in <a href="#">Volume 2, Chapter 4: Marine Mammals and Volume 5, Annex 4.5: Subsea Noise Technical Report</a> and text has been provided to clarify this, but no assessment of significance is presented.
S42_0052_1.6.11	MMO	Outline Marine Mammal Mitigation Protocol (MMMP) (F2.5):  There are some discrepancies between Table 5 of the Outline MMMP and the results provided in the Subsea Noise Technical	Y	N/A	Updated noise modelling has been carried out and checks made between all application documents

		Report. For example, the MMMP gives a predicted PTS impact range of 1.1 km for LF cetaceans (for a 5,000-kJ hammer energy, maximum design scenario). The subsea noise report gives a value of 1.3 km under the same scenario (for location E).			(e.g. <a href="#">Volume F2, Chapter 5: Outline Marine Mammal Mitigation Protocol</a> ; <a href="#">Volume A4, Annex 4.5: Subsea Noise Technical Report</a> ; <a href="#">Volume A2, Chapter 4: Marine Mammals</a> ; <a href="#">Volume A5, Annex 4.1 Marine Mammal Technical Report</a> ) to ensure impact ranges are consistent throughout.
S42_0070_001	Whale and Dolphin Conservation	<p>Below are WDCs comments specifically on Volume 2: Chapter 4: Marine Mammals, unless stated otherwise. We are commenting on issues relating to cetaceans only.</p> <p>We recognise that the conclusions drawn are a theoretical/ most likely worst-case scenario when assessing the impact on marine mammals, and believe this to be appropriate given the considerable unknowns surrounding the development of the wind farm. But, as they are deemed realistic, they should be treated accordingly.</p> <p>Southern North Sea Special Area of Conservation (SAC) WDC are glad to see that Volume 2: Chapter 4: Marine Mammals of the PEIR recognises the importance of the Hornsea Zone for cetaceans, in particular harbour porpoises as Hornsea Four lies entirely within the Southern North Sea SAC (SNS SAC), and within the summer area, with the cable corridor going through the SAC.</p> <p>As an SAC the Southern North Sea is a strictly protected site, designated under the EC Habitats Directive, with a specific Conservation Objective of "To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to maintaining Favourable Conservation Status for the UK harbour porpoise." (JNCC, 2017).</p>	I	N/A	A full and quantitative assessment of maximum design scenario piling parameters and an assessment of simultaneous piling has been undertaken and presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> and <a href="#">Volume 5, Annex 4.5: Subsea Noise Technical Report</a> .

		Due to its location within the SNS SAC, it is likely that the construction of Hornsea Four wind farm will impact the harbour porpoise population of the SNS SAC, both stand-alone and particularly in-combination. Therefore, the assessment of impacts on cetaceans and harbour porpoise in particular, must be undertaken not only against the North Sea management unit, but a HRA must be undertaken for the SAC to ensure there is no likely significant effect (LSE) from the development. Additionally, construction at any time of year will require proven mitigation methods to ensure there is no adverse impact on the population of harbour porpoise supported by the site.			
S42_0070_002	Whale and Dolphin Conservation	We note that in section 2.3.2.1 of Volume 5 Annex 4.1: Marine Mammal Technical Report that "Full consideration of the potential impact on the draft conservation objectives of the SNS SAC will be presented as part of the Report to Inform Appropriate Assessment (RIAA)". Until the RIAA is undertaken, it is inaccurate at this time to make any assumptions or conclusion of the impact of Hornsea Four on the SNS SAC. WDC request to be a consultee on the RIAA.	I	N/A	The Applicant has provided the RIAA to WDC for comment.
S42_0070_003	Whale and Dolphin Conservation	One of our main concerns is that the assessment on the harbour porpoise population in the SNS SCI is based against the North Sea Management Unit. WDC acknowledges that this is following guidance from the SNCB's, and within the SNS SCI Site Selection Document, it states "because this estimate is from a one-month survey in a single year it cannot be considered as a specific population number for the site. It is therefore not appropriate to use site population estimates in any assessments of effects of plans or projects (i.e. Habitats regulation Assessments), as these need to take into consideration population estimates at the MU level, to account for daily and seasonal movements of the animals" (JNCC, 2017). WDC strongly disagree with this advice. The European Commission guidance on managing Natura 2000 sites also states that the integrity of the site (habitat and species) must be maintained (European Commission and Office for Official Publications of the European Communities, 2000).  Any assessment on the SNS SCI must take into account the draft Conservation Objectives provided in the SNS consultation documents - that the site integrity must be maintained and there is no adverse impact on the population of harbour	I	N/A	The Applicant has submitted <a href="#">Volume F2, Annex 11: Outline Site Integrity Plan</a> with the DCO application. The DCO commitment ensures the Applicant will develop and secure the approval of a SIP for the SNS SAC prior to the commencement of works (Condition 13(1)(k)) for both Schedule 11 and 12 of the draft DCO). Within the SIP, the 2019 conservation objectives and advice on operations of the SNS SAC are referenced and considered, along with the draft guidance on assessing the significance

		porpoise at the site (JNCC, 2016). Site based protection cannot be met by assessing the whole North Sea population, but only by assessing the impacts for the number of individuals that are supported by the site (Rees et al., 2013).			of underwater noise disturbance against the conservation objectives of harbour porpoise SACs published for consultation in 2020.
S42_0070_004	Whale and Dolphin Conservation	<p>WDC has previously raised concerns with the SNCB advice "Noise disturbance within an SAC from a plan/project individually or in combination is significant if it excludes harbour porpoises from more than 20% of the relevant area of the site in any given day, and, an average of 10% of the relevant area of the site over a season." (JNCC and Natural England, 2019). We do recognise that this is the current advice given by SNCBs and this is the guidelines that developers have to work within. However, this threshold approach proposed by the SNCBs has not been agreed with the competent authorities and has not been consulted upon and we have serious concerns about the evidence base of these thresholds. Additionally, these thresholds are based on the ASCOBANS 1.7% bycatch threshold for harbour porpoise population decline. We do not agree that this is appropriate as these are thresholds set for bycatch using the North Sea Management Unit harbour porpoise population as a baseline.</p> <p>We welcome the commitment to using mitigation methods to reduce the risk of piling activities on harbour porpoise and the SNS SCI. We also acknowledge that the full details of mitigation to be used are yet to be finalised in the Marine Mammal Mitigation Protocol (MMMP), the piling MMMP and the Report to Inform Appropriate Assessment (RIAA), and that these documents will set out the approach to deliver any project mitigation or management measures in relation to the SNS SAC. However, we have concerns over the embedded mitigation measures proposed and would like to see a commitment to using proven mitigation methods (see section below on Mitigation Methods). Until the details of the MMMPs and RIAA are finalised, it is impossible to conclude that there will be no Adverse Effect on Integrity (AEoI) on the SNS SCI. We also recommend that a Site Integrity Plan (SIP) is undertaken. WDC request to be included on a consultee of the above</p>	N/A		The Applicant notes WDCs concerns with SNCB advice.

		documents, to ensure that proven and effective methods are used.			
S42_0070_005	Whale and Dolphin Conservation	<p><b>Survey methodologies</b> WDC is pleased to see that a number of site surveys have been undertaken to understand the use of the area by marine mammals, and provide a baseline upon which to assess the impacts of the development. However WDC has some concerns regarding the methodology used, which are detailed below.</p> <p>The site based surveys that have been undertaken have shown the area to be incredibly important for harbour porpoise, with densities significantly higher than the surrounding area and wider North Sea. Due to some of our concerns over the methodology used, as noted below, it is likely that the data under-represent the numbers of marine mammals in the area and their use of the area. Therefore, we have concerns over the accuracy of the baseline data and the resulting analyses.</p> <p><b>Aerial Surveys</b> Section 2.4.1 in Volume 5 Annex 4.1 Marine Mammal Technical Report details the methodology used in aerial surveys for marine mammals. WDC agrees that high definition aerial surveys are suitable for surveying for marine mammals, and we are pleased that monthly surveys have been undertaken for two years and with the methodology that has been used. As discussed in the Marine Mammals Technical Meetings, aerial surveys should not take place in conditions above sea state 4, WDC are concerned that surveys were undertaken up to sea state 6, but as outlined in the document above this was a very small number of surveys, with 80% undertaken in up to sea state 4, so we agree that these conditions would provide a suitable dataset. We have concerns that only a buffer of 4 km around Hornsea Four was used when undertaking the surveys, we feel this is inadequate to assess the numbers of marine mammals that could be impacted by the development, given the distances at which construction noises can disturb porpoises, these distances are highlighted below.</p> <p><b>Boat-based Surveys</b> Section 2.4.2 in Volume 5 Annex 4.1 Marine Mammal Technical Report details the methodology used for the visual boat-based</p>	I	N/A	The Evidence Planning process reached agreement that the baseline survey methodologies were adequate for marine mammals. Agreements made with consultees within the Evidence Plan process are set out in the topic specific Evidence Plan Logs which are appendices to the Hornsea Four Evidence Plan ( <a href="#">Volume B1, Annex 1.1: Evidence Plan</a> ), an annex of the Hornsea Four Consultation Report ( <a href="#">Volume B1, Chapter 1: Consultation Report</a> ).



	<p>surveys that were undertaken for marine mammals at the former Hornsea Zone between March 2010 and February 2013. Although WDC is pleased to see that three years of data were collected, including a 10km buffer from the former Hornsea Zone, we raised our concerns over the methodology used in these surveys when previous Hornsea projects were being developed. Our concerns remain the same that the methodology for boat-based surveys used was not adequate for assessing marine mammal numbers.</p> <p>The methodology that was used is designed for ornithology surveys. Marine mammal surveys that are developed as an add-on to boat-based bird surveys are inadequately designed monitoring programmes that cannot provide a sufficient baseline to characterise the environment. This is acknowledged when previous Hornsea projects have been developed, and WDC are disappointed to see that this has not been rectified. We are very concerned to see that in the last five years that additional dedicated marine mammal boat surveys have not been undertaken to plug this gap to ensure that the research design is robust, to address these concerns and provide scientifically up-to-date, robust marine mammal data on which accurate assessment can be undertaken. Again, the fact the data are old and potentially do not reflect the use of the area by marine mammals has been acknowledged for previous Hornsea projects, yet this has not been addressed. It is inappropriate to use in assessing the area for marine mammals and assessing any impacts.</p> <p>Section 2.4.2.3 on the acoustic surveys undertaken states that Passive Acoustic Monitoring (PAM) was used, and we are pleased to see that 2 years surveys was undertaken. We note that the area planned to be surveyed had to be adjusted, and this has led to holes in the dataset. WDC strongly disagree with the conclusions that "the un-surveyed area was outside the boundary of the Hornsea Four array area and therefore the absence of acoustic detections in the southern part of the survey area will not have affected the density and abundance estimations for Hornsea Four". Due to Hornsea Four being within the SNS SAC, and the distance at which harbour porpoises can be impacted by the development, the hole in this dataset</p>			
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		needs to be addressed, as currently there is not complete information on which to base any assessment. We would like to know how this will be addressed.			
S42_0070_006	Whale and Dolphin Conservation	<p><b>SCANS Data</b></p> <p>We are pleased to see that SCANS III surveys have been used to assist with assessing marine mammal populations, and potential impacts on marine mammals. However, the SCANS surveys are only one seasonal snapshot in time, with a 10-year gap between datasets. It is not therefore appropriate to be used for estimates of density and finer-scale information is required where such data are not available (Green et al., 2012).</p>	I	N/A	The Applicant has provided multiple density sources in the impact assessment provided in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> due to the limitations of each survey type.
S42_0070_007	Whale and Dolphin Conservation	<p><b>Potential impacts</b></p> <p>Table 4.7 in Volume 1 Chapter 4 of the PEIR 'Project Description' describes the various foundation types being considered for Hornsea Four. We are pleased to see that a number of options are open for n the RIAA consideration. However, we are concerned to see that foundations requiring piling are included, in particular monopiles. Pile driving, even with the use of pin piles, has the potential to cause physical harm, as well as displacement. We strongly recommend that foundations requiring piling are taken out of consideration, particularly as the offshore wind farm is within the SNS SCI; or alternatively there is a commitment to using proven mitigation measures during construction.</p> <p>Our primary concern surrounds the intense noise pollution resulting from pile driving for all cetacean species and the harbour porpoise population supported by the SNS SCI. Reactions of harbour porpoises to the pile driving process have been recorded at distances many kilometres from the piling location (Brandt et al., 2018, 2011; Carstensen et al., 2006; Dähne et al., 2013; Thomsen et al., 2006). In some cases, pile driving is audible by harbour porpoises beyond 80 km from the source and could mask communication at 30 – 40 km (Thomsen et al., 2006). Bottlenose dolphins (<i>Tursiops truncatus</i>) could exhibit behavioural responses at distances of up to 40 km from pile driving locations (Bailey et al., 2010).</p> <p>Research has shown that pile driving causes behavioural changes in harbour porpoises which leave the area during</p>	I	N/A	<p>The Applicant notes the concerns of WDC. The assessment of PTS and disturbance on cetacean species presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> was based upon best available data and methods and the approach was agreed with consultees.</p> <p>Potential impacts on marine mammals (including from the Southern North Sea SAC) are detailed in <a href="#">Volume 2, Chapter 4: Marine Mammals</a>. Potential impacts on the Southern North Sea SAC are set out in <a href="#">Volume B2, Chapter 2: Report to Inform Appropriate Assessment (RIAA)</a> and <a href="#">Volume F2, Annex 1.1: Outline Site Integrity Plan</a> details potential mitigation options where required.</p>

	<p>construction and in some instances did not later return to their usual numbers (Brandt et al., 2011; Carstensen et al., 2006; Teilmann and Carstensen, 2012). Some studies have shown harbour porpoise start to return in one area, yet years later have not returned to other areas (Snyder and Kaiser, 2009). The longest running study into the effects of windfarms on harbour porpoises shows that ten years later, the population has only recovered to 29% of the baseline level (Teilmann and Carstensen, 2012). Even where areas have been recolonised, it is not clear if these are the same animals returning or new animals moving into the area, or if the animals are using the area in the same way.</p> <p>A paper analysing foraging rates in harbour porpoise found that they feed almost continuously to meet energy needs and are therefore highly sensitive to disturbance (Wisniewska et al., 2016). Loud noises, such as pile driving, can cause harbour porpoise to be displaced (Dähne et al., 2013) from potential important feeding grounds. Additionally, harbour porpoise can lose 4% of their body weight in just 24 hours from starvation (Kastelein, 2018). Given the importance of the Hornsea Four area and the SNS SCI for harbour porpoise, most likely as prime foraging areas, displacement from the area could be very significant.</p> <p>Although it is likely that pile driving activity will not be constant, the installation of monopile foundations has been found to have a profound negative effect on harbour porpoise acoustic activity up to 72 hours after pile driving activity (Brandt et al., 2011). It is unlikely that harbour porpoises will return to an area during these gaps, resulting in them most likely being excluded from the area for the entire duration of construction.</p> <p>The construction window of 12 months is of concern, particularly as there is likely to be piling at more than one location. Piling at two locations will add additional noise into the environment and have a cumulative impact on the harbour porpoise population supported by the SNS SCI. This need so be properly assessed.</p>			
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		<p>We are pleased that it is recognised that the impacts from piling include both physiological and behavioural impacts on marine mammals. We note that INSPIRE modelling has been used to predict underwater noise levels from the construction of Hornsea Four. Whilst we feel this is model will be helpful in the assessment, the model has been found to under predict noise levels (Spiga, 2015) which can potentially lead to underestimate the impact of piling on cetaceans. We are pleased that the National Marine Fisheries Service (NMFS) modelling (National Marine Fisheries Service (NMFS), 2018) is also used.</p>			
S42_0070_008	Whale and Dolphin Conservation	<p><b>Vessel activity</b></p> <p>WDC is concerned about the impacts of increased vessel activity particularly during construction. Increased vessel noise can interrupt harbour porpoise foraging behaviour and echolocation, which can lead to significantly fewer prey capture attempts (Wisniewska et al., 2018). Harbour porpoises have a high metabolism and need to feed constantly and therefore are highly sensitive to disturbance (Wisniewska et al., 2016), and can lose 4% of their body weight in just 24h from starvation<sup>2</sup>. There is an increased risk of collision and disturbance to cetaceans from increased vessel activity (Dyndo et al., 2015; James, 2013).</p>	I	N/A	The marine mammal impact assessment presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> has considered the best available data to inform the magnitude and sensitivity scores relating to vessel activity.
S42_0070_009	Whale and Dolphin Conservation	<p><b>In-combination effects</b></p> <p>We note that a Cumulative Effect Assessment (CEA) has been undertaken. However, the list of projects is in Volume 4, Annex 5.3: Offshore Cumulative Effects, which we do not have a copy of. We would like a copy of this document to be able to comment on the CEA that has been undertaken.</p> <p>As a guide, this assessment should not only incorporate offshore wind farms with an overlapping construction timeframe, but also include other offshore developments that have the possibility to have an in-combination effect, such as oil and gas developments, navigation and shipping. These other activities need to be included to ensure an effective assessment is undertaken.</p> <p>Guidelines for in-combination assessment state that other</p>	I		The cumulative effects assessment presented in <a href="#">Volume 2, Chapter 4: Marine Mammals</a> includes the following impacts: The potential for disturbance from underwater noise during construction activity (pile driving, UXO, seismic survey, vessels, other construction activity); Collision risk from vessels during construction and operation; and Disturbance from underwater noise from

		<p>developments, including cross boundary developments must be taken into account when undertaking the assessment. Any conclusion based on an incomplete assessment will be unreliable.</p> <p>Cumulative effects from across marine boundaries need to be considered to consider all potential transient impacts across such boundaries, especially considering the mobile nature of cetaceans.</p>			<p>vessels during operation.</p> <p>Shipping is not included in the Cumulative effects assessment since it was included within the baseline for marine mammals.</p>
S42_0070_010	Whale and Dolphin Conservation	<p><b>Mitigation methods</b></p> <p>WDC are pleased to see a commitment to using mitigation methods to reduce noise during piling activities. We recognise that embedded mitigation measures that have already been incorporated into the project design. As discussed at previous meetings, WDC are pleased to see a commitment to mitigation measures however, we strongly disagree that these measures are appropriate mitigation methods.</p> <p>We understand that the JNCC guidance for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010) has been followed. We recognise that currently these are the only guidelines available to developers to use to minimise the impacts of piling activity on marine mammals, however it is widely known that these guidelines are outdated, and do not use the latest scientific evidence.</p> <p>The in-situ methods in the JNCC guidelines have been widely criticised as arbitrary and with a lack of supportive evidence (Wright and Cosentino, 2015). Additionally the guidelines have not been updated for a number of years and therefore do not include the latest and increasing body scientific data of the impacts of noise on marine mammals (Wright and Cosentino, 2015).</p> <p>In particular WDC have concerns over the guidance that soft-starts should be used and the use of Marine Mammal Observers (MMOs). WDC do not consider 'soft-start' to be an adequate mitigation measure as they are only a reduction in sound source at the initiation of a piling event. It cannot be assumed that cetaceans will leave an area during a soft start as they may be remaining the area due to prey availability or breeding despite</p>	I	Change Co110	<p>The Applicant acknowledges comments regarding the Commitments Register detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>. At the point of DCO application the JNCC piling mitigation guidance remains the only publicly available guidance document.</p> <p>The wording of Co110 has been adjusted to ensure that best practice mitigation will be considered, rather than reliance on the JNCC (2010) guidelines.</p> <p>The Applicant will discuss and agree appropriate mitigation methods with consultees at the time of drafting the Piling Schedule at the post-consent stage.</p>

	<p>the harmful noise levels (Faulkner et al., 2018). Whilst a common sense measure, soft-starts are not a proven mitigation technique and so cannot be relied upon to mitigate impacts, especially for developments within the SNS SAC.</p> <p>We are concerned that acoustic deterrent devices (ADDs) such as pingers may be used to move marine mammals out of the area. Not only will this add another source of noise into the environment (Faulkner et al., 2018), the use of ADDs has not been proven as a mitigation for pile driving and cannot be relied upon for the range of species likely to be encountered in the wind farm region. The range of displacement from ADDs has the potential to exceed the range of displacement from pile driving itself when using bubble curtains (Dähne et al., 2017).</p> <p>We agree that mitigation methods will be reviewed closer to construction and that best practice mitigation, and that exact methods will be agreed at that time. However at this time we would like to see a commitment to using only proven mitigation methods.</p> <p>Due to the location of Hornsea Four in the SNS SCI, it is particularly important that only proven mitigation measures are used as this is the only way to ensure no AEol on the harbour porpoise population of the site. WDC would like to see a commitment to using mitigation methods that have been proven in both test scale (Diederichs et al., 2013; Wilke et al., 2012) and full-scale sites, in particular bubble curtains (Brandt et al., 2018; Dähne et al., 2017; Nehls et al., 2016).</p> <p>A study analysing the assessed the benefits of noise reduction to harbour porpoise during offshore wind construction found that if wind farms inside the Southern North Sea cSAC reduced their noise levels by the equivalent of around 8dB, the risk of a 1% annual decline in the North Sea porpoise population can be reduced by up to 66% (WWF, 2016). Such an approach is the only way to reduce the far reaching avoidance distances for cetaceans.</p> <p>Due to the results of studies into the impacts of piling activity on harbour porpoises, and the unknown surrounding mitigation</p>			
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		<p>measure, we strongly disagree with the conclusions in the PEIR that the impacts on harbour porpoise will be minor.</p> <p>We also have concerns over the approach to monitoring impacts of piling on harbour porpoises during construction. To fully understand the impacts of piling on the SNS SAC and harbour porpoise, the monitoring should be robust enough to demonstrate the responses of harbour porpoise to piling activities. Monitoring should be undertaken throughout the construction period, and into the operational phase, across the Hornsea Four site to fully assess the impacts of piling.</p>			
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## EIA topic area: Offshore and Intertidal Ornithology

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/New or N/A)	Applicant Response
S42_0052_INT 2.4	Natural England	<p><b>Offshore Ornithology</b></p> <p>Regarding offshore ornithology, Natural England has identified several high-level issues that preclude, at this stage the ability to comment on conclusions for individual receptors. These issues include the adequacy of data (namely the robustness of density estimates); the lack of density modelling to generate densities; the definition of densities and spatial scales for the assessment; the lack of assessment for some species and effect (especially cumulatively), and finally the deviation from advice provided by Natural England during the Evidence Plan process.</p> <p>Until key issues are resolved, Natural England cannot confidently comment on conclusions drawn from the assessment, either regarding the project alone or cumulative impacts. Regarding cumulative impacts, during the Norfolk Vanguard examination, it is worth noting that Natural England has previously concluded that there are significant adverse impacts at an EIA scale due to cumulative collision and/or displacement impacts for a number of species. Hornsea Four (as</p>	N	N/A	<p>The Applicant notes that Natural England considered there are issues that precluded their ability to comment on conclusions for individual receptors at the PEIR stage. The Applicant has worked to address each topic individually to allow Natural England to be able to comment on the conclusions of the ornithology EIA submitted as part of the ES. Specifically:</p> <p>- <b>Adequacy of data</b> – The Applicant has followed Natural England’s recommendations and</p>

		<p>well as Norfolk Boreas, East Anglia 1 North and East Anglia 2) will add further birds to the collision/displacement totals.</p>		<p>undertaken additional camera analysis for a selection of months, agreed with Natural England via email correspondence as of 11/11/19. During Ornithology Technical Panel meeting #9 on 21/04/20, Natural England agreed with the findings of the report and that the topic can be closed. During Ornithology Technical Panel meeting #13 on 23/11/20, Natural England and RSPB agreed they are confident in the Hornsea Four baseline data characterisation.</p> <p><b>- Lack of density modelling to generate densities –</b>          The Applicant has now used a model-based method (MRSea) to characterise the baseline for certain species. This was discussed through the Offshore and Intertidal Ornithology Evidence Plan Technical Panel and is presented in <a href="#">Volume A5, Annex 5.6: Offshore Ornithology MRSea Annex</a>. Furthermore, the Applicant has updated <a href="#">Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline</a></p>
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				<p><b>Characterisation Report</b> to include detailed reasoning for species where design-based techniques are used.</p> <p>- <b>Definition of densities and spatial scales for the assessment:</b> This topic was concluded as part of the Evidence Plan Process and subsequent updates on this position are summarised in the ES</p> <p>- <b>The lack of assessment for some species and effect (especially cumulatively):</b> The Applicant agreed with Natural England at Ornithology Technical Panel Meeting #5 the main species of interest that would be considered for potential impacts. The Applicant has taken the Industry standard approach to consider the receptor-impact-pathway approach to cumulative assessment where it is considered that a material contribution is apparent to the cumulative effect, which has been explained to Natural England throughout the Evidence Plan Process.</p> <p>- <b>Deviation from advice</b></p>
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					<p><b>provided by Natural England:</b> Any methods or approaches deviating from Natural England’s advice have been presented and discussed through the Evidence Plan Process, the outcomes of which are presented in <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>.</p> <p>Between PEIR and ES, the Applicant has made a commitment (Co138) to increase the lower tip height of wind turbines to 40 m above MSL to reduce the impact on collision and is working in alignment with other projects to ensure the cumulative impact is addressed.</p>
S42_0052_1.73	Natural England	<p>Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection is the same area as habitat loss. As such this is not considering the surface area of the turbines and other structures themselves which in turn will be colonised as well.</p> <p><i>NER: Include infrastructure surface area</i></p>	I	N/A	<p>The Applicant notes this comment and confirm that a review of the commitments register has been undertaken to refine the wording of commitments wherever possible. The commitments register provides clear signposting to the DCO to ensure each of the commitments are adequately secured.</p>

<p>S42_0052_5.4.2</p>	<p>Natural England</p>	<p><b>Project Parameters</b></p> <p><u>Project Definition</u></p> <p>The worst-case scenario for collision risk is not clear (in terms of number and type of turbines)  <i>NER: Clearer explanation of Rochdale Envelope. Clarity should be provided regarding the turbine specification for the worst-case scenario.</i></p> <p><u>Worst Case Scenario (WCS)</u></p> <p>Same as above  <i>NER: Same as above</i></p> <p><u>NE position on WCS</u></p> <p>It is still unclear the WCS (see comment above)  <i>NER: Same as above</i></p> <p><b>Baseline Characterisation</b></p> <p><u>Data suitability and baseline characterisation</u></p> <p>Natural England cannot yet be sure that sampling is adequate. We have not been supplied with any information to show that estimates are robust – in fact, precision looks consistently below the standard (0.16) suggested by Thaxter &amp; Burton (2009) now that 54% of observations have been excluded from losing 29% of the AfL area.</p> <p><i>NER: Test a few key months for the key receptors to show the effect of including additional data (collected but not analysed) on density and precision estimates. Many of these issues have previously been discussed at the June 2019 ETG and we anticipate that further detailed discussions on how to rectify these issues will be needed prior to submission.</i></p> <p><u>Data gaps</u></p> <p>Further data from an additional two cameras from</p>	<p>I</p>	<p>N/A</p>	<p><b>Project Parameters</b></p> <p><u>Project Definition, Worst Case Scenario (WCS) and NE position on WCS:</u></p> <p>The Applicant addressed the “Worst Case Scenario” for collision risk with Natural England during Ornithology Technical Panel Meeting #9 on 29/10/19. The Applicant explained the terminology Maximum Design Scenario (MDS) which includes the maximum number of turbines and the maximum parameter sizes for all rotor parameters which will be included in the collision risk modelling. The Applicant noted during these meetings that the number of turbines was not provided at PEIR in error and <b>Volume A5, Annex 5.3: Offshore Ornithology Collision Risk Modelling</b> has been updated accordingly at ES, along with clear detail of the turbine specification included in the sCRM.</p> <p><b>Baseline Characterisation</b></p> <p><u>Data suitability and baseline characterisation and Data gaps</u></p> <p>The Applicant has followed Natural England’s recommendations and undertaken additional camera analysis for a selection of months, agreed with Natural England via email correspondence as of 11/11/19, to evaluate the robustness of data. During Ornithology Technical Panel meeting #9 on 21/04/20, Natural England agreed with the findings of the report and that the</p>
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		<p>the Digital Aerial Surveys is potentially available for analysis.</p> <p><i>NER: See above comment. Natural England advises that analysing the full set of data available is likely to deliver greater confidence regarding the baseline characterisation.</i></p>			<p>topic can be closed. During Ornithology Technical Panel meeting #13 on 23/11/20, Natural England and RSPB agreed they are confident in the Hornsea Four baseline data characterisation.</p>
S42_0052_5.4.3	Natural England	<p><b>Data analysis</b></p> <p>Several elements deviate from advice provided by NE, including:</p> <ul style="list-style-type: none"> <li>- Displacement (and mortality) rates</li> <li>- Collision risk model parameters</li> <li>- Definition of seasonality</li> </ul> <p>Prior to PEIR, Ørsted produced density surface model estimates for key receptors across the AfL area. Precision estimates tended to be better than the design-based estimates presented for the new development area at PEIR. We would welcome model-based estimates for the new development area to help instil confidence in the robustness of data, which underpins the entire assessment.</p> <p>NER: Review and refine information in Furness (2015), including using BDMPS seasons accurately and using wider breeding seasons. Compare model-based estimates of density and precision (using e.g. MRSea) with those presented to decide which are more robust. Further discussions at the ETG are likely to be needed to address these issues.</p> <p><b>Environmental Impact Assessment</b> Identified Impacts</p>	I	N/A	<p><b>Data analysis</b></p> <p>The Applicant has discussed CRM parameters, definition of seasonality and displacement/mortality rates in detail with Natural England during Ornithology Technical Panel meetings 5 – 9 to ensure we are aligned. The Applicant has now used a model-based method (MRSea) to characterise the baseline for certain species. This was discussed through the Offshore and Intertidal Ornithology Evidence Plan Technical Panel and is presented in <a href="#">Volume A5, Annex 5.6: Offshore Ornithology MRSea Annex</a>. Furthermore, the Applicant has updated <a href="#">Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation Report</a> to include detailed reasoning for species where design-based techniques are used.</p> <p><b>Environmental Impact Assessment</b> The figures used within the</p>

		<p>Whilst all potential pressures/impacts have been identified, some of them have been dealt with cursorily e.g. construction phase disturbance, gannet displacement, lighting impacts on migratory passerines.</p> <p>NER: Update assessment in light of Natural England's advice.</p> <p><b>Methodology</b> We do not agree with some of the definitions for intertidal disturbance (sanderling) and offshore displacement (gannet, auks). Please see our detailed comments.</p> <p>NER: Update assessments of sensitivity for species referred to in our detailed advice. Consider using CIEEM (2018) guidance.</p>			<p>cumulative CRM assessment were agreed with Natural England during Ornithology Technical Panel #10 as those used by Norfolk Boreas with updates provided by Hornsea Four based from projects within the planning process.</p> <p><b>Cumulative Effect Assessment (CEA)</b></p> <p>So far as the Applicant is aware, and in line with the PINS guidance, all OWFs have been included in the CEA.</p> <p><b>Assessment Conclusion</b> The Applicant notes Natural England's reservations on being able to draw conclusions from the assessment, and is working to resolve key issues through the Evidence Plan Process between PEIR and ES. The Applicant is keeping informed of Natural England's conclusions on other projects and wider strategic issues will be taken into consideration.</p> <p><b>Other Comments</b> The Applicant notes Natural England's key issues, and has commented on each topic above and in responses to Natural England's detailed comments.</p> <p><u>Displacement</u></p> <p>The Applicant notes Natural England's key concerns regarding displacement, and has provided</p>
S42_0052_5.4.4	Natural England	<p><b>Cumulative Effect Assessment (CEA)</b></p> <p>We have identified a number of small OWFs apparently excluded.</p> <p>NER: CEA to be updated with additional projects. Assessment</p> <p>Some figures (e.g. collision estimates) have been adjusted contrary to Natural England advice. There has been some reworking of the totals from individual projects without a clear audit trail of why changes are justified (or whether they have already been changed by previous CEA).</p> <p>CEA to use figures from project-specific examinations unless a clear argument can be made that the parameters used in the project-level assessments are fully-understood and therefore can be re-calculated.</p> <p><b>Assessment Conclusion</b></p> <p>Until key issues are resolved, we cannot confidently</p>	I	N/A	<p>The Applicant notes Natural England's reservations on being able to draw conclusions from the assessment, and is working to resolve key issues through the Evidence Plan Process between PEIR and ES. The Applicant is keeping informed of Natural England's conclusions on other projects and wider strategic issues will be taken into consideration.</p> <p><b>Other Comments</b> The Applicant notes Natural England's key issues, and has commented on each topic above and in responses to Natural England's detailed comments.</p> <p><u>Displacement</u></p> <p>The Applicant notes Natural England's key concerns regarding displacement, and has provided</p>

		<p>comment on conclusions drawn from the assessment, either regarding the project alone or cumulative impacts. Regarding cumulative impacts, during the Norfolk Vanguard examination, it is worth noting that Natural England has previously concluded that there are significant adverse impacts at an EIA scale due</p> <p>NER: CEA to be carried out as per Natural England advice.</p> <p><b>Other Comments</b></p> <p>We have identified several high level issues that preclude, at this stage, comment on conclusions for individual receptors. These include:</p> <ul style="list-style-type: none"> <li>- Adequacy of data (robustness of density estimates)</li> <li>- Generation of densities (lack of density modelling)</li> <li>- Definition of seasonality and spatial scales for assessment</li> <li>- Deviation from NE advice</li> <li>- Lack of assessments for some species and effects, especially cumulatively</li> </ul>			<p>responses to Natural England’s detailed comments on this topic. The Applicant has amended the displacement assessments to be more aligned with SNCB guidance and advice received from Natural England during the Evidence Plan Process.</p> <p><u>Collision risk modelling (CRM)</u> The Applicant notes Natural England’s key concerns regarding CRM parameters and has resolved these through discussions in Ornithology Technical Panel meetings #8 and #9. The Applicant clarified CRM parameters with Natural England and presented deterministic band model comparisons which Natural England approved. The Applicant has also provided responses to Natural England’s detailed comments on this topic.</p> <p><u>Population modelling</u> The Applicant notes Natural England’s key concerns regarding PVA, and has provided responses to Natural England’s detailed comments on this topic. The Applicant has discussed the NE PVA tool through the Evidence Plan Process and will be using this to conduct assessments in <a href="#">Volume A, Annex 5.4: Offshore Ornithology Population Viability Analysis</a>.</p>
S42_0052_5.4.5	Natural England	<p>Displacement – the assessment departs from SNCB guidance in several significant ways – please see our detailed comments. Until these are addressed the impacts cannot be said to be adequately quantified.</p> <p>Collision risk modelling (CRM) – we have a number of concerns regarding the parameters used in the CRM, and therefore are not able to advise on the outputs. Again see our detailed comments.</p> <p>Population modelling – our detailed comments set out issues with the EIA-scale Population Viability Analyses referred to.</p> <p>NER: displacement – assessments to be provided in line with SNCB guidance.</p> <p>CRM – provide clarification on a number of parameters, particularly how PCH% value has been calculated, and re-run CRM including presentation of deterministic Band model for comparison.</p> <p>Population modelling – consider using NE PVA tool to update PVAs.</p>	I	N/A	<p><u>Population modelling</u> The Applicant notes Natural England’s key concerns regarding PVA, and has provided responses to Natural England’s detailed comments on this topic. The Applicant has discussed the NE PVA tool through the Evidence Plan Process and will be using this to conduct assessments in <a href="#">Volume A, Annex 5.4: Offshore Ornithology Population Viability Analysis</a>.</p>

S42_0052_6.1	Natural England	<p>19 transects remain for the new development area. Four do not cross the array area, and three cross only a narrow part of the array area. Only 12 transects therefore cross the array area in full. We are concerned data are insufficient to make robust estimates of density as the area covered may be too small to make sufficient detections of birds present.</p> <p><i>NER: Test the adequacy of data used, by analysing data from additional cameras in a selection of relevant months, to show effect of increasing data on density and precision estimates for key receptors.</i></p>	I	N/A	<p>The main purpose of Table 5.6: <i>Summary of survey data (2010-2018) of relevance to Hornsea Four</i> is to recognise the different data sets that have been collected within the Hornsea Zone, though not all will be used in the baseline characterisation or for impact assessment purposes. With regards to the survey data of relevance to Hornsea Four, an explanation of how these data sources has been incorporated in the assessment is provided in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>
S42_0052_6.2	Natural England	<p>We would welcome discussion on how these additional data sources will be incorporated in the assessment.</p> <p><i>NER: Explore issue within Expert Technical Group prior to DCO application.</i></p>	I	N/A	
S42_0052_6.3	Natural England	<p>Much of the information in Furness (2015) has been misinterpreted when defining seasons for species. For instance, Furness states (21.4) that one seasonal BDMPS period (Aug – Feb) is appropriate for guillemot. This is because the BDMPS population will be present within this region at this time, even though movement may occur within it. It is incorrect to break this period into spring, winter and autumn. Comments on seasonal apportioning to specific protected sites for HRA will follow in response to the RIAA.</p> <p><i>NER: Revisit Furness (2015) to follow recommendations accurately, using the seasons marked in bold.</i> (We note that due to the nature of monthly data collection Puffin seasons may need to be interpreted as <b>Breeding = April – July</b>, and <b>non-breeding = August – March</b>)</p>	I	N/A	<p>The Applicant has undertaken a full review on breeding and non-breeding populations, with consideration of differing population scales, and reviewed the recent submissions for Norfolk Vanguard and Boreas to inform the process, which informed <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>
S42_0052_6.4	Natural England	<p>It is not clear how age ratios are determined, and the reference (Royal Haskoning 2018) is not listed. If this table is from the Norfolk Vanguard or Boreas submission, careful cross-checking of the information</p>	I	N/A	<p>The Applicant recognises these comments and notes the errors in <i>Table 5.12: Average mortality across all age classes presented at PEIR</i>. A</p>

		<p>is needed as several figures do not match those presented in those examinations.</p> <p><i>NER: Supply reference (Royal Haskoning 2018) so we can review the approach to age ratio determination.</i></p>			<p>full review of the source data feeding into the population age ratios and demographic rates has been undertaken to inform <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> and an updated version was agreed with Natural England and the RSPB through the Evidence Plan Process.</p>
S42_0052_6.5	Natural England	<p>The assumption that the proportion of non-breeding birds contributing to the breeding season regional total remains consistent between seasons is untested and contentious. The spatial scale used for the regional breeding assessment is unclear.</p> <p><i>NER: We recommend following the approach used at Norfolk Boreas and Vanguard, where the regional assessment considers the seasonal impacts (e.g. breeding, spring and autumn) against the relevant regional BDMPS (so non-breeding season BDMPSs are from Furness 2015 and the breeding ones they have calculated themselves) and then sum the seasonal impacts to get an annual impact and assess this against the largest of the seasonal BDMPSs (which is generally one of the non-breeding season BDMPSs). If it is necessary to define a smaller spatial scale for the breeding season, this will effectively become analogous to an assessment of impact to F&amp;FC SPA, should no other breeding sites be within foraging range of Hornsea Four.</i></p>	I	N/A	<p>The Applicant has undertaken a full review on breeding and non-breeding populations, with consideration of differing population scales, and reviewed the recent submissions for Norfolk Vanguard and Boreas to inform the process, which informed <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b>.</p>
S42_0052_6.6	Natural England	<p>In addition to problems stemming from previous issues (seasonal definitions and proportions of non-breeders), figures for guillemots and razorbills are presented incorrectly, though the number of breeding individuals from F&amp;FC SPA appears correct.</p> <p><i>NER: Birds from Filey need to be added to those from Flamborough and Bempton when using SMP data. (Aitken et al. (2017) report 90,861 individuals which equates to 121,754 breeding adults).</i></p>	I	N/A	<p>The Applicant has reviewed the figures for guillemots and razorbills and presented updates within <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b>. The Applicant has reviewed breeding and non-breeding populations, with consideration of differing population scales, and agreed with Natural England during Ornithology Technical Panel #9.</p>



S42_0052_6.7	Natural England	<p>We are concerned the values in this table have not been used appropriately. These represent population estimates of all birds connected to UK waters, and should not be used for comparison within regional assessments at smaller population scales.</p> <p><i>NER: We recommend the assessments of regional impact consider annual impact at the largest BDMPS population scale.</i></p>	I	N/A	<p>The Applicant has undertaken a full review on breeding and non-breeding populations, with consideration of differing population scales, including the provision of annual regional impacts against the largest BDMPS scale. This has informed <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>
S42_0052_6.8	Natural England	<p>Whilst we are in agreement regarding the broad survey methodology of monthly surveys over a two-year period, currently we are not satisfied that all data collected have been analysed in a way that affords a representative baseline characterisation of seabird usage of the site. So it is not yet true to say Natural England agree the data are 'representative of the site'.</p> <p><i>NER: Please see comments elsewhere regarding e.g. implications of transect coverage, the analysis of data from the further two cameras, potential to use MRSea rather than design-based population estimates.</i></p>	I	N/A	<p>The Applicant has followed Natural England's recommendations and undertaken additional camera analysis for a selection of months, agreed with Natural England via email correspondence of 11/11/19, to evaluate the robustness of data. During Ornithology Technical Panel meeting #9 on 21/04/20, Natural England agreed with the findings of the report. During Ornithology Technical Panel meeting #13 on 23/11/20, Natural England and RSPB agreed they are confident in the Hornsea Four baseline data characterisation.</p> <p>The Applicant has now used a model-based method (MRSea) to characterise the baseline for certain species. This was discussed through the Offshore and Intertidal Ornithology Evidence Plan Technical Panel and is presented in <a href="#">Volume A5, Annex 5.6: Offshore Ornithology MRSea Annex</a>. Furthermore, the Applicant has updated <a href="#">Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation Report</a> to include</p>

					detailed reasoning for species where design-based techniques are used.
S42_0052_6.9	Natural England	<p>Whilst we welcome the efforts made to reduce the impacts of the proposal through the developable area approach, we do have outstanding uncertainties relating to the reduction of the AfL and the persistence of higher bird densities in the area removed.</p> <p>Also, we would welcome discussion about the use of MSL for collision risk modelling, as opposed to HAT or other baselines.</p> <p><i>NER: Discuss further in Expert Technical Group.</i></p>	I	Change	<p>The Applicant has further reduced the AfL in an effort to reduce/eliminate the potential for AEol the guillemot and razorbill features of the FFC SPA.</p> <p>Where applicable the Applicant has converted any references to sea level heights and bird flight heights to ensure that the measures are used correctly in collision risk modelling. The use and / or conversion of such measures is contained within <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a>, respectively.</p>
S42_0052_6.10	Natural England	<p>What is the intended route of vessel and helicopter movements? Details will be required to assess impacts.</p> <p><i>NER: Include details of vessel and helicopter movements in final assessment.</i></p>	I	N/A	<p>At this stage of the project development, it is not possible to ascertain the specific routes of vessel and helicopter movements planned for the construction of all components of Hornsea Four and the operation of the wind farm. The Project Description has been updated to illustrate the location of potential ports in relation to the project. This is captured in <a href="#">Volume A1, Chapter 4: Project Description</a>.</p>
S42_0052_6.11	Natural England	<p>How are value, importance and sensitivity combined in the matrix?</p> <p><i>NER: Provide more detail on methodology.</i></p>	I	N/A	<p>A full review of each contributing factor is being undertaken for the value, importance and sensitivity, with the final compilation completed in a manner that incorporates professional judgement.</p>
S42_0052_6.12	Natural England	<p>We query the usefulness of the DMRB matrix approach to EIA for an offshore wind farm, especially as many of the categories (e.g. importance, magnitude) apply scales which are</p>	I	N/A	<p>The Applicant notes this comment and is discussing the DMRB matrix approach to EIA during the Evidence Plan Process.</p>

		<p>unlikely to ever flag up impacts.</p> <p><i>NER: Consider using CIEEM (2018) guidance which provides guidance relevant to marine and coastal developments, and which uses concepts such as integrity and uncertainty.</i></p>			
S42_0052_6.13	Natural England	<p>The construction phase presents a range of potential drivers that may cause displacement. This includes vessel movement and construction activities (which may be both spatially and temporally limited), however the physical presence of the constructed turbines are also likely to cause a displacement response. As the construction phase progresses, more turbines are built and the spatial scale increases, until a point when the entire array is constructed, yet not operational, and may present the same displacement stimulus as an operational farm. Considering this, we do not agree with screening out gannet from displacement during construction.</p> <p><i>NER: Include gannet in assessment of displacement during construction.</i></p>	I	N/A	<p>The Applicant notes that the assessments to date have taken an industry standard approach. This topic has been discussed with Natural England during the Ornithology Technical Panel meetings.</p>
S42_0052_6.14	Natural England	<p>We advise that the sensitivity to disturbance and displacement during the construction phase should be the same as during the operational phase. We do not agree with sensitivities of gannet, guillemot, razorbill or puffin.</p> <p><i>NER: Re-categorise appropriately.</i></p>	I	N/A	<p>This topic was addressed through the Evidence Plan Process in Ornithology Technical Panel meeting #5, which is encapsulated in <a href="#">Volume B1, Annex 1.1: Evidence Plan</a>.</p> <p>The Applicant and Natural England agreed that there is no evidence to suggest that the overall sensitivity or level of displacement is the same for any species in both construction and operational phases and agreed to consider a proposed new approach for this topic. This new method and additional justification for its use is provided in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>

<p>S42_0052_6.15</p>	<p>Natural England</p>	<p>We do not agree with the assertion that displacement will only occur where vessels and construction activities are present; instead we consider that displacement is likely to occur within and around the constructed array area (due to the presence of turbines) and where construction activities are ongoing. This will represent an increasing spatial impact as construction progresses. See comments below.</p> <p><i>NER: Re-evaluate displacement effects for the construction phase, drawing on evidence from post-construction monitoring where appropriate.</i></p>	<p>I</p>	<p>N/A</p>	<p>This topic was addressed through the Evidence Plan Process in Ornithology Technical Panel meeting #5, which is encapsulated in <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>.</p> <p>The Applicant and Natural England agreed that there is no evidence to suggest that the overall sensitivity or level of displacement is the same for any species in both construction and operational phases and agreed to consider a proposed new approach for this topic. This new method and additional justification for its use was agreed with Natural England through the Evidence Plan Process and is provided in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>
<p>S42_0052_6.16</p>	<p>Natural England</p>	<p>We do not agree with the displacement rates/buffers/mortality rates presented and suggest that species-specific parameterisation of displacement effect during construction is extremely challenging. Instead we would draw attention to the pragmatic method employed at Dogger Bank Creyke Beck A&amp;B and Teesside A&amp;B (section 4.3.5.1. in Appendix A to Chapter 11 in Dogger Bank Creyke Beck A&amp;B <a href="https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010021/EN010021-000502-6.11.1%20Chapter%2011%20Appendix%20A%20Creyke%20Beck%20A%20and%20B%20Ornithology%20Technical%20Report%20-%20Application%20Submission_F-OFC-CH-011.pdf">https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010021/EN010021-000502-6.11.1%20Chapter%2011%20Appendix%20A%20Creyke%20Beck%20A%20and%20B%20Ornithology%20Technical%20Report%20-%20Application%20Submission_F-OFC-CH-011.pdf</a>), of calculating operational displacement per species and reducing by 50% during the construction period (to broadly reflect reduced spatial and temporal scale).</p>	<p>I</p>	<p>N/A</p>	<p>The Applicant discussed an appropriate method to quantify and assess red-throated diver density and abundance within the Hornsea Four Export Cable Corridor (ECC) with Natural England on a one-to-one basis. The Applicant presented a document summarising this methodology in Ornithology Technical Panel Meeting #9 and Natural England agreed it was an appropriate approach. This is captured in the meeting minutes within <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>. The final outcome is presented within <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a>.</p>

		<p><i>NER: Revise displacement during construction to reflect 50% of operational displacement for gannet, guillemot, razorbill and puffin.</i></p>			
S42_0052_6.17	Natural England	<p>We can offer no opinion – other than that significant effects/AEOI cannot be ruled out - on conclusions about displacement impact for any species until underlying issues (adequacy of data, definition of seasons, reference population levels, background mortality rates, displacement rates, mortality rates from displacement) are resolved.</p> <p><i>NER: Amend submission to address issues raised by Natural England</i></p>	I	N/A	The Applicant notes this response.
S42_0052_6.18	Natural England	<p>In addition to general points above, specifically:</p> <ul style="list-style-type: none"> <li>- we do not support the use of four seasons for guillemot; irrespective of this, the bio-seasons presented do not align with the seasons presented in Furness (2015) (e.g. the migration free breeding season is not Apr-Aug).</li> <li>- seasonal abundance should be presented as array plus 2km buffer combined. We do not agree with varying buffer size for construction as it is not sufficiently evidence-based.</li> <li>- regional baseline populations taken from BDMPS cannot be summed across seasons. Instead we refer you to our SNCB advice on displacement that notes in regard EIA: "the assessment of potential impacts may need to be undertaken against the most appropriate population scale, for each season in turn, although the default position is to assess the summed annual mortality against the largest population scale in the annual cycle for EIA. (SNCB 2017)"</li> <li>- Hence, the summed annual mortality arising from displacement should be assessed against the largest population scale (e.g. for guillemot this would be the North Sea and English Channel) and the summed increase in baseline mortality should be presented based on this population scale alone.</li> <li>- We do not agree with the approach taken to calculate the breeding season regional population</li> </ul>	I	N/A	<p>This topic was addressed through the Evidence Plan Process in Ornithology Technical Panel meeting #5, which is encapsulated in <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>.</p> <p>To address Natural England's specific points:</p> <ul style="list-style-type: none"> <li>- The Applicant revised the assessment to two seasons for guillemot following Natural England's advice;</li> <li>- The Applicant has aligned with seasons presented in Furness (2015) in the main and use evidence from site-specific data where there are gaps in Furness;</li> <li>- The Applicant has incorporated Natural England's proposed method for buffer sizes for construction;</li> <li>- The Applicant is broadly following SNCB advice and Natural England's recommendations on displacement, but wider literature and expert opinion are also considered. Where there is evidence to support alternate</li> </ul>

		<p>(see comments above).</p> <ul style="list-style-type: none"> <li>- We seek clarification about the weighted average mortality rate approach outlined in 5.7.4.3 to calculate baseline mortality (see comments above).</li> <li>- When presenting the 'number of guillemots displaced' please clearly present the displacement and mortality rates being applied to reach these figures.</li> </ul> <p><i>NER: Correct table to reflect seasons recommended in BDMPS report (Furness 2015). For guillemot this is: breeding - March to July; non-breeding - August to February.</i></p> <p><i>Present seasonal abundance as array plus 2km buffer (and clarify on the table that this is a mean of peaks). Revise population scales and baseline mortality. Present information regarding the displacement and mortality rates clearly within the table.</i></p>			<p>approaches, and these are justifiable, these have been used.</p>
S42_0052_6.19	Natural England	<p>As comments above for guillemot (Table 5.22).</p> <p><i>NER: Refer to points above</i></p>	I	N/A	<p>The Applicant has undertaken a full review of this topic to inform <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b>, and discussed with Natural England through the Offshore and Intertidal Ornithology Evidence Plan Technical Panel.</p>
S42_0052_6.20	Natural England	<p>Please present tables for puffin and gannet.</p>	I	N/A	<p>The Applicant has included the assessment of disturbance &amp; displacement impacts for gannet and puffin during the construction phase in response to Natural England's request. This is presented in <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b>.</p>
S42_0052_6.21	Natural England	<p>SeaMast was designed as tool to describe relative sensitivity of species to development, and predicted densities were therefore not intended to be used to estimate abundance. It is preferable to compare relative densities with areas for which abundance estimates have expressly been generated, for instance the Outer Thames Estuary SPA.</p>	I	N/A	<p>The Applicant considers this advice as contrary to that agreed as appropriate during previous Ornithology Technical Panel meetings. Using an approach similar to the Thanet Extension Offshore Wind Farm would not be appropriate in this instance, particularly</p>

		<p>NER: discuss with NE benchmarking densities to areas with known RTD density. The cumulative assessment for Thanet Extension used a relative proportionate approach: see e.g. Annex C of Thanet Extension's Appendix 1, Annexes A to G to Deadline 1 Submission, <a href="https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/ENO10084/ENO10084-001076-Vattenfall%20Wind%20Power%20LTD%20-%20summary%20of%20RR%20annex%20A%20-%20C.pdf">https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/ENO10084/ENO10084-001076-Vattenfall%20Wind%20Power%20LTD%20-%20summary%20of%20RR%20annex%20A%20-%20C.pdf</a></p>			<p>considering a full assessment of potential displacement associated with export cable laying was not undertaken for that project to this level / scale. The report being referenced made use of data to assess the array area effects and not the cable route.</p>
S42_0052_6.22	Natural England	<p>It remains unclear to what extent the 2km buffer around the ECC falls within the Greater Wash SPA.</p> <p>NER: Precision regarding the area of the SPA within 2km of cable installation works should be presented in the submitted ES.</p>	I	N/A	<p>The Applicant has discussed this with Natural England during the Ornithology Technical Panel, and followed-up with GIS imagery to illustrate a 2km buffer around the ECC and its proximity to the Greater Wash SPA. This is encapsulated in <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</b> and will be addressed in <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b>.</p>
S42_0052_6.23	Natural England	<p>There is also evidence that sanderling are sensitive to anthropogenic disturbance e.g. Thomas et al. (2003), as well as a wide range of research regarding the sensitivity of non-breeding waders more generally. Therefore, Natural England considers the species has moderate sensitivity to disturbance.</p> <p>NER: Sensitivity of sanderling to be presented as moderate.</p>	I	N/A	<p>The revised assessments within the ES consider the HDD methods only which has been deemed to reduce any impacts on birds within the intertidal area. Therefore, there are no impacts predicted to sanderling regardless of the sensitivity level.</p>
S42_0052_6.24	Natural England	<p>We note that as stated the 'joint SNCB displacement advice (SNCB 2017)' 'provides the latest advice for UK development applications on how to consider, assess and present information and potential consequences of seabird displacement from offshore wind farms.' Consequently, we would strongly advise following this guidance note as closely as possible, and at the very least, if an alternative approach is favoured, we suggest that</p>	I	N/A	<p>This topic was addressed through the Evidence Plan Process in Ornithology Technical Panel meeting #5, which is encapsulated in <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</b>.</p> <p>The Applicant and Natural England</p>

the data is also presented as per the guidance note in an annex.

In particular we note the following guidance points that have not been adhered to:

- Seasonal impacts should be summed across seasons. While acknowledged that this could result in birds being assessed in more than one season, and thus double counted, the precautionary approach is required in absence of empirical information on seasonal turnover on development sites. Methods that do not consider mortality impacts on populations across all seasons may result in potential impacts being underestimated.
- However, an alternative approach for EIA may have to be taken where the appropriate population scale varies with each season. In these instances, the assessment of potential impacts may need to be undertaken against the most appropriate population scale, for each season in turn, although the default position is to assess the summed annual mortality against the largest population scale in the annual cycle for EIA.
- Displacement impacts and collision impacts will be added together for assessment of total impacts. This is acknowledged to involve some degree of double counting, but is adopted as a precautionary approach in the absence, at present, of being able to distinguish between birds which might be subject to collision and those that may be displaced.
- All species taken forward to the matrix stage of displacement assessment should be assessed against impacts to development site plus appropriate buffer. For most species, the buffer should be 2km outside the OWF footprint.

agreed that there is no evidence to suggest that the overall sensitivity or level of displacement is the same for any species in both construction and operational phases and has agreed a new approach for this topic. This new method and additional justification for its use is provided in [Volume A2, Chapter 5: Offshore and Intertidal Ornithology](#).

The Applicant has broadly followed SNCB advice but where there is evidence to support alternate approaches, these were considered.



		<p>Exceptions for more sensitive species (i.e. divers and sea ducks) require a 4km buffer zone be applied. In both cases no gradient of impact of displacement level should be applied to the buffer zone, as there is not sufficient evidence to underpin any such gradient application on a species-by-species basis. However, as displacement levels in some instances may exceed 4km, the SNCBs feel this flat application of displacement level across the OWF site plus buffer is sufficiently precautionary.</p> <ul style="list-style-type: none"> <li>Matrix tables should be presented in the main ES with and without appropriate buffer data included, to allow for future changes in understanding regarding buffer zones and effects. (Note that for the purposes of impact assessment NE will focus advice on estimates and confidence intervals from the site plus buffer).</li> <li>Given there is currently no empirical evidence on the impacts of displacement to seabirds, the SNCBs do not view it as appropriate at this time to apply varying mortality levels by season.</li> </ul> <p><i>NER: Present an assessment which follows all aspects of the SNCB displacement advice.</i></p>			
S42_0052_6.25	Natural England	<p>In addition we note that the matrices presented in Volume 5, Annex 5.1 Offshore and Intertidal Ornithology Baseline Technical Report are derived from mean monthly abundance alone and we request that the matrices are presented of the upper and lower confidence intervals, so that the full range of effect scenarios can be understood.</p> <p><i>NER: Present matrices of mean peak abundance derived from the upper and lower confidence intervals.</i></p>	I	N/A	Confidence intervals are not available for bio-seasonal data that are by default already precautionary by being calculated using the peaks of each year to estimate a mean across the season. This topic has been discussed during the Ornithology Technical Panel meetings, which are encapsulated in <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a> .
S42_0052_6.26	Natural England	<p>We recommend basing sensitivity to disturbance and displacement on recent reviews that have been</p>	I	N/A	The Applicant has undertaken a full review of this topic to inform <a href="#">Volume</a>

		<p>conducted for this purpose: Furness &amp; Wade 2013, Wade et al. 2016, also see Dierschke et al. (2016).</p> <p><i>We do not agree that puffin and gannet have a 'low' sensitivity to displacement.</i></p> <p><i>Justify displacement sensitivity ratings, especially for gannet.</i></p>			<p><b>A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the final ES. This topic has been discussed during the Ornithology Technical Panel meetings, which are encapsulated in <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan.</b></p>
S42_0052_6.27	Natural England	<p>We query how the displacement rates have been derived. Furthermore, we do not consider the evidence base is sufficient to vary either displacement or mortality rates between seasons, and consider that the same rates should be applied to the buffer and array area.</p> <p>In previous Hornsea Zone projects, NE have accepted a range of displacement of 30-70% and mortality of 1-10% for auks and gannets (i.e. worse-case scenario = 70% displacement and 10% mortality and best case = 30% displacement and 1% mortality in all seasons across array and buffer).</p> <p><i>NER: Present the same displacement rate across seasons and for the array and buffer combined. Propose a range and/or highlight evidence-based rates within a range.</i></p>	I	N/A	<p>This specific topic of how displacement rates have been derived, including mortality rates, was discussed during Ornithology Technical Panel meeting #5.</p> <p>The Applicant undertook a full review of this topic to inform <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> and the final ES is based on an evidence led approach, whilst also accounting for Natural England's preferred position.</p>
S42_0052_6.28	Natural England	<p>We do not agree with this approach. As noted above the SNCB guidance clearly states that: "given there is currently no empirical evidence on the impacts of displacement to seabirds, the SNCBs do not view it as appropriate at this time to apply varying mortality levels by season".</p> <p><i>NER: Mortality rates should be the same for all seasons.</i></p>	I	N/A	<p>Assessments are based on a level of impact considered most likely (breeding population). In addition, the Applicant undertook a full review of this topic to inform <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the final ES.</p>
S42_0052_6.29	Natural England	<p>NE can offer no opinion on conclusions – other than that significant effects/AEOI cannot be ruled out - about displacement impact for any species until underlying issues (adequacy of data, definition of seasons, reference population levels, background mortality rates, displacement rates, mortality rates</p>	I	N/A	<p>The Applicant notes this comment.</p>

		from displacement) are resolved. Please refer to all notes above regarding displacement and population scales.			
S42_0052_6.30	Natural England	Please refer to POINT 6.18. The comments apply equally to these tables.	I	N/A	The Applicant notes this comment.
S42_0052_6.31	Natural England	Notwithstanding the outstanding issues regarding the underpinning data and its analysis, Natural England has significant concerns regarding the high abundances of guillemot presented in this Table and elsewhere in the PEIR. These are well in excess of those recorded at other OWF sites to date. The displacement effects on guillemot have significant potential for impacts at the EIA and HRA scales, the latter given the proximity of the proposal to FFC SPA (noting that we have not yet reviewed the RIAA). Note that that during the Norfolk Vanguard examination, Natural England were unable to rule out a significant adverse effect for cumulative operational collision risk on guillemot at the EIA scale – and that this project (along with Boreas, EA1 North and EA2) is adding further affected birds to this total.  <i>NER: Detailed discussions required regarding guillemot once data/analysis issues have been addressed.</i>	I	N/A	The peak abundance for guillemot occurs mostly within a single month (Sept in Yr1 and Aug in Yr. 2) and not throughout an entire bio-season, so any such potential impacts may be overly precautionary when considering wider periods of time. This is accounted for in the updated baseline and assessments of disturbance and displacement.
S42_0052_6.32	Natural England	Note that that during the Norfolk Vanguard examination, Natural England were unable to rule out a significant adverse effect for cumulative operational collision risk on razorbill at the EIA scale – and that this project (along with Boreas, EA1 North and EA2) is adding further affected birds to this total.	I	N/A	The Applicant notes this comment.
S42_0052_6.33	Natural England	Detailed comments on the collision risk modelling methodology are provided under the Volume 5, Annex 5.3: Offshore Ornithology Collision Risk Modelling section comments. Key points that relate to the Volume 2, Chapter 5 report are: • The iteration of CRM outputs in the impact	I	Change	Full details in relation to the Collision Risk Modelling Technical Report are provided in the Applicant response to Comment ID S42_0052_6.77 to Comment ID S42_0052_6.89. The points below provide an overview of how Natural England's comments on

assessment does not align with our position/advice on CRM parameters to use;

- Only the central estimates of collision are presented. The assessment needs to consider the 95% CIs in the assessment – as these reflect where the mean estimate could lie;
- Mitigation measures are outlined to “reduce collision risk” (e.g. Co138 and Co87) – but it is not clear what the worst case scenario for collisions is within the project’s Rochdale Envelope or whether a range of options have been tested. For example, it is not clear what number of turbines and capacity of turbines has been used in the CRM models, or what turbine design options have been modelled in CRM as the worst case scenario.

We are not able to comment on the magnitude or significance of the impacts presented as we do not agree with the assessment methodology (e.g. model parameters used).

*NER: We request that the ‘model Outputs’ zip files from the sCRM runs are provided as part of the audit trail and to provide transparency for input parameters used.  
We also request a Band Model spreadsheet version for the CRM for comparison.*

Collision Risk Modelling (CRM) have been addressed.

- A revised set of CRM parameters have been utilised that align with Natural England’s position/advice. Table 1 of **Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling** presents a comparison of CRM input parameters advocated by the Applicant and Natural England / RSPB advocated parameters, illustrating whether there is agreement, partial agreement or disagreement for each input parameter. The Applicant undertook detailed consultation with Natural England, the RSPB and the MSS sCRM development team on the most suitable use of the CRM models available and the input parameters in order to ensure they are correctly accounted for. This topic was part of EPM #5, #6, #7 and #8 as well as a specific CRM / sCRM call between representatives of Natural England, the RSPB and the sCRM development team on 12th March 2020.

- Due to the precautionary nature of the impact assessment process the Applicant does not agree that use of 95% Confidence Intervals are required for the purpose of an assessment for collision risk using sCRM (which already accounts for multiple variance), though the full outputs from the sCRM will be provided for transparency in the CRM Annex.

					<p>- The Maximum Design Scenario (MDS) provides the worst case scenario for Hornsea Four (as described in the EIA Methods chapter). Collision risk has considered the maximum parameters associated with the greatest size of turbine provided by the Hornsea Four engineers, whilst the number of WTCs being considered at this stage is a maximum of 180, which is noted in the ES Chapter.</p> <p>- The Applicant has provided model outputs that are available from the sCRM and submitted these within <a href="#">Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling</a>, where appropriate.</p>
S42_0052_6.34	Natural England	<p>We do not agree it is appropriate that no assessment of migration collisions has been undertaken.</p> <p>Run migratory collision risk models for all relevant species to assess both project alone and cumulative effect. Any other relevant species, especially with links to SPAs in the 'shadow' of the OWF, should also be included, consistent with NE's advice for HOWF3.</p>	I	N/A	<p>The Applicant considered Natural England's comment and has submitted a new Annex at ES: <a href="#">Volume A5, Annex 5.5: Offshore Ornithology Migratory Birds Report</a> to provide an assessment of the migratory seabirds and non-seabirds for this project, including migratory CRMs.</p>
S42_0052_6.35	Natural England	<p>Twelve little gull collisions were predicted from previous projects, which would represent 1% of the Greater Wash SPA population if all assumed to use that marine area. More generally, this information is needed to inform assessments of cumulative impact.</p> <p><i>NER: Run collision risk model for little gull and include assessment of little gull in RIAA / shadow HRA.</i></p>	I	N/A	<p>Consideration of potential impacts on migrant seabirds (including little gull) has been completed within the updates to the impact assessment stage, including accounting for the entire migratory population of little gull in the southern North Sea, so as to be able to account for the scale of any potential impact more accurately. Updates are included within <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> of the final ES.</p>

S42_0052_6.36	Natural England	<p>We question the assertion that 'very few auks forage in the waters to the east of the Hornsea Four array area'.</p> <p><i>NER: Data from Hornsea projects 1 and 2 should be evaluated to see whether this statement can be evidenced.</i></p>	I	N/A	<p>To clarify, the statement quoted in the comment is in reference to few auks foraging beyond Hornsea Four on a regular basis during peak breeding months only. During this period, it would not make biological sense for breeding success (given energy outputs and time spent away from the nest) to regularly fly further away. This is discussed in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>
S42_0052_6.37	Natural England	<p>Welckler et al. (2017) studied nocturnal migration at small (max. 25 turbines) onshore (coastal) wind farms with a maximum rotor height of 100 m. It is uncertainty at best how this evidence translates to 180 offshore wind turbines with a maximum rotor height of 300 m, and the conclusions of negligible magnitude seem unsupported.</p> <p><i>NER: Consider lighting impacts further, including precaution where evidence is lacking. See NE advice to HOWF3 (Deadline 1 response), and OSPAR guidance (<a href="https://www.ospar.org/documents?v=33046">https://www.ospar.org/documents?v=33046</a>) on minimising lighting impacts.</i></p>	I	N/A	<p>The Applicant discussed the topic of lighting with Natural England during Ornithology Technical Panel #6, discussions of which are encapsulated in <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>. The Applicant considered lighting as a force of attraction and its additional risk to birds in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> of the final ES.</p>
S42_0052_6.38	Natural England	<p>We have ongoing concerns about the acceptability of the baseline data from HOWF3 that should be flagged in the assessment.</p> <p><i>NER: Refer to Annex C of Appendix 28 of the Deadline 4 submission by the Hornsea Three Applicant (Hornsea Project Three Offshore Wind Farm 2019).</i></p>	I	N/A	<p>The Applicant views that any data issues were dealt with through the most recent submission by Hornsea Three to PINS in July 2019 (HOW03 (EN010080) - Ornithology Baseline Data Comparison, July 2019, Niras Consulting Ltd). The additional survey data collected for Hornsea Three covering months that were missing from the DCO submission baseline provides evidence in support of the modelling work completed to estimate abundances being within a reasonable margin of error and equally precautionary for the</p>

					<p>purpose of impact assessments of collision risk and disturbance and displacement. In addition, the Secretary of State's decision letter for Norfolk Vanguard stated that "the Secretary of State considers that a robust in-combination assessment has been made in view of additional survey data provided by Hornsea Three". By utilising the additional survey data provided by Hornsea Three, we therefore also consider the approach for Hornsea Four to be robust.</p> <p>In June 2021, Hornsea Three provided to Natural England a document of Hornsea Three calculations of the effect estimates to address Natural England's concerns.</p>
S42_0052_6.39	Natural England	<p>The table appears to omit Methil, Kincardine, Scroby Sands and Gunfleet Sands OWFs.</p> <p><i>NER: Include missing OWFs.</i></p>	I	N/A	<p>The Applicant has updated Table 5.38 - <i>Projects screened into the offshore and intertidal ornithology cumulative assessment</i> to include Methil, Kincardine, Scroby Sands and Gunfleet Sands OWFs.</p>
S42_0052_6.40	Natural England	<p>We do not agree with exclusion of some of these cumulative impacts, especially:</p> <ul style="list-style-type: none"> <li>- Construction displacement</li> <li>- Gannet displacement (+ collision)</li> <li>- Gull collision risk</li> <li>- Migrant bird collision risk</li> </ul> <p><i>NER: We advise even small effects from Hornsea Four should be examined in combination. Indirect effects will need to be cross-checked, as effects to birds may be at different thresholds than the other species and habitats which they rely upon.</i></p> <p><i>Please refer to other advice provided relating to construction displacement, summation of collision</i></p>	I	N/A	<p>The Applicant discussed cumulative impacts with Natural England during Ornithology Technical Panel Meetings #5, #6 and #8.</p> <ul style="list-style-type: none"> <li>- The Applicant does not consider that there is a cumulative displacement impact from Hornsea Four with other projects during the construction phase, but the methods put forward for Norfolk Boreas have been reviewed as part of the ES Chapter work for Hornsea Four.</li> <li>- Combining estimated mortality</li> </ul>

		<p>and displacement effects for gannet, and the Norfolk Boreas DCO submission which includes a CEA for gannet displacement.</p>			<p>rates from collision and disturbance and displacement is considered by the Applicant to be overly precautionary. However, a review of how it may be most appropriate to combine these two interactive potential impacts has been considered to inform <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the final ES.</p> <p>- The Applicant has cross-checked indirect effects and since there is no significant effects from other projects, there will be no cumulative effect to consider.</p>
S42_0052_6.41	Natural England	<p>Please refer to all previous comments regarding displacement (project alone) as all apply equally at a cumulative level.</p>	I	N/A	<p>The Applicant discussed the approach to disturbance and displacement both for Hornsea Four alone and in combination with other projects in Ornithology Technical Panel Meeting #5, meeting minutes of which are encapsulated in <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</b>. The Applicant has considered suitable approaches for addressing disturbance and displacement cumulatively and updates will be included within <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the final ES. The final cumulative data was presented to Natural England for consultation through the Evidence Plan Process and discussed during Technical Panel meetings #12 and #13 (see <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</b>).</p>



# Hornsea 4



S42_0052_6.42	Natural England	<p>The recently announced 'extension' projects that have been granted seabed leases by The Crown Estate are (understandably) not included in this table.</p> <p><i>NER: 'Extension' projects should be included in Tier 3 in the submitted ES.</i></p>	I	N/A	<p>The Applicant has reviewed the status of other projects that are in line for submission to PINS ahead of or after Hornsea Four and includes the most appropriate tier in the final ES Chapter. Known extension projects, for which no data is available on offshore ornithology, then these are listed as such in the appropriate Tier.</p>
S42_0052_6.43	Natural England	<p>Please refer to our comments above on assigning sensitivity to disturbance and displacement.</p>	I	N/A	<p>The Applicant has reviewed how sensitivity is assigned to disturbance and displacement within <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> of the ES.</p>
S42_0052_6.44	Natural England	<p>We do not agree that it is appropriate to screen out gannet at this stage. Furthermore, as previously advised, displacement impacts and collision impacts should be added together for assessment of total impacts.</p> <p><i>NER: Present CEA for displacement of gannet for both EIA and HRA scale assessments.</i></p>	I	N/A	<p>The Applicant does not consider that there is a cumulative displacement impact from Hornsea Four with other projects for gannet, but the methods put forward to consider this for Norfolk Boreas were reviewed and additional assessments provided within <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> of the ES.</p>
S42_0052_6.45	Natural England	<p>Please present cumulative effects displacement matrices as opposed to selecting a single displacement rate.</p> <p><i>NER: Provide cumulative displacement matrices.</i></p>	I	N/A	<p>The Applicant has updated <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> of the ES to include a range of displacement matrices, including cumulative effects displacement matrices.</p>
S42_0052_6.46	Natural England	<p>We have ongoing concerns about the acceptability of the baseline data from HOWF3 that should be flagged in the assessment.</p> <p><i>NER: Refer to Annex C of Appendix 28 of the Deadline 4 submission by the Hornsea Three Applicant (Hornsea Project Three Offshore Wind Farm 2019): Tables 1.11, 1.15 and 1.19 for guillemot, razorbill and puffin.</i></p>	I	N/A	<p>The Applicant views that any data issues were dealt with through the most recent submission by Hornsea Three to PINS in July 2019 (HOW03 (EN010080) - Ornithology Baseline Data Comparison, July 2019, Niras Consulting Ltd). The additional survey data collected for Hornsea Three covering months that the DCO submission was missing from its</p>

					<p>baseline provides evidence in support of the modelling work completed to estimate abundances being within a reasonable margin of error and equally precautionary for the purpose of impact assessments of collision risk and disturbance and displacement. In addition, the Secretary of State's decision letter for Norfolk Vanguard stated that "<i>the Secretary of State considers that a robust in-combination assessment has been made in view of additional survey data provided by Hornsea Three</i>". By utilising the additional survey data provided by Hornsea Three, we therefore also consider the approach for Hornsea Four to be robust.</p> <p>In June 2021, Hornsea Three provided to Natural England a document of Hornsea Three calculations of the effect estimates to address Natural England's concerns.</p>
S42_0052_6.47	Natural England	<p>East Anglia One North and East Anglia Two projects are missing from these tables.</p> <p><i>NER: Data from the PEIRs (or applications should they be submitted in time) for these projects should be included here, as they have been for other species.</i></p>	I	N/A	<p>The Applicant has reviewed the status of and data from other projects to ensure the appropriate projects are considered in the relevant Tier. <b>Tables 5.40, Table 5.41, and Table 5.42 of Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the ES have been updated accordingly. This has been cross-checked up until document finalisation to ensure the most up-to-date project information is included.</p>
S42_0052_6.48	Natural England	<p>We welcome the presentation of only two seasons for guillemot and the approach of scaling up or down to calculate total abundance and a 2km buffer. However, we request that more detail is</p>	I	N/A	<p>The Applicant has reviewed the latest agreed cumulative data submitted for Norfolk Boreas and made any amends as appropriate</p>

	<p>provided in the table (or elsewhere) to indicate where and how scaling up/down has taken place.</p> <p><i>NER: Submission to provide more information regarding how values have been arrived at.</i></p>			where projects may since have made changes to their design.
Natural England	<p>Only three species have been assessed for cumulative collision impact. Our advice is to present figures for all relevant species, particularly those at high risk of impact such as herring gull and lesser black-backed gull.</p> <p>It is not clear whether using avoidance rates “most appropriate to each species” means the rates in Table 1 of the collision risk annex, which are the avoidance rates used for the HOW4 sCRM. We do not agree with these rates and therefore do not agree that the figures for other projects should be amended in this way, especially as stochastic model avoidance rates are not necessarily retrospectively applicable to traditional Band model outputs.</p> <p>Natural England also does not agree with some of the collision figures presented for projects in the cumulative totals. This results from 1) using project figures that were not ‘final’ in assessments; 2) using figures that NE disagreed with during examinations; 3) applying avoidance rates or other parameters NE disagrees with.</p> <p><i>NER: We would welcome discussion on this section at the Expert Technical Group.</i></p> <p><i>We request that cumulative collision figures for herring gull and lesser black-backed gull are presented as well as those for kittiwake, great black-backed gull and gannet.</i></p> <p><i>We also request that detailed information about the derivation of the collision figures presented for the projects in the cumulative assessments is provided (e.g. in Tables 5.43, 5.44, 5.45), including information</i></p>	I	N/A	<p>The Applicant notes this comment. The Applicant continues to follow Industry common practice whereby cumulative Collision Risk Modelling (CRM) is not undertaken in detail for species where no significant impact is predicted from a project alone. However, despite no significant impact being predicted for herring gull and lesser black-backed gull, these species were included in the Cumulative Effects Assessment CRM presented in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a>.</p>

		<p>about the avoidance rate used to generate the collision totals for each project.</p> <p>We do not agree with the CRM assessment (e.g. parameters used in the model) for herring gull and lesser black-backed gull. These species should be included within the cumulative assessment.</p>			
S42_0052_6.50	Natural England	<p>We would welcome future monitoring to determine an appropriate avoidance rate for gannet, but the APEM (2014) report cannot do this alone – partly because it is based on behaviour of just eight gannets at one OWF, and partly because observance of avoidance behaviour from aerial survey does not directly translate into a collision risk model avoidance rate.</p> <p>We do not agree with the statement that gannet collisions are overestimated. It is not correct to suggest that the figures from a considerable number of projects are based on avoidance rates as low as 95% as the figures in the cumulative assessments presented in recent OWF examinations (and used in this assessment) appear to have been updated to an AR of 98.9% for the Basic Band Model across all projects (although see comment under 5.12.2.34 as NE does not always agree with this approach).</p> <p>The TCE Headroom report (TCE 2017) is stated to provide an overall reduction of 409 to the cumulative total for gannet mortality. We do not agree that this calculation is accurate.</p> <p>We acknowledge that differences between the turbine layouts assessed and those that are constructed is an important issue with regard to cumulative/in-combination CRM predictions and assessments. However, without a legally secured reduction in the consented Rochdale Envelope, and a re-run CRM with the final design parameters, cumulative assessments should be based on consented parameters.</p> <p><i>NER: Our position on as-built layouts is that for revised collision figures based on design or build</i></p>	I	N/A	<p>- The Applicant used an avoidance rate in accordance to Natural England's advice for gannet and in accordance to the SNCBs review of avoidance rates to be applied in the Band models (JNCC et al., 2014 in response to Cook et al., 2014) of 98.9.</p> <p>The figures used within the cumulative CRM assessment were agreed with Natural England during Ornithology Technical Panel #10 as those used by Norfolk Boreas with updates provided by Hornsea Four based from projects within the planning process.</p> <p>The Applicant confirmed that any OWF development consents that have been amended are included as appropriate in accordance with Natural England's preference.</p>

		<p>changes to be accepted, it is necessary to:</p> <ul style="list-style-type: none"> <li>• Provide documentary proof that the design envelope used to calculate new collision figures is 1) legally secured with no further change possible (i.e. written confirmation from the appropriate Regulator provided); 2) the worst case scenario design envelope for collisions for each species considered for projects that are not yet built;</li> <li>• Agree with Natural England the updated CRM figures – including bird parameters used in the CRM, which CRM model/option to be used, etc.;</li> <li>• Re-run CRMs to generate updated collision figures against any agreed changes to turbine design layouts. Where this is not possible for a project because original bird density data cannot be obtained, we would need to agree whether correction ratios can be calculated (for example following an approach such as MacArthur Green (2017)) and see the full calculation details for these correction factors.</li> </ul>			
S42_0052_6.51	Natural England	<p>The WWT (2012) gannet PVA model is used to assess the significance of impacts from cumulative collision risk. As pointed out, there are a number of issues with using the WWT model in the context of a North Sea scale EIA assessment for gannet. In addition to the model not being a North Sea scale model, and not reflecting the recent growth in the gannet population, it also does not provide impact metrics that we consider are the most robust PVA metrics to use to assess population impacts – namely the counterfactual of growth rate and the counterfactual of final population size. We do not agree that use of probabilistic metrics as presented in paragraph 5.12.2.39 is appropriate. See Norfolk Vanguard advice including Relevant Representations and Deadline 8 response.</p> <p><i>NER: We suggest PVA models are re-run e.g. using NE Seabird PVA Tool.</i></p>	I	N/A	<p>The Applicant has used the Natural England PVA tool, which was released in Q1 2020, to inform the PVA modelling presented in <a href="#">Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis</a>. The topic of PVA Modelling was planned discussed in detail with Natural England during the Ornithology Technical Panel meetings #8 to #13. The Applicant's approach to PVA is outlined in <a href="#">Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis</a>.</p>
S42_0052_6.52	Natural England	<p>Note that that during the Norfolk Vanguard examination, Natural England were unable to rule</p>	I	N/A	<p>The Applicant notes this comment.</p>

		out a significant adverse effect for cumulative operational collision risk on gannet at the EIA – and that this project (along with Boreas, EA1 North and EA2) is adding further affected birds to this total.			
S42_0052_6.53	Natural England	<p>Our advice is that an avoidance rate of 98.9%, not 99.4%, should be used for kittiwake with the Basic Band model options. Hornsea Four stated its intention to use 99.4% in the Environmental Statement at the Expert Technical Group meetings – Natural England provided our advised rates. See POINT 6.50 regarding other statements.</p> <p><i>NER: Present outputs for a 98.9% avoidance rate for kittiwake alongside the 99.4% rate currently presented.</i></p>	I	N/A	The Applicant has revised the avoidance rates used for CRM to those presented in SNCB (2014), as agreed with Natural England through the Evidence Plan Process and presented in <b>Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling.</b>
S42_0052_6.54	Natural England	<p>We do not agree with the conclusions regarding the significance level of the cumulative collision estimate for kittiwake. The outputs from a PVA model submitted for East Anglia Three and subsequently re-worked for Norfolk Boreas are subject to outstanding queries and we have advised Norfolk Boreas that the PVA models need to be revisited.</p> <p>Similar comments apply as to the gannet PVA above regarding our concerns with the model.</p> <p><i>NER: We suggest running a model using the NE PVA Tool. The NE PVA tool report can be downloaded from: <a href="http://publications.naturalengland.org.uk/publication/4926995073073152">http://publications.naturalengland.org.uk/publication/4926995073073152</a> The report contains a link to the GitHub repository where there is a link to the online version of the PVA Modelling Tool. The repository also has all the code and you can flag any issues etc. encountered with the code/tool via GitHub.</i></p>	I	N/A	The Applicant has used the Natural England PVA tool, which was released in Q1 2020, to inform the PVA modelling presented in <b>Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis.</b> The topic of PVA Modelling was planned discussed in detail with Natural England during the Ornithology Technical Panel meetings #8 to #13. The Applicant's approach to PVA is outlined in <b>Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis.</b>
S42_0052_6.55	Natural England	Note that during the Vanguard examination, Natural England were unable to rule out a significant adverse effect for cumulative operational collision risk on kittiwake at the EIA scale – and that this	N/A	N/A	The Applicant notes this comment.

		project (along with Boreas, EA1 North and EA2) is adding further affected birds to this total.			
S42_0052_6.56	Natural England	See POINT 6.50 above.	N/A	N/A	The Applicant notes this comment. See the Applicant's response to Comment ID S42_0052_6.50.
S42_0052_6.57	Natural England	<p>We note the reference to a PBR undertaken at Rampion for GBBG cumulative collision and to the PVA model that was developed at EA3 to assess the potential effects of cumulative mortality on the GBBG BDMPS population (cited as EATL 2016). We do not advise use of PBR for assessing the significance of population impacts from offshore developments on seabirds.</p> <p>While a PVA modelling approach is the recommended method for assessing impacts, Natural England has outstanding queries relating to the PVA modelling undertaken for GBBG for East Anglia Three – see Relevant Representations for Norfolk Vanguard and NE's Deadline 8 response.</p> <p><i>NER: We suggest running a model using the NE PVA Tool.</i></p>	I	N/A	The Applicant has used the Natural England PVA tool, which was released in Q1 2020, to inform the PVA modelling presented in <a href="#">Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis</a> . The topic of PVA Modelling was planned discussed in detail with Natural England during the Ornithology Technical Panel meetings #8 to #13. The Applicant's approach to PVA is outlined in <a href="#">Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis</a> .
S42_0052_6.58	Natural England	Note that during the Vanguard examination, Natural England were unable to rule out a significant adverse effect for cumulative operational collision risk on GBBG at the EIA scale – and that this project (along with Boreas, EA1 North and EA2) is adding further affected birds to this total.	N/A	N/A	The Applicant notes this comment.
S42_0052_6.59	Natural England	<p>Four transects were missed in October 2017. Which – and what are the implications of this?</p> <p><i>NER: Show which transects were not completed and discuss implications. It would be helpful to see data on transect lengths, transect areas, cameras analysed and coverage in each survey month. It would be helpful to clarify if each camera stream is treated as a separate transect, or whether streams are combined within transects.</i></p>	I	N/A	The transects were in the southern 4 km buffer and additional data were analysed from transects immediately above those missed to achieve same level of coverage (approx. 10%). The Applicant has provided a figure within <a href="#">Volume A5, Annex 5.1 Offshore and Intertidal Ornithology Baseline Characterisation Report</a> to provide further explanation and detail the implications.
S42_0052_6.60	Natural England	Natural England queries if it would be possible to see QA results.	N/A	N/A	The Applicant presented QA results to Natural England and RSPB ahead

		<p><i>NER: Share QA results via the Expert Technical Group.</i></p>			<p>of Ornithology Technical Panel Meeting #9. During the meeting Natural England confirmed this resolved their query. This is captured in the meeting minutes within <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>.</p>
S42_0052_6.61	Natural England	<p>Natural England queries why design-based estimates have been used in favour of model-based estimates. MRSea models were presented pre-PEIR for the AfL, and it would be useful to compare similar models for the new development area.</p> <p><i>NER: Run MRSea models for the new development area, as was presented for the AfL, and compare precision with design-based estimates to decide on basis for assessment baseline data.</i></p>	I	N/A	<p>The Applicant provided clarification to Natural England during Ornithology Technical Panel Meeting #5 as to why design-based abundance estimates were used in the PEIR, as the standard method for all OWF projects in English waters. In addition, the Applicant has updated <a href="#">Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation Report</a> to include detailed reasoning for species where design-based techniques are used.</p> <p>During Technical Panel #11, the Applicant confirmed that, following previous consultation advice from Natural England and in addition to the use of design-based abundance estimates, MRSea will be used to produce density and abundance estimates for the seven species with sufficient data. Further, through the Evidence Plan the Applicant shared an "MRSea Modelling Methods paper" and a draft of <a href="#">Volume A5, Annex 5.6: Offshore Ornithology MRSea Annex</a> for consultation with Natural England and RSPB. These documents were discussed during Technical Panel meetings #12 and 13, and updated to reflect Natural England's advice. This is captured in the meeting minutes within <a href="#">Volume B1, Chapter</a></p>



					1.1: Consultation Report Annex 1 Evidence Plan.
S42_0052_6.62	Natural England	It is not clear if abundance estimates for species in Appendix A include those birds not identified to species level and apportioned accordingly.  <i>NER: Clarify the nature of the data presented in Appendix A.</i>	I	N/A	The abundances within the Appendices of <b>Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation</b> are for all birds recorded and have precision / confidence intervals. It is not possible to provide precision/confidence intervals for post-apportioned abundances, so therefore they are not included.
S42_0052_6.63	Natural England	See comments on Volume 2, Chapter 5 (5.7.4) and elsewhere  <i>NER: Use seasons set out in Furness et al (2015)</i>	I	N/A	The Applicant has taken this comment into consideration and has undertaken a full review of the applicable BDMPS bio-seasons and associated populations to inform <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the final ES.
S42_0052_6.64	Natural England	Natural England queries how the maps of distribution were produced. There is no information on methods used.  <i>NER: Clarify methods used for distribution maps.</i>	N/A	N/A	The Applicant provided an explanation of how the heat maps were compiled during Ornithology Technical Panel #5. This is captured in the meeting minutes within <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</b> . The Applicant has included a more detailed methodology within <b>Volume A5 Annex 5.1: Offshore Ornithology Baseline Technical Report</b> .
S42_0052_6.65	Natural England	Natural England queries how flight direction data will be analysed and used. We have concerns about flight height data used (see comments on Collision Annex)  <i>NER: Clarify use of directional data. Flight height data comments in collision annex comments.</i>	I	N/A	A complete set of monthly rose diagrams providing flight direction for the key species is included within <b>Volume A5, Annex 5.1 Offshore and Intertidal Ornithology Baseline Characterisation Report</b> .  Following consultation with Natural England it was agreed that flight height data from Johnston et al., (2014) would be used for assessing

					impacts from collision risk to seabirds within the ES.
S42_0052_6.66	Natural England	<p>We have some concerns with the method of deriving population estimates for the buffers in isolation from the array area, because a) it reduces the amount of data used for estimation; b) it does not allow confidence limits around estimates to be summed; and c) when deriving mean seasonal peaks, estimates from different months may be selected from the different areas.</p> <p><i>NER: Produce estimates for array, array + 2km buffer, and array + 4 km buffer instead of separately for each area.</i></p>	I	N/A	<p>The final DCO array area (plus applicable corresponding buffers) population estimates are presented in <a href="#">Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation</a> following the methodology as advised by Natural England.</p> <p>It should be noted that for seven species (fulmar, gannet, kittiwake, great black-backed gull, guillemot, razorbill and puffin) MRSea analysis was undertaken to derive population estimates as detailed in <a href="#">Volume A5, Annex 5.6: Offshore MRSea Report</a>, as agreed with Natural England through the Evidence Plan Process.</p>
S42_0052_6.67	Natural England	<p>Precision is poor for all key receptors: with the exception of occasional guillemot estimates, it never reaches the &lt;0.16 threshold of Thaxter &amp; Burton (2010).</p> <p><i>NER: Test the adequacy of data used, by analysing data from additional cameras in a selection of relevant months to show effect of increasing data on precision estimates for key receptors.</i></p>	I	N/A	<p>The Applicant has followed Natural England's recommendations and undertaken additional camera analysis for a selection of months, agreed with Natural England via email correspondence as of 11/11/19, to evaluate the robustness of data. During Ornithology Technical Panel meeting #9 on 21/04/20, Natural England agreed with the findings of the preliminary report based on 4 months. The Applicant shared the final report (based on 7 months) entitled "The relationship between aerial survey coverage and bird data metrics at Hornsea Four" by email on 18/05/20. In Technical Panel #11 on 15/07/20, Natural England confirmed they are content to progress with the original two camera dataset for the Hornsea Four</p>

					DCO application. In addition, during Ornithology Technical Panel meeting #13 on 23/11/20, Natural England and RSPB agreed they are confident in the Hornsea Four baseline data characterisation. This is captured in the meeting minutes within <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a> .
S42_0052_6.68	Natural England	<p>Precision may improve when considering array + buffer estimates. If so, these may offer more robust density estimates for impact assessment.</p> <p><i>NER: Consider using density estimates from array + buffer for impact assessment (e.g. for CRM inputs) if precision is improved.</i></p>	I	N/A	<p>Following consultation with Natural England, MRSea analysis was undertaken to improve confidence in the baseline data that underpins the impact assessments. For key species MRSea analysis was undertaken to derive density estimates which incorporates data from the entire AFL area. Further details of the MRSea analysis can be found in <a href="#">Volume A5, Annex 5.6: Offshore Ornithology MRSea Report</a>.</p> <p>Densities of birds outside of the array area are not considered appropriate for certain assessments, particularly CRM. Further explanation is provided within <a href="#">Volume A5, Annex 5.1 Offshore and Intertidal Ornithology Baseline Characterisation Report</a>.</p>
S42_0052_6.69	Natural England	Please refer to the comments Natural England have provided on the main chapter.	N/A	N/A	The Applicant notes this comment.
S42_0052_6.70	Natural England	<p>We request that matrices are presented as the array area PLUS the appropriate buffer (in this case 2km for all species). The SNCB guidance is quite clear on this point:</p> <p>'Matrix tables should be presented with and without appropriate buffer data included, to allow for future changes in understanding regarding buffer zones and effects' (SNCB 2017)</p>	I	N/A	The Applicant has reviewed the assessments of displacement and the array area and 2 km buffer matrices as presented within <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a> . The assessments broadly follow Natural England's guidance and as stipulated in the guidance note the use of the latest evidence for different species

		<p>Natural England continue to advise that the same displacement and mortality rate should be applied to both array and buffer areas (as per SNCB 2017 guidance), and hence see no value in the presentation of separate matrices for the 1km and 2km buffers.</p> <p><i>NER: Present revised matrices in line with SNCB guidance.</i></p>			<p>of interest with respect to differing levels of potential displacement within sites and / or varying scales of buffers will also be accounted for as best practice.</p>
S42_0052_6.71	Natural England	<p>Please refer to our comments on:</p> <ul style="list-style-type: none"> <li>• calculating monthly abundance for the array area and 2km buffer;</li> <li>• the use of appropriate seasons;</li> <li>• the presentation of matrices of annual displacement.</li> </ul> <p><i>NER: Present matrices using mean peak abundances calculated for the array area plus the 2km buffer and present these</i></p>	I	N/A	<p>The Applicant has presented displacement matrices within <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a> for relevant bio-seasons and appropriate buffers.</p> <p>The Applicant has also presented displacement matrices based on the annual population estimates for each displacement assessments within the main body of the ES for the array area plus a 2 km buffer.</p>
S42_0052_6.72	Natural England	<p>See comments on main chapter regarding RTD SeaMast data.</p>	I	N/A	<p>The Applicant discussed an appropriate method to quantify and assess red-throated diver density and abundance within the Hornsea Four Export Cable Corridor (ECC) with Natural England on a one-to-one basis. The Applicant presented a document summarising this methodology in Ornithology Technical Panel Meeting #9 and Natural England agreed it was an appropriate approach. This is captured in the meeting minutes within <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>. The final outcome is presented within <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex</a></p>

					<b>5.2: Offshore Ornithology Displacement Analysis.</b>
S42_0052_6.73	Natural England	<p>Natural England are surprised to learn that the displacement matrices derived from the 24 months of digital aerial data collected to inform the impact assessment for Hornsea Four 'may or may not' be used to form the basis of assessment for EIA and HRA purposes.</p> <p><i>NER: Provide clarification on this point via the Expert Technical Group, and if alternative methods are being considered, please outline these.</i></p>	I	N/A	The baseline data is to be used and relied upon for the purpose of the EIA and HRA process. This sentence was in reference to the fact that multiple different matrices with different bio-seasons (shorter / longer) were included as well as matrices with different degrees of buffers too. A refinement process will take place for <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a> of the final ES, but the source data will remain that from the 24 months of site-specific aerial digital survey data.
S42_0052_6.74	Natural England	<p>Natural England strongly recommend using the seasons clearly advised within the BDMPS report (Furness 2015). The annex contains a number of matrices of 'bio-seasons' that do not have corresponding BDMPS, and hence are not required or appropriate.</p> <p>Further as noted in the annex 'Each species is subject to different months being considered to be part of different bio-seasons as well as the number of bio-seasons varying also.' We request that the months being included in each season for each species are clearly noted in the legend of each matrix and Table 2.</p> <p><i>NER: Revisit Furness (2015) to follow recommendations accurately, using the seasons marked in bold.</i></p> <p><i>(We note that due to the nature of monthly data collection Puffin seasons may need to be interpreted as Breeding = April – July, and non-breeding = August – March).</i></p>	I	N/A	The Applicant has based their bio-seasons on those presented by Furness (2015), with an evidence led approach using site-specific data to ensure all bio-seasons correspond to correct months. The months that make up each bio-season have now been, at Natural England's request, added to the relevant table in <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a> of the final ES.
S42_0052_6.75	Natural England	As noted, we consider that a number of these matrices are not appropriate (buffers	I	N/A	The Applicant has updated <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a> with a range

		<p>alone/incorrect seasons), and that crucial ones are missing – array plus 2km, annual totals.</p> <p>In addition, we note that monthly abundances are calculated as a mean with associated confidence intervals. The matrices presented are derived from mean monthly abundance alone and we request that the matrices are presented of the upper and lower confidence intervals, so that the full range of effect scenarios can be understood.</p> <p><i>NER: Remove inappropriate matrices (buffers alone, incorrect seasons) Insert required matrices (array plus 2km, annual totals, mean of peak derived from upper and lower confidence intervals).</i></p>			<p>that includes buffers of the array area plus a 2 km buffer, following Natural England's recommendation. The matrices have been updated to present each species across all seasons. However it is not the Applicant's plan to incorporate additional overly-precautionary or under pre-cautionary assessments that contain the upper and lower confidence intervals around abundances within displacement matrices.</p>
S42_0052_6.76	Natural England	<p>The annex does not contain matrices of the cumulative displacement effect. We advise these are presented.</p> <p><i>NER: Present cumulative effects matrices for relevant species.</i></p>	N/A	N/A	<p>The displacement analysis within <a href="#">Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis</a> incorporates a range of matrices for the array area and buffers surrounding it only.</p> <p>The Applicant has presented cumulative displacement matrices within the mainbody of the ES.</p>
S42_0052_6.77	Natural England	<p>We welcome the use of the Marine Scotland sCRM model, however it is important that sufficient confidence is provided that the sCRM is operating correctly and the outputs are accurate.</p> <p><i>NER: We recommend that the 'model Output' files for the sCRM runs are shared to provide a robust audit trail, and further that outputs using the same parameters generated from the deterministic Band Model (SOSS version) are also presented.</i></p>	I	N/A	<p>The Applicant carried out a joint call between Natural England, the RPSB and the developers behind the MSS (2018) sCRM on 12/03/20 to discuss the intricacies of the model. Following this, the Applicant undertook a series of tests to compare the outputs of the Band (2012) CRM and MSS (2018) sCRM in order to ensure that agreement was reached on the appropriateness of the model for use in OWF EIAs. Natural England replicated the tests and found the same results. This culminated with NE and the RSPB</p>

					providing agreement during Ornithology Technical Panel Meeting #9 that the use of the MSS (2018) sCRM is suitable for the purpose of determining collision for OWFs when used deterministically. The sCRM, therefore, has been used in the final impact assessments to inform <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume 5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a> of the ES.
S42_0052_6.78	Natural England	<p>We agree with the list of species selected for the main CRM analysis. We agree that it is not necessary to undertake CRM for fulmar based on no impact pathway for collisions with turbine blades due to flight height behaviour. However, we do not agree with the decision to carry out no migratory CRMs.</p> <p><i>NER: As noted in the main comments, migratory CRM is required for a range of species.</i></p>	I	N/A	<p>The Applicant is pleased that Natural England agree with the species selected for the main CRM analysis.</p> <p>The Applicant has undertaken CRM modelling for migratory seabirds, waterbird species and other bird species with the rationale, methods and results presented in <a href="#">Volume A5, Annex 5.5: Offshore Ornithology Migratory Birds Report</a>, for selected species as agreed through the Evidence Plan Process.</p>
S42_0052_6.79	Natural England	<p>It is not clear what boat-based surveys are being referred to and how these data have been used to derive a PCH value for use in the Hornsea Four CRM.</p> <p><i>NER: There is an urgent need to clarify exactly what boat-based site specific surveys have been used, and how PCH values have been derived from these data for use in CRM for the 5 species. We seek discussion on this point at the next Expert Technical Group.</i></p>	I	N/A	<p>The Applicant notes this comment and has provided details of the site-specific surveys used to derive the PCH values in <a href="#">Volume A5, Annex 5.3 Offshore Ornithology Collision Risk Modelling</a>. However, it must be noted that these data sources are not used for the basis of assessing collision risk, as the generic flight height data</p>

					from Johnston el at (2012) underpins the impact assessments in the ES.
S42_0052_6.80	Natural England	<p>PCH values derived from boat-based datasets have been used with Option 3 in the sCRM for kittiwake, lesser black-backed gull, Herring gull and great black-backed gull. Using Option 3 in this way is stated to be "as per Statutory Body advice (JNCC et al., 2014 in response to Cook et al., 2014; Bowgen &amp; Cook, 2018)."</p> <p>That is not correct. The Natural England (and SNCB) position is that we do not advise use of the Extended Band Model (including Option 3) when the baseline data have been collected via digital aerial surveys but the flight height data are derived from boat-based surveys.</p> <p><i>NER: Option 3 cannot be used for CRM with the data as presented, and, given the uncertainty regarding the Option 1 PCH, we advise that any conclusions regarding collision mortality should be based on Option 2 outputs.</i></p>	I	N/A	<p>The Applicant has not undertaken collision risk modelling using Band Option 3 for the DCO Application.</p> <p>PCH values within the sCRM have been derived from generic flight height data from Johnston el at (2012), which underpins the impact assessments in the ES.</p>
S42_0052_6.81	Natural England	<p>We query the PCH values derived from the "boat-based surveys" – in particular the use of 0.5% PCH for kittiwake.</p> <p>Across the Hornsea projects Natural England has raised issues with the boat-based flight height methods and data and our position has been to look at the Option 2 outputs as a result of concerns that we have regarding the boat data on flight heights. With specific reference to what was agreed at the ETP on 11.06.19, we note that in response to Hornsea Four's stated intention to use Option 1 outputs, Natural England advised we have 'ongoing concerns about flight height data based on boat-based surveys so are likely to raise this concern and continue to recommend focussing on Option 2'.</p> <p><i>NER: As noted above, there is an urgent need to clarify what boat-based surveys have been used –</i></p>	I	N/A	<p>PCH values within the sCRM have been derived from generic flight height data from Johnston el at (2012), as agreed with Natural England, which underpins the impact assessments in the ES.</p>



		<p>and in this context how the value of 0.5% PCH for kittiwake has been arrived at.</p>			
S42_0052_6.82	Natural England	<p>Avoidance rates (ARs) and Standard Deviations (SDs) are as advised in SNCB (2014) for gannet (although see comment re SD); and Bowgen and Cook (2018) ARs (for use with sCRM) for all other species for both Basic and Extended Option ARs. However the SDs used with the ARs for these species (in Table 1) do not come from Bowgen and Cook (2018), and it is not clear how these have been derived.</p> <p><i>NER: Clarity is required regarding how the SDs used in Table 1 have been arrived at.</i></p> <p><i>The SNCBs are currently reviewing Bowgen and Cook (2018) and will publish updated advice on ARs and SDs for use with the sCRM when the review is complete. Natural England advises that the ARs in SNCB (2014) should be used until the updated advice is published.</i></p> <p><i>Furthermore, we note that the ARs and/or SDs in any updated advice may not match those used in Table 1 for all species – therefore it cannot be assumed that the SNCB update will necessarily align.</i></p> <p><i>We also note that the sCRM requires a SD, and therefore there would be a need to convert the 2SD in SNCB (2014) to a SD, rather than use the 2SD figure (which appears to have been done)</i></p>	I	N/A	<p>The Applicant's CRM estimates in <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> and <b>Volume A5, Annex 5.3 Offshore Ornithology Collision Risk Modelling</b> are based on the avoidance rates from SNCB (2014) as agreed with Natural England through the Evidence Plan Process.</p>
S42_0052_6.83	Natural England	<p>We accept the actual values used for body length and wingspan (taken from Birdfacts). However, the SDs used are cited as from "Marine Scotland (2018)", which is not in the references. We assume this is referring to values that are pre-populated in the sCRM Shiny app. However, we are not clear where these SD values have been derived from or if they are supported by evidence.</p> <p><i>NER: We request that the submission ES either justifies use of the prepopulated SDs or presents some that are based on evidence from literature or other sources.</i></p>	I	N/A	<p>After further consultation on this topic through the Evidence Plan Process, it was concluded that the most precautionary approach would be to simply run without variability due to the uncertainty of how the SDs were calculated as proposed in the feedback note provided by Natural England titled '<b>309535 Hornsea 4 Ornithology NE Advice CRM parameters</b>'.</p>

<p>S42_0052_6.84</p>	<p>Natural England</p>	<p>Flight speeds are used that have typically been used in CRM (i.e. from Pennycuik/Alerstam) for all species apart from kittiwake, where 13.1 m/s Alerstam value typically used is substituted for a 7.26 m/s (+/- 0.4) attributed (in Table 2) to Masden (2015). It is not clear why the flight speed figure has changed only for kittiwake, or why the Masden (2015) figure has been selected over any other source.</p> <p>Masden (2015) provides a worked example for the first coding of a sCRM, using kittiwake as the example species. The flight speed data used for the kittiwake worked example comes from “the RSPB FAME project and were collected using GPS tags”. Masden (2015) does not provide any further details of how the flight speed figure was derived. We query why this particular data on flight speed has been selected as opposed to any other reference source. Additionally the SD for the kittiwake flight speed figure in Masden (2015) is cited as 1.47 (or rounded to 1.5) so it is not clear where a SD of 0.4 is derived from, although Alerstam gives a flight speed of 13.1 (SD 0.4) for kittiwake. The text also refers to Skov et al (2018) but the flight speed figure for kittiwake in Skov is 8.71 m/s, with a SD of 3.16 to reflect the large amount of variation that was recorded. Note that there are no SDs for gannet provided in Pennycuik (1987, 1997). The sCRM appears to have utilised 0 as a SD value (mean 14.9 m/s)? This appears somewhat inconsistent, as the sCRM seems to have utilised SD information for kittiwake from alternative sources. We note that Skov et al (2018), which is cited for kittiwake, gives data for gannet as 13.33 m/s SD 4.24.</p> <p><i>NER: We accept that there are now additional sources of data available which include information on flight speeds (e.g. from seabird tracking studies) and that a review is needed of appropriate flight speeds and variability around these to use for Collision Risk Modelling.</i></p> <p><i>However, we advise that the Pennycuick (1987,</i></p>	<p>I</p> <p>N/A</p>	<p>The Applicant undertook a full review of the use of the MSS (2018) sCRM to determine collision risk and consulted on this through Ornithology Technical Panel Meetings #8 and #9, taking NE's comments into consideration. This included a full review of the source data and references that may be used for each species on flight speeds and associated Standard Deviations to inform <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a>. The Applicant intends to run the sCRM using an evidence led approach, whilst also providing a separate set of CRM outputs in accordance with NE's own parameters, including those for flight speeds, which have been agreed through the Evidence Plan Process.</p>
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		1997) and Alerstam et al. (2007) published figures (also used in Cook et al. (2014)) should be used until a full review of all evidence sources has been undertaken.			
S42_0052_6.85	Natural England	<p>Garthe and Hüppop (2004) are cited as the source for all species in Table 2 except kittiwake. This is somewhat misleading, as it appears to ‘translate’ Garthe and Hüppop (2004) to be 0% NAF for gannet and 25% NAF for large gulls Garthe and Hüppop (2004) score species 1-5 where 1 denotes “hardly any flight activity at night” and 5 “much flight activity at night”.</p> <p>Band (2012) translated these scores to percentages: 0% (1), 25% (2); 50% (3), 75% (4) and 100% (5). Gannet scores 2 in Garthe and Hüppop (2004). So whether you defer to Band (2012) or to the original Garthe and Hüppop scores it seems difficult to justify a NAF of 0% for gannet from these references.</p> <p>Large gulls and kittiwake score 3 in Garthe and Hüppop (2004) – translated to 50% NAF by Band (2012). The text states that the NAF should be 25% for large gulls – which again does not align with the references cited in Table 2.</p> <p>For kittiwake, the assessment uses 0.033 (NAF of 3.3%) with a SD of 0.0045, which is cited as Masden (2015). Masden (2015) gives the sources as “RSPB telemetry data (breeding season only)”.</p> <p>The text then states that more recent evidence sources have been used to derive NAFs in Table 2 (contrary to the Table footnote), although the exact process and data sources are not clear.</p> <p><i>NER: Given the uncertainty as well as variability in the data on activity levels (both during the daytime and during night), We advise that collision risk outputs covering a range of nocturnal activity factors are considered to account for the uncertainty /variability (in the same way as has been recommended for bird densities, avoidance rates and flight heights). The suggested range of nocturnal flight activities to be</i></p>	I	N/A	<p>The Applicant undertook a full review of the use of the MSS (2018) sCRM to determine collision risk and consulted on this through Ornithology Technical Panel Meetings #8 and #9, taking NE's comments into consideration. This included a full review of the source data and references that may be used for each species on nocturnal activity factors to inform <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a>. The Applicant has run the sCRM using an evidence led approach, whilst also providing a separate set of CRM outputs in accordance with Natural England's own parameters, as agreed through the Evidence Plan Process.</p>

		<p>considered within the Band model CRM are:</p> <ul style="list-style-type: none"> <li>• Gannet: 1-2 (equating to 0-25% nocturnal activity)</li> <li>• Kittiwake: 2-3 (equating to 25-50% nocturnal activity)</li> <li>• Large gulls: 2-3 (equating to 25-50% nocturnal activity)</li> </ul> <p>As there are no SDs associated with these, we advise that the sCRM will have to be run twice with each NAF separately (e.g. 25% and 50% for kittiwake) and SD set to 0.</p>			
S42_0052_6.86	Natural England	<p>This section is confusing. It seems to refer to the process by which a PCH value has been derived for use in CRM.</p> <p>Given that flight heights are recorded across a range of tidal heights the assumption is that the flight heights recorded from surveys can be assumed to relate to heights relative to MSL, which we accept. However the text about how PCH relative to MSL was then calculated is unclear.</p> <p>If the assessment is referring to the HPZ, HOW1 and HOW2 boat based data from 2010-2013 then it was collected in height bands that were to the nearest 5m e.g. 0m, 5m, 10m, 15m etc. When the data were processed they were assigned to height bands so that 0m was assumed to equate to 0-2.5m, 5m = 2.5-7.5m, 10m = 7.5-12.5m etc.</p> <p>We have previously questioned the accuracy and precision of these figures (during the examinations of HOW1, HOW2 and HOW3). Birds were not assigned in the field to 32.5-37.5m – they were recorded as at 30m or 35m, and then 30m was assumed to relate to birds at 27.5-32.5m and 35m to 32.5-37.5m. We do not agree that a bird can accurately be assigned to 30m or 35m height at sea, and further that a bird at 30m can then be assumed to be precisely at 27.5-32.5m.</p> <p>Further we are not clear how the calculation of the</p>	I	N/A	<p>The Applicant notes Natural England's comment and revised Section 2.2.4.2 of <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a>, regarding how Potential Collision Height (PCH) relative to MSL is calculated, to provide clarity.</p> <p>However, the Applicant has run the sCRM using an evidence led approach making use of site-specific flight height data and those from Johnston et al (2014), whilst also providing a separate set of CRM outputs in accordance with Natural England's own parameters, as agreed through the Evidence Plan Process at technical panel #8 and these data are the source of impacts assessed for collision risk in the ES.</p>

number of records in the 32.5-37.5m band equates to the PCH value, as birds in higher flight bands would also be at collision height and therefore should contribute to the PCH value.

The 32.5-37.5m band would have been birds recorded as 35m – so we consider that birds recorded at 30m would have also been indistinguishable against a 32.57m hub height. Accordingly the 27.5-32.5m band should be considered to be potentially PCH – in the context set out above it isn't valid to say that given the bottom of the rotor swept area is at 32.57m relative to MSL, that birds assigned to 27.5-32.5m during post processing of the flight data are not potentially at collision risk.

The text also equates a value of 35m against LAT to be 32.57 against MSL, but it is unclear how this has been calculated. The Tidal Offset is given as 4.71m, but also referred to as 2.28, 4.71 and 2.43 elsewhere.

We also note that a SD for the site specific flight height data has not been derived – although this should be possible.

*NER: We request clarification of how the PCH values used in the Option 1 CRM were derived, as well as how the LAT values have been calculated and which tidal offset figure has been used.*

*We continue to have significant reservations about the use of Option 1 outputs, which have been intensified by this section. We note that the 0.5% PCH value presented is considerably lower than both the corresponding value from Johnson et al as well as that used elsewhere e.g. at Hornsea 1. In this context, Natural England will in all likelihood base our assessments on Option 2 CRM outputs and advise the Examiners to do the same.*

S42_0052_6.87	Natural England	<p>The “SDs” of density used in the CRM are calculated from the mean of the 2 density estimates from Yr1 and Yr2. The density estimate for each year is a mean (with a variance) of a sample – and then it seems the 2 means (Yr1 and Yr2) are simply averaged and a SD calculated for these two mean values? Are the variances similar for each year? Are the means assumed to be independent between years?</p> <p><i>NER: We would welcome discussion of the methods used to derive SDs for CRM, and refer to earlier comments relating to model-based estimates. Generating monthly density estimates from model-based approaches should incorporate spatial-temporal variability and allow monthly density predictions with associated variability estimates.</i></p>	I	N/A	<p>The Applicant undertook a full review of the way in which SDs of density used in the sCRM are calculated to inform <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a> of the final ES.</p> <p>A revised method was proposed and agreed with NE as appropriate for use in the sCRM during Ornithology Technical Panel Meetings #5 and #8. This is captured in the meeting minutes within <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>. The method for the final agreed approach is summarised in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a>.</p>
S42_0052_6.88	Natural England	<p>We query some of the wind turbine parameters that have been used in the sCRM, for the following reasons:</p> <ol style="list-style-type: none"> <li>1. There is no information about the number of turbines that have been modelled or the MW capacity of these;</li> <li>2. There is no evidence provided that the parameters modelled represented a worst case scenario for the design envelope options;</li> </ol> <p><i>NER: We request further details about the turbine parameters used in collision risk modelling and clarification that these represent the worst case scenario Rochdale Envelope for the proposed development.</i></p>	Y	Change	<p>Hornsea Four uses the Maximum Design Scenario (MDS) in place of the Worst-Case Scenario (WCS), which is explained further in <a href="#">Volume A1 Chapter 5 Environmental Impact Assessment Methodology</a>. The MDS is outlined in <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> which includes 180 WTCs used to assess collision. This is based on the largest number (180) or the largest available WTC in the design, but no MW capacity is referenced as the focus is on the design and not the energy outputs.</p>
S42_0052_6.89	Natural England	<p>We note that the second iteration of the sCRM (0) incorporating input parameters currently advocated for use by SNCBs uses NAFs that do not include the</p>	I	N/A	<p>The Applicant compiled a complete list of sCRM input parameters in a paper entitled “2. Hornsea Four CRM</p>

		<p>variability that we have accepted (i.e. 0-25% GX and 25-50% for other spa). We highlight that this approach was adopted during the Norfolk Vanguard hearings, as communicated to Orsted during the June 2019 ETG.</p> <p>Note also that the "SD" cited for the NE ARs are 2SDs. It is not clear what values have been used in the CRM.</p> <p>Note that we do not accept Extended Band Model for any species if the flight height data comes from boat data and the density from digital aerial data (DAS). Orsted are suggesting that Natural England accepts the Extended Band Model outputs for large gulls, where both flight height and bird density data is derived from DAS, but this is not the case for Hornsea Project 4 data.</p> <p><i>NER: Natural England's input parameters should be accurately presented in future iterations of the Annex and elsewhere in the ES.</i></p>			<p>Parameters &amp; sCRM Test" and shared with Natural England ahead of Technical Panel #8. CRM input parameters were discussed in detail with Natural England and RSPB through the Evidence Plan Process and their own position of what input parameters they consider most appropriate is captured within the meeting minutes within <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan. Table 1 of Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling</a> presents a comparison of CRM input parameters advocated by the Applicant and Natural England / RSPB advocated parameters, illustrating whether there is agreement, partial agreement or disagreement for each input parameter. Modelling results are presented for both the Applicant's approach and the SNCB approach in <a href="#">Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling</a>.</p>
S42_0068_001	RSPB	<p>Regrettably, the large number of documents has presented significant challenges in getting to grips with the information presented. We are disappointed to note that despite the attempts to reduce the size of the assessment documents using a proportionate approach that this has not been carried through to all areas of the assessment process. In particular, we highlight the approach to disturbance and displacement and collision risk adopted in the Report to Inform the Appropriate Assessment where large quantities of text for each species in each SPA considered could have been reduced to a limited set of explanatory text setting out the approaches adopted coupled with the presentation of the key numbers in a tabulated</p>	N/A	N/A	<p>The Applicant acknowledges that a large number of documents were presented at PEIR. Given the importance of and risks associated with the topic of ornithology, there is still a large volume of information that is vital to include, despite the proportionate approach. However, the Applicant has continued to take a proportionate approach at ES stage, where feasible in order to reduce the scale of documents in the DCO Submission where possible.</p> <p>The Applicant has adopted a more</p>

		<p>form. This would have made the information significantly more accessible as well as removing a significant amount of text. We encourage the project team to address this point before the submission of the Development Consent Order application.</p> <p>Given the extensive amount of information that parties have had to scrutinise in order to respond to these consultations we urge the Hornsea Four project team to give careful consideration to effective signposting of changes in the versions of the documents that are submitted to accompany the DCO application. We consider this to be a logical extension of the proportionate EIA approach being advocated by the Hornsea Four project team.</p>			<p>proportionate approach to dealing with species from multiple SPAs in order to reduce the scale of the RIAA and provide a clear and concise assessment of risk when considering the appointment of potential impacts and effects across them all. This topic was concluded as part of the Evidence Plan Process and subsequent updates on this position are summarised in ES and RIAA. The Applicant has taken Natural England through the changes made between PEIR and ES.</p>
S42_0068_002	RSPB	<p><b>Offshore and Intertidal Ornithology (Volume 2, Chapter 5) Paragraph 5.3.1.8:</b></p> <p>The reference to the Conservation of Habitats and Species Regulations 2010 is incorrect and should refer to the Conservation of Habitats and Species Regulations 2017.</p> <p><b>Paragraph 5.3.1.9:</b> The reference to the Offshore Marine Conservation (Natural Habitats &amp;c.) Regulations 2007 is incorrect and should refer to the Conservation of Offshore Marine Habitats and Species Regulations 2017.</p> <p><b>Figure 5.1:</b> The Scoping Area reduction of Hornsea Four and the proposed PEIR Array Area: we note the inclusion of this figure. However, we consider that it would have been helpful to have included the “heat map” of bird distribution which informed this reduction in size.</p> <p><b>Paragraph 5.5.1:</b> We welcome the decision to reduce the Developable Area of the offshore wind farm and note that this removes the highest areas of bird usage from the scope of the scheme. However,</p>	N/A	N/A	<p>The Applicant notes the repetition, referencing and labelling errors within the PEIR and has updated <b>Volume A2, Chapter 5: Offshore and Intertidal Ornithology</b> of the ES accordingly.</p> <p>The Applicant acknowledges the concerns raised by RSPB with regards to the potential impacts on ornithological receptors.</p> <p>The Applicant is pleased that RSPB welcomes the inclusion of 24 months survey in order to characterise the bird usage of the area.</p> <p>The Applicant notes RSPB's comment regarding heat maps. However, as multiple phases of the Developable Area Approach have been undertaken since Scoping, further updates to the heat maps were not included to reduce any confusion.</p>



		<p>we still have significant concerns about the extent of potential impacts.</p> <p><b>Paragraph 5.6.2:</b> We welcome the inclusion of 24 months survey in order to characterise the bird usage of the area.</p> <p><b>Paragraph 5.11.1.37:</b> This incorrectly labels the annex dealing with displacement to red-throated diver arising from cable laying as Annex 5.3, collision risk modelling.</p> <p>Paragraph 5.11.2.111: We note that this paragraph is repeated verbatim in paragraphs 5.11.2.112 and 5.11.2.113</p>			<p>However, heatmaps were presented at Evidence Plan Meeting #11 to provide a visual representation for the rationale behind the reduction in developable area to Natural England and the RSPB.</p> <p>Heatmaps are also provided for the DCO array area and 4 km buffer in <a href="#">Volume A5, Annex 5.1: Offshore and Intertidal Ornithology Baseline Characterisation Report</a> for applicable seasons for each species of interest.</p>
S42_0068_3.1	RSPB	<p><b>Offshore Ornithology Collision Risk Modelling Operational Impacts and Annex 5.3</b></p> <p>The applicant has used, following advice from Natural England and the RSPB, the newly developed stochastic Collision Risk Model (sCRM), (McGregor et al., 2018) in order to assess the mortality arising from collisions. While acknowledging that it was impossible for the Applicant to predict, we note that an issue has been found in comparing the outputs of the sCRM with the original Band 2012 model version and described in the website supporting the sCRM model version1. Unless this issue is resolved we request that the applicant subsequently presents both the sCRM and Band 2012 model outputs in the ES.</p> <p><b>Paragraph 2.1.4.2:</b> It is incorrect to say that presentation of Option 3 of the Band model follows SNCB advice. The current advice is as detailed in SNCB 2014 is that it is not appropriate to use this option for kittiwake.</p> <p><b>Paragraph 2.2.2:</b> The avoidance rates used for kittiwake, lesser black-backed gull, herring gull, and great black-backed gull are not in alignment with those recommended by the SNCBs and RSPB, as</p>	I	N/A	<p>The Applicant has reviewed the use of the MSS (2018) sCRM to determine collision risk and consulted on this through Ornithology Technical Panel Meetings #8 and #9, taking RSPB's comments into consideration. This included a full review of the source data and references for all the input parameters used for each species and associated Standard Deviations. The Applicant also carried out a joint call between NE, the RPSB and the developers behind the MSS (2018) sCRM on 12/03/20 to discuss the intricacies of the model. Following this, the Applicant undertook a series of tests to compare the outputs of the Band (2012) CRM and MSS (2018) sCRM in order to ensure that agreement was reached on the appropriateness of the model for use in OWF EIAs. Natural England replicated the tests and found the same results. This culminated with NE and the RSPB providing agreement during Ornithology Technical Panel</p>

		<p>described in the evidence plan process, and will likely lead to an underestimate of collision risk for these species. The avoidance rates presented are derived from Bowgen &amp; Cook (2018) which relates to a single site and largely non-breeding birds. As such these rates are not appropriate for this site.</p> <p>The avoidance rate used for gannet differs from that recommended by the RSPB for use during the breeding season. Whilst the RSPB accepts the SNCB's recommended amendment to the gannet AR (from 98% to 98.9%) for non-breeding birds, we do not agree that this figure should be applied to the breeding season due to the lack of available evidence relating to breeding birds. The reason for the difference between Natural England and the RSPB in their preferred avoidance rates for gannet is that</p>			<p>Meeting #9 that the use of the MSS (2018) sCRM is suitable for the purpose of determining collision for OWFs when used deterministically. The sCRM will therefore be used in the final impact assessments to inform <a href="#">Volume A2, Chapter 5: Offshore and Intertidal Ornithology</a> and <a href="#">Volume A5 Annex 5.3: Offshore Ornithology Collision Risk Modelling</a> of the ES.</p> <p>The Applicant intends to run the sCRM using an evidence led approach but will present modelling results for both the Applicant's approach and the SNCB approach in <a href="#">Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling</a>.</p>
S42_0068_3.2	RSPB	<p>the avoidance rate review carried out by the BTO for gannet was almost entirely based on birds outside the breeding season</p> <p>Paragraph 2.2.3.3: We do not agree with the amended flight speed for kittiwake used in the collision risk model. This is based on non-breeding birds at a single site and it is unclear whether or not it can be used at other sites during all stages of the breeding cycle.</p> <p>Paragraph 2.2.3.4: We do not agree with the changes in Nocturnal Activity Factor (a parameter used in collision risk modelling) proposed. These factors were derived from the expert opinion collected by Garthe and Huppopp (2004) and this use is endorsed by Band (2012). A review of seabird vulnerability to offshore wind farms (Furness et al., 2013) recommended that no changes be made to the nocturnal activity scores for these species, and an update, including the same authors (Wade et al., 2016) maintained this recommendation.</p>	I	N/A	<p>The Applicant compiled a complete list of sCRM input parameters which was shared with the RSPB through the Evidence Plan Process, ahead of Technical Panel meeting #8 on 27/02/20. During the meeting, the Applicant discussed every parameter with Natural England and RSPB - see the meeting minutes in <a href="#">Volume B1, Chapter 1.1: Consultation Report, Annex 1: Evidence Plan</a>. Natural England also confirmed their position on Hornsea Four's proposed Collision Risk Model parameters via written correspondence on 15/05/20. RSPB were in accordance with Natural England's advice. The Applicant and Natural England are in agreement on</p>

<p>S42_0068_3.3</p>	<p>RSPB</p>	<p>It is also not clear how these revised rates account for the distinction between the definition of daylight as used in the Band model and with the official concept of 'twilight' and 'night'. This is an issue as the Band (2012) model considers the nocturnal period as between sunset to sunrise and so treats flight activity that occurs at twilight as being within the nocturnal flight period. Evidence from tagging shows that an important number of seabirds actively forage at twilight.</p> <p>We are also concerned that the mortalities predicted using revised nocturnal activity rates are potentially underestimated because they do not account for the potential interaction between survey timing and diurnal behavioural patterns. Peaks in foraging activity at first and last light (see for example Fig. 3 in Furness et al. 2018) will not be accounted for in the assessment if these did not coincide with surveys, and the survey may have been carried out at a time of much lower activity. Thereby the application of these revised nocturnal activity factors could result in inaccurate underestimates of collision risk.</p> <p>The RSPB welcome the presentation of "SNCB" iterations of sCRM in Appendix 2 of Annex 5.3 but note that these should have been taken forward into the main body of the reports, not the values arising from modelling using the Applicants preferred parameters, which we disagree with as detailed above.</p> <p>Because in the limitations of the collision risk modelling approach, we are unable come to a conclusion with regards to the magnitude of collision impact on kittiwake, gannet, herring gull and great black-backed gull. Furthermore, in order to understand the nature of these impacts the Applicant should have carried out Population Viability Analysis</p>	<p>I</p>	<p>N/A</p>	<p>all parameters apart from gannet flight speed values, nocturnal activity factors for the mean estimates and the use of Johnston et al, (2014) 95% CI flight height data for calculating the minimum and maximum collision risk estimates. The alternate gannet flight speed values preferred by Natural England and RSPB are considered in a Second CRM Iteration in <a href="#">Appendix A of Volume A5, Annex 5.3: Offshore Ornithology Collision Risk Modelling</a>.</p>
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<p>S42_0068_00 4</p>	<p>RSPB</p>	<p><b>Displacement</b></p> <p>While we acknowledge that matrices are presented in Annex 5.2 of Volume 5, that these should also be presented in the main report. The SNCBs recommendation to present such matrices is based on the considerable uncertainty in the assessment of displace effects and therefore the necessity to show a range of possible outcomes. It is also desirable that not only derived from mean monthly abundance are shown but that the matrices are presented of the upper and lower confidence intervals are also presented.</p> <p>Without the context of up to date and robust Population Viability Analysis, it is impossible to reach conclusions on the magnitude of displacement impacts on guillemot, razorbill and puffin, as, in particular for guillemot, the predicted mortalities are very high (up to 1136 birds from mean monthly abundance).</p>	<p>N/A</p>	<p>N/A</p>	<p>The displacement impact assessments in the ES follow the guidance set out in The joint SNCB Displacement advice note (SNCB 2017), with the exception of including upper and lower confidence limit displacement matrices.</p> <p>The Applicant also notes the request for the use of PVAs to assess potential impacts at the population level for a range of seabirds. The topic of PVA Modelling was discussed in detail during Ornithology Technical Panel meetings #8 to #13 and the Applicant's approach to PVA is outlined in <a href="#">Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis</a></p>
<p>S42_0068_00 5</p>	<p>RSPB</p>	<p><b>Cumulative impacts</b></p> <p>We do not agree with the magnitude of cumulative displacement effects on guillemot, razorbill or puffin as up to date and robust Population Viability Analysis has not been carried out to explore the population scale impacts of the predicted mortalities.</p> <p>We do not agree with the conclusions with regard to magnitude of collision impact on gannet, kittiwake and great black-backed gull, because, as discussed above, we do not agree with parameterisation of the sCRM for calculation of the predicted mortalities from Hornsea 4 Furthermore, up to date and robust Population Viability Analysis has not been carried out to explore the population scale impacts of the predicted mortalities. The assessment for all three species states that a number of projects listed used lower avoidance rates. However, the data shown is that presented by Norfolk Vanguard, whereby</p>	<p>N/A</p>	<p>N/A</p>	<p><b>Cumulative Impacts</b></p> <p>The Applicant acknowledges that the RSPB views the cumulative displacement effects on guillemot, razorbill or puffin as not up to date. The Applicant has undertaken a review of all magnitudes within the ES and updated accordingly.</p> <p>The Applicant notes the request for the use of PVAs to assess potential impacts at the population level for a range of seabirds and this has been addressed in a new annex presented at ES: <a href="#">Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis</a>.</p>

collision estimates were adjusted to account for more recent advice with regard to Avoidance Rates. The Applicant is also incorrect in stating in 5.12.2.47 that an avoidance rate of 99.4% was agreed with Natural England during the evidence plan process: the value recommended by Natural England was 98.9%.

The Natural England PVA tool was released in Q1 2020 – this has now been used by the Applicant to inform the PVA modelling presented in [Volume A5, Annex 5.4: Offshore Ornithology Population Viability Analysis](#). The topic of PVA Modelling was planned discussed in detail with Natural England during the Ornithology Technical Panel meetings #8 to #13.

The Applicant acknowledges the RSPB disagrees with the magnitude of collision impact on gannet, kittiwake and great black-backed gull. As a result, the Applicant has consulted on the use of the sCRM and what Natural England and the RSPB consider to be their preferred input parameters through the Evidence Plan Process. The Applicant compiled a complete list of sCRM input parameters which was shared with the RSPB through the Evidence Plan Process, ahead of Technical Panel meeting #8 on 27/02/20. During the meeting, the Applicant discussed every parameter with Natural England and RSPB - see the meeting minutes in [Volume B1, Chapter 1.1: Consultation Report, Annex 1: Evidence Plan](#). Natural England also confirmed their position on Hornsea Four's proposed Collision Risk Model parameters via written correspondence on 15/05/20. RSPB were in accordance with Natural England's advice. [Table 1 of Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling](#) presents a

					<p>comparison of CRM input parameters advocated by the Applicant and Natural England / RSPB advocated parameters, illustrating whether there is agreement, partial agreement or disagreement for each input parameter. Modelling results are presented for both the Applicant's approach and the SNCB approach in <a href="#">Volume A5 Annex 5.3 Offshore Ornithology Collision Risk Modelling</a>.</p> <p>Discussions from the Evidence Plan Process are encapsulated in meeting minutes, presented in <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a>.</p>
S42_0068_009	RSPB	<p><b>Commitments for Offshore Ornithology</b></p> <p>The RSPB welcomes commitment 86 (that the offshore export cable corridor route will avoid the Greater Wash SPA, Flamborough and Filey Coast SPA and the Flamborough Head SAC).</p> <p>The RSPB notes commitment 87 (reduction of the proposed developable area). We note that the intention is to "avoid areas with the highest concentrations of birds". Whilst we welcome this reduction we are concerned that important areas for birds still remain within the revised developable area, particularly adjacent to the areas that have now been excluded.</p> <p>The RSPB notes commitment 88 (construction and operational maintenance vessels will avoid high concentrations of rafting red-throated diver between their port of origin and the array area), although given the acknowledged distances of sensitivity of red-throated diver we consider that this commitment is likely to be difficult to operate in practice.</p>	Y	Change	<p>The Applicant notes this comment. The updated Commitments Register can also be found at <a href="#">Volume A4, Annex 5.2: Commitments Register</a>.</p>

		<p>The RSPB notes commitment 1.38 (minimum lower air draft of wind turbines will be a minimum of 35m above Mean Sea Level). Whilst this is likely to reduce the potential collision risk arising from the scheme (as with similar measures set out in the deemed marine licences for Hornsea Two and Hornsea Three) we consider (as highlighted above) that despite this measure the impacts are likely to be too severe for it to be possible for the scheme to avoid an adverse effect on the integrity of the Flamborough and Filey Coast SPA.</p>			
S42_0068_010	RSPB	<p><b>Assessment of Adverse Effects</b></p> <p>We disagree with the statement that the assumptions in the assessment process "contribute to the predicted impacts and potential effects being considered overly precautionary".<sup>3</sup> For example a number of times the comments seem to conflate the mean of peaks with maximum number. Taking the mean of peaks is a reasonable realistic approach in assessing the population within a bio season given that there is likely to be considerable variation in abundance over the lifetime of the wind farm and that the two years survey are only a snapshot of these numbers. This variation will most likely result in some years actual abundance being much higher, as well as other years being much lower. It is unhelpful to continually claim over precaution when precaution is a proportionate response to the considerable uncertainty inherent in the assessment process.</p> <p>We note with concern that in the assessments for each species for each SPA that an approach has been adopted that seeks to diminish the population that falls to be assessed. Whilst we accept that the population of birds will vary according to time both between and within various elements of the species' breeding cycles serves to downplay the numbers of birds which may be impacted by the Hornsea Four scheme.</p>	N/A	N/A	<p>The Applicant notes the RSPB's comments, though we still consider that assessments for OWFs do include multiple layers of precaution that may contribute towards significant overestimates of potential impacts, especially when combining multiple OWFs into cumulative assessments.</p>

		We note that for gannet, although both displacement and collision impacts are assessed, that contrary to SNCB advice, these impacts are not combined for assessment of total impact.			
S42_0068_011	RSPB	<p>Question 1 – Impact and Effect Register Are all potential impacts associated with the relevant receptor correctly identified within the Impacts/Effects Register and aligned with the Hornsea Four Scoping Opinion and therefore clearly setting the scope of the PEIR?</p> <p>The RSPB has restricted its consideration of receptors to ornithological features. We consider that the appropriate receptors have been identified, but we have set out our concerns about how the potential impacts upon those receptors have been evaluated.</p>	N/A	N/A	The Applicant notes these comments.
S42_0068_015	RSPB	<p>Question 4 – PEIR &amp; Technical Report Do you agree with the scope of the EIA at PEIR and the simple/detailed assessments?</p> <p>We have restricted our consideration to the potential ornithological impacts. We have elaborated our concerns with the scope in our detailed comments upon the PEIR and the RIAA.</p>	N/A	N/A	
S42_0068_008	RSPB	<p><b><u>The Report to Inform the Appropriate Assessment Offshore ornithological impacts</u></b></p> <p>This area represents the RSPB’s greatest concern. Whilst we welcome the decision to reduce the Developable Area of the offshore wind farm we note that whilst this removes the highest areas of bird usage from the scope of the scheme there are still significant levels of birds encountered across the scheme area and consequently we remain concerned about the extent of potential impacts to,</p>			The Applicant notes the concerns raised by RSPB and has continued to engage through the Evidence Plan process on ornithological assessment, impact significance and the Report to Inform Appropriate Assessment (RIAA), through Technical Panels #5 - #13 held between PEIR and DCO submission (see <a href="#">Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan</a> ).



in particular, the Flamborough and Filey Coast SPA. We note the reservations expressed by Natural England in relation to likely cumulative impacts on guillemot, razorbill, gannet (point 6.52) and kittiwake (points 6.31, 6.32, 6.52 and 6.55 of Natural England's response to the PEIR). Given the much closer proximity of Hornsea Four to the Flamborough and Filey Coast SPA, and the fact that it will fall to be considered after Hornsea Three and Norfolk Vanguard we doubt that it will be possible to avoid an adverse effect on integrity on this SPA. We note the number of SPAs that have been screened in for assessment, especially for collision risk. Given our comments above, we are concerned to note that after assessment that all of these sites, including the Flamborough and Filey Coast SPA, have been excluded.

The Applicant welcomes RSPB's observation that the reduction of the Developable Area has removed the highest areas of bird usage from the scope of the scheme, and notes that the further reduction in the array area adopted for the Environmental Statement (ES) and DCO application has further removed a high area of bird usage from the scope of the scheme. See [Volume A1, Chapter 3: Site Selection and Consideration of Alternatives](#) and [Volume A4, Annex 3.2: Selection and Refinement of the Offshore Infrastructure](#) for full details of the evolution of the array area.

## EIA topic area: Commercial Fisheries

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0031_001	Holderness Fishing Industry Group (HFIG)	<p>Our main concern is the lack of information presented with regards to the fisheries that our members target. HOW04 is in an area that the offshore fleet use to target Edible Crab predominantly with smaller catches of lobster.</p> <p>The offshore surveys cited, from which assumptions were made, were from surveys deploying gear types that are not typical for collecting edible crab samples (<a href="#">Volume 5, Annex 3.1</a>).</p> <p>Trammel nets and trawls will not accurately represent the population size of edible crab or lobster in the area. There was no evidence presented that reflects effort into understanding the</p>	I	N/A	<p>Relevant statutory stakeholders were consulted via the Marine Ecology &amp; Processes Evidence Plan process and it was agreed the focus of fish and shellfish assessment, as detailed in <a href="#">Volume 2, Chapter 3 of the ES: Fish and Shellfish Ecology</a>, would be primarily on herring and sandeel, as these species are considered to be the most sensitive receptors in the region.</p> <p>Cefas provided additional information for scallops, crab, lobster and Nephrops which is included in</p>

		<p>baseline for the offshore edible crab and lobster populations. The offshore crab grounds act as feeder grounds for the whole crab fishery. Whether via the seasonal migration patterns, offshore to inshore over the summer months and vice versa or as spawning grounds for larval release. Whilst the addition of additional hard substrate may enhance the edible crab populations, the noise and vibration of wind turbines may present disruption to settling larvae of the species.</p> <p>The chapter states an absence of berried crab observed, with the sampling regimes deployed it is highly unlikely to observe berried crab as they have low motility during the brood period. It is mentioned that there is not a need for a monitoring programme during the construction and operational phase for edible crab and lobster. We would like to see a monitoring programme commissioned as the evidence presented to make this decision is not sufficient to make an accurate decision.</p>			<p><b>Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report</b> (see technical panel meeting four, <b>Volume B1, Chapter 1.1: Consultation Report Annex 1 Evidence Plan.</b></p> <p>Disturbance impacts to shellfish, such as crab and lobster, are expected to be limited during construction and maintenance activities on a very localised scale. More specifically, noise from operational turbines is of a very low level and spatial extent from each turbine. Due to the distance between turbines, there will be no overlap in any area of effect, and as such it is not expected that there will be any detrimental impacts on spawning grounds or settlement of larvae. As such, no monitoring has been proposed.</p> <p>However, the Applicant is committed to supporting HFIG via the East Coast Fisheries Research Fund, should Consent be awarded.</p>
S42_0031_002	HFIG	<p>The extent and importance of the commercial crustacean fisheries in the Holderness that are susceptible to the effects of HOW04 are well documented in the PEIR based on the evidence presented. As discussed in the PEIR, the pitfalls of using VMS data and NEIFCA sightings can lead to an underestimation of the fleet size and vessels working in the area. Of the 63 boats that are HFIG members, only 5 are &gt; 15 m in length and subject to mandatory VMS. NEIFCA jurisdiction only extends to 6 nm, therefore their sightings will not consider most of the gear outside of this range, and some offshore vessels do not mark their gear on the surface.</p>	I	1o	<p>Data limitations are clarified in the VMS potting and sightings data figures presented in <b>Volume A5, Annex 3.1: Fish and Shellfish Ecology Technical Report.</b></p> <p>The Applicant will continue to take steps to minimise the effects upon the fishing industry in the area through appropriate mitigation where required. Relevant commitments (Co90, Co95, Co180) are detailed in</p>

		<p>The effects of displacement of both potters and mobile gear vessels from the sight during the 36-month construction period, we feel are underestimated. HFIG members often have gear conflict with mobile gear vessels, spatial restriction due to construction of HOW04 is likely to increase these gear type interactions. Additionally, the vessels operating in the array area, whilst low in number, operate large numbers of pots. This displacement of effort will put additional stress on both the target population and the other vessels operating in the area.</p>			<p><b>Volume A4, Annex 5.2: Commitment Register</b></p> <p>This includes a commitment to developing a Fisheries Coexistence and Liaison Plan (<b>Volume F2, Chapter 9: Outline Fisheries Coexistence and Liaison Plan</b>). The Applicant will continue to work with HFIG and their members to minimise any impacts to their members.</p>
S42_0031_003	HFIG	<p>Lessons learnt from one development are not always directly transferrable to another development. Whilst we appreciate the PEIR acknowledging the work done by HFIG and Orsted for the Westernmost Rough, this survey was focusing on the inshore lobster fishery. The offshore crab fishery in the array area and the inshore/mid and offshore fisheries along the export cable corridor may respond differently to the development. As stated above, we would like to see some form of monitoring programme as part of the development to assess the potential effects of the development.</p>	I	N/A	<p>Disturbance impacts to shellfish, such as crab and lobster, are expected to be limited during construction and maintenance activities on a very localised scale. More specifically, noise from operational turbines is of a very low level and spatial extent from each turbine. Due to the distance between turbines, there will be no overlap in any area of effect, and as such it is not expected that there will be any detrimental impacts on spawning grounds or settlement of larvae. As such, no monitoring has been proposed.</p>
S42_0048_002	NEIFCA	<p>Also, within this report, our sightings data is displayed in Figure 38 and referenced a number of times. While it points out in section 7.7.1.14 of the shorter commercial fisheries report the limitations of the data set, it is worth highlighting again that without factoring for patrol vessel effort, the displayed data will not fully indicate the level of intensity. Bridlington is our biggest port and the intensity of effort south of Flamborough is likely higher than that occurring in North Yorkshire, a point</p>	Y	N/A	<p>This comment is noted by the Applicant and has updated the assessment as appropriate (<b>Volume A5, Annex 6.1: Commercial Fisheries Technical Report</b>).</p>

		not easily acknowledged given how the data is presented.			
S42_0048_003	NEIFCA	<p>Of particular concern, however, is the potential impacts on brown crab spawning, primarily within the wind farm array. Previous work undertaken by Eaton is noted within the fish and shellfish technical report (3.5.1.6, 3.5.1.9), however potential impacts are not discussed in the spawning and nursery ground section of the report. I also cannot see reference to any planned shellfish potting or larval surveys.</p> <p>I understand that there is a fisheries technical group associated with the project, which is attended by NE, Cefas and MMO. Perhaps this group would be an appropriate forum to discuss this.</p>	Y	N/A	<p>This comment is noted by the Applicant and has updated the assessment in <a href="#">ES Volume A2, Chapter 3: Fish and Shellfish Ecology</a> as appropriate to justify why impacts to brown crab spawning and nursery grounds will not be significant within the array and along the cable corridor. Surveys are not considered necessary as the location of spawning and nursery grounds are already understood, and any impacts are assessed as not significant in ELA terms. To clarify, impacts are only considered in the <a href="#">ES Volume A2, Chapter 3: Fish and Shellfish Ecology and Chapter 6: Commercial Fisheries</a>. Impacts are not considered within the Technical Report for any receptor.</p>
S42_0061_001	NFFO	<p><b><u>Commercial Fisheries Assessment</u></b></p> <p><u>Applying Magnitude Criteria</u></p> <p>Magnitude criteria appear to have been defined as applying to the footprint of the project area, yet for example the assessment of the impact "Physical presence of Hornsea Four array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds (CF-O-8)", the magnitude for trawl and dredge fisheries refers to the greater levels of activities taking place elsewhere and therefore a minor impact magnitude is recorded. It is not explained in the methodology what is the relevance of vessels obtaining their catches from elsewhere in relation to the criteria.</p>	I	N/A	<p>The justification cited is of relevance to the sensitivity assessment. The magnitude assessment justification has been reviewed and updated in <a href="#">Volume 2, Chapter 6: Commercial Fisheries</a>, and the cited text has been added to the sensitivity justification.</p>
S42_0061_002	NFFO	<p><u>Construction Phase</u></p>	I	N/A	<p>Further detail and justification on displacement of potting gear from</p>

		<p>The assessment of impact "Displacement from Hornsea Four array area leading to gear conflict and increased fishing pressure on adjacent grounds (CF-C-3)" with reference to potting only considers the displacement of trawl activities on to potting grounds and not potting activities into remaining potting grounds. This latter effect does not appear to have been considered (7.11.1.42, p67).</p>			<p>within the array area into grounds already targeted by potters is provided in <a href="#">Volume 2, Chapter 6: Commercial Fisheries</a>.</p>
S42_0061_003	NFFO	<p><u>Operational and Maintenance Phase</u></p> <p>The assessment assumes that fishing will resume around and between infrastructure within the Hornsea Four array area where possible, with the exception of an assumed 50m operating distance from infrastructure, areas of cable protection, and safety zones around infrastructure undergoing major maintenance.</p> <p>With respect to the SoCG for Hornsea Three between Ørsted and NFFO/VisNed, this states that:</p> <p>The assessment assumes that fishing can resume within the project boundaries, to an extent i.e. out with safety zones, advisory safety distances and assumed operating distances. Furthermore, the assessment considers that "the individual decisions made by skippers with their own perception of risk will determine the likelihood of whether their fishing will resume within the Hornsea Three array area. Inclement weather will be a significant contributor to this risk perception".</p> <p>We consider that the current assumption for Hornsea Four does not reflect a worst case scenario for the purposes of completing the impact assessment and that in the case of mobile twined gear activities, the worst case scenario is that fishing will not take place within the wind farm array.</p> <p>We also note that 7.11.2.41 states that "It is considered likely that fishermen would operate</p>	I	N/A	<p>The Applicant acknowledges certain gear types including pelagic trawl, twin rigged trawls and demersal seine / fly shooting will not be practically deployed within the operational array. This has been clarified within the assessment (<a href="#">Volume 2, Chapter 6: Commercial Fisheries</a>) in line with the Statement of Common Ground for Hornsea Three.</p> <p>The term "Appropriate" is interpreted as avoiding the indicated infrastructure and cable protection at the defined location.</p> <p>The Applicant is a member of FLOWW and has been involved in the development of the FLOWW cables document, which outlines both developers' and fishermen's position on fishing within the vicinity of cables and cable protection. Locations of cable protection will be communicated to the fishing industry.</p>

appropriately given adequate notification of the locations of any snagging hazards; and are highly likely to avoid the infrastructure and cable protection within the Hornsea Four array area.”

Can Ørsted therefore clarify what is meant by the term “appropriate” with respect to the access to fishing activities within the site. We understand that Ørsted is a member of the European Sub Sea Cables Association (ESCA) which has issued a position statement entitled “ESCA Statement on vessels operating in the vicinity of subsea cables”. Can Ørsted therefore clarify its position with respect fishing in the vicinity of cables, and under what circumstances it would seek legal redress for damages to cables due to fishing operations under the Continental Shelf Act and whether or not it subscribes to the ESCA position statement?

With reference to the following:

- Physical presence of Hornsea Four array area leading to gear snagging (CF-O11).
- Physical presence of the export cable and associated infrastructure leading to gear snagging (CF-O-12).

Whilst we observe that these impacts could have an impact on fishing businesses due to damages to gears and associated costs, the more significant issue is related to safety. In this regard we consider that safety risk should be assessed using approaches used in the Shipping and Navigation PEIR in line with MCA guidance and based on the IMO FSA process in order to determine that sufficient controls are in place to be judged as acceptable or tolerable.

How does the impact assessment assess emergency response capability with respect to incidents occurring within the vicinity of the array?

<p>S42_0061_00 4</p>	<p>NFFO</p>	<p><u>Cumulative Effects Assessment</u></p> <p>The assessment does not currently include fisheries or spatial management measures such as associated with Marine Protected Areas that are likely to impact on fleet sectors operating in the vicinity of the project area.</p> <p>We have concerns that prior completed projects may have impacts upon commercial fisheries that may be borne by the fleet but are assumed to have been accounted for in the baseline. This assumes that the fleet has perfected adapted to previous impacts.</p> <p>In addition, no guidance is provided in the methodology on how an assessor is able to judge when incremental losses of fishing ground become significant. In particular, the sensitivity criteria in the underpinning methodology is open to subjective interpretation with respect to the extent of fishing ground affected i.e. the difference between limited, moderate and extended physical extent. • The CEA draws on other EIAs to inform magnitude but is not clear whether other EIAs have applied the criteria in the same way as the current assessment. Furthermore, it is not clear how magnitude of impact for other projects has been combined to inform the overall magnitude of impact in the CEA. We have noted above that we consider a worst case scenario to be that certain towed gear types may effectively be excluded from the site. There is not yet evidence that we are aware of that demonstrates a significant return of bottom towed gear activities to fish within operational UK wind farm sites. • In order to ensure transparency and allow stakeholders and decision-makers to verify the results of the CEA, presentations of fishing activity data and projects and proposals included the CEA should be included. • As it stands, without the above issues being</p>	<p>Y</p>	<p>N/A</p>	<p>The Applicant acknowledges the comment and has amended the cumulative assessment to include marine protected areas (<a href="#">Volume 2, Chapter 6 Commercial Fisheries</a>). Cumulative Effects Assessments follows the standard methodology with respect to whether a project is considered within the baseline or not.</p> <p>The Applicant acknowledges that the fishing industry does not instantly adapt to a wind farm site once it becomes operational, however The Applicant do their utmost to minimise impacts and assist the fishing industry to adapt to the 'new normal' through data sharing and development of a Fisheries Coexistence and Liaison Plan in consultation with the NFFO.</p>
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addressed it is not possible for us to effectively consider the validity of results of the CEA.

## EIA topic area: Shipping and Navigation

Comment ID (consultation _ response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0036_001	ABP	<p>Several of our commercial port users, inter alia Finnlines plc, Finland, have requested that we raise concerns with you, as they have the potential to impact directly upon the accessibility of our ports to our trading partners in continental Europe. We therefore raise these issues as potential matters of concern but are sure that they can be resolved as part of the ongoing consultation process. In particular we are aware that you have been separately liaising with DFDS on the routings of their Immingham to Esbjerg, Immingham to Gothenburg and North Shields to Ijmuiden services but we would make the point that the same issues of re-routing these ships around the proposed wind turbine array exist for other shipping lines accessing Scandinavia, Denmark, the Baltic Sea and Russia.</p> <p>We have reviewed your PEIR document and it is obvious that some effort has been expended in articulating the potential impact of the proposal on commercial shipping. We do however wish to raise some concern over the degree to which the commercial impact of your proposal has been assessed. We recognise the commitment in paragraph 8.11.2.23 to consult further on this matter and would agree with you that there is still a potential for the project to have 'commercial consequences.'</p> <p>We presume, therefore, that you will be liaising further with stakeholders specifically representing</p>	I	N/A	<p>Regular operator consultation has been undertaken with limited response from operators undertaking routes to Scandinavia and Eastern Europe. Using this consultation as input, the Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments (see <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a>). This commercial impact is considered transboundary, given the international nature of the shipping routes involved transiting between the UK and other EEA ports.</p> <p>In response to consultation undertaken at PEIR, an additional round of pre-application consultation with regulator operators, shipping and navigation industry stakeholders and statutory bodies was undertaken in 2020 where mitigation options were presented and discussed.</p> <p>The Applicant has subsequently committed to mitigating commercial transboundary impacts to the shipping industry through a reduction</p>



		<p>merchant shipping interests and that these commercial consequences will be investigated in much more detail. We would furthermore request that a view is taken on the additional carbon footprint of the proposed vessel re-routings as an increased journey distance and time will not just necessarily result in increased fuel consumption, but also equate to a consequential uplift in carbon emissions. Given that the main purpose of the project is to reduce the UK's dependence upon fossil fuels and assist with the overall decarbonisation of the UK economy, we hope that you will consider this issue in more detail.</p> <p>We note with interest the close liaison work that has taken place between Dutch authorities and the merchant shipping sector in negotiating navigational routing solutions for their offshore wind farms and do wonder whether there may be some useful parallels that could be drawn for this situation.</p> <p>In summary, therefore, we are grateful for the opportunity to be consulted on this important project, and are in favour of the overall agenda to capitalise on wind energy in the North Sea. We do of course support the Hornsea 4 project in general terms, but would like further clarity on the impacts upon merchant shipping, and the mitigation measures that you refer to in your PEIR document (paragraph 8.11.2.26.) We would therefore anticipate that further discussions would presumably need to take place in order to further establish routing baseline data and potential solutions</p>			<p>in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a>.</p>
S42_0039_001	Trinity House	<p>I can confirm that Trinity House has the following general comments to make at this stage:</p> <ul style="list-style-type: none"> <li>We would welcome a joint meeting with the MCA, to discuss the NRA and its accordance with MGN543 in due course.</li> </ul>	I	Io	<p>Consultation with Trinity House and the Maritime and Coastguard Agency to discuss compliance with MGN 543 was undertaken in February 2020. Both organisations have been provided a draft MGN 543 compliant</p>

- To assist the safety of surface vessels navigating in or close to the project, Trinity House would prefer structures to be positioned creating multiple lines of orientation and at the very least continue the single line of orientation with Hornsea One and Two (on adjacent boundaries). However, if a sufficient “corridor” is provided between the Hornsea Four and Hornsea One and Two sites, the lines of orientation need not be continuous as Hornsea Four will appear to the mariner as a completely separate site.
- Any effect the project may have on current aids to navigation provision, both onshore and offshore should be considered.
- Any cable protection works which reduce charted clearance depths by >5% should be brought to our attention and risk assessed on an individual basis.
- Any work lighting should be switched off, unless work is being carried out, in order that the conspicuity of marine aids to navigation lighting is not diminished.
- With reference to aviation lighting, Trinity House request that you seek the approval of the CAA for all required aviation lighting to exhibit synchronised red Morse Code “W” light characteristics.
- Going forward into potential Examination, we would wish for a Statement of Common Ground to be produced between us.
- I have attached our standard navigation conditions, which we would expect to be provided for within your DCO/DML.

Navigational Risk Assessment prior to DCO application for review.

The effect of applying a single line of orientation upon the safety of surface navigation and search and rescue helicopter capability will be further assessed and justified through the submission of a detailed safety justification as per the MGN 543 guidance. This safety justification will be discussed and agreed with the Maritime and Coastguard Agency and Trinity House alongside the DCO examination process.

Further, the Applicant commits to agree layout principles with MCA. This is supported by project commitment (Co96) as detailed in [Volume A4, Annex 5.2: Commitment Register](#).

Existing aids to navigation are considered in Section 18.10 of [Volume A5, Annex 7.1: Navigational Risk Assessment](#). Aids to navigation (marking and lighting) will be deployed in accordance with the latest relevant available standard industry guidance and as advised by Trinity House, MCA and Civil Aviation Authority (CAA) and MoD as appropriate. This will include a buoyed construction area around the array area and the HVAC booster station in consultation with Trinity House. This is supported by project commitment (Co93) as detailed in [Volume A4, Annex 5.2: Commitment Register](#).

		<ul style="list-style-type: none"> <li>Could you please forward the relevant updated shape files for this project?</li> </ul>			<p>Where scour protection is required, MGN 543 (or latest relevant available guidance) will be adhered to with respect to changes greater than 5% to the under keel clearance in consultation with the Maritime and Coastguard Agency. This is supported by project commitment (Co8.1) as detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p> <p>The Applicant confirms a Statement of Common Ground with Trinity House will be developed in advance of DCO application.</p>
S42_0040_001	Maritime & Coastguard Agency (MCA)	<p><b><u>Proportionate Approach</u></b></p> <p>The Navigation Risk Assessment (NRA) currently states that 'a Formal Safety Assessment (FSA) has not been undertaken within the NRA. Instead impacts have been assessed within Volume 2, Chapter 8: Shipping and Navigation'. The MCA understands that this is part of the proportionate approach adopted by Orsted.</p> <p>The MCA require the FSA methodology to be used as a template for preparing NRAs and we would like reassurance that the proportionate approach undertaken by the applicant still ensures that all MCA requirements are addressed and assessed as appropriate in line with MGN 543, and are provided to MCA as part of the application process. At this stage, the MCA is not clear on the changes we can expect to see as part of the 'proportionate approach'. We note however that no shipping and navigation aspects have been scoped out of the EIA approach, which we support. We also note that the NRA will be expanded for the final ES that will accompany the final DCO application, including outputs from a vessel-based traffic survey to be</p>	I	N/A	<p>All outstanding information is provided in <a href="#">Volume A5, Annex 7.1 of the ES: Navigational Risk Assessment</a> with which the Maritime and Coastguard Agency has been consulted on. A Hazard Workshop was undertaken on 27 June 2019, the outputs of which were used to inform environmental impact assessment. The finalised Hazard Log is included in <a href="#">Volume A5, Annex 7.1 of the ES: Navigational Risk Assessment</a> as well as additional vessel traffic survey data, consultation, collision and allision risk modelling.</p> <p>The proportionate approach to EIA aims to ensure the Environmental Statement does not duplicate information but does not diminish the information provided to the MCA at DCO application.</p>

		undertaken in July/August 2019, further consultation and collision and allision risk modelling.			
S42_0040_00 2	MCA	<p><b><u>Navigation Risk Assessment and MGN Checklist</u></b></p> <p>We note that the radar observations for the summer peak were not completed to inform the PEIR NRA submission. Therefore, at present we cannot reply on the NRA as a true reflection of the current vessel traffic operating in and around the area. However, we know there are plans in place to collect this data and ensure it is provided in the application NRA submission accordance with MGN 543, noting “A vessel-based traffic survey for the summer period will be undertaken in July/August 2019 and the outputs will be fed into the final NRA submitted alongside the ES, thus ensuring the baseline shipping activity assessment is compliant with MGN 543”.</p> <p>With regards to the statement in section 5.4 of the NRA that “specific agreement was given by the MCA [and TH] for the use of an AIS only dataset for characterising vessel movements within the Hornsea Four offshore ECC shipping and navigation study area (excluding where this intersects the Hornsea Four HVAC booster station shipping and navigation study area). Consequently, there will be limitations with the data associated with non-AIS targets.</p> <p>And with regards to the statement in section 7.1 of the NRA “As agreed with the MCA (see Table 8.3 in Volume 2, Chapter 8: Shipping and Navigation), and in line with standard practice, a vessel-based traffic survey of the sections of the Hornsea Four offshore ECC outside of the Hornsea Four HVAC booster station search area shipping and navigation study area was not required.</p> <p>The MCA would like to make it clear that these approvals were purely for the purposes of the PEIR submission, taking account of the time constraints.</p>	I	N/A	<p>Additional vessel traffic survey data was collected to ensure compliance with MGN 543 and informed the baseline description described in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a>.</p> <p>Given that some elements of the Navigational Risk Assessment were incomplete at PEIR stage (e.g. vessel traffic survey data and allision risk modelling), the MGN 543 checklist was omitted. An MGN 543 checklist is included however in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> which the Maritime and Coastguard Agency have been consulted on. Consultation with Trinity House and the Maritime and Coastguard Agency to discuss compliance with MGN 543 was undertaken in February 2020. Both organisations were provided a draft version of the MGN 543 compliant Navigational Risk Assessment prior to DCO application.</p>

		<p>The MCA will expect full traffic surveys in accordance with MGN 543 for application submission. Table 8.3 states "Proposed marine traffic survey methodology was discussed, noting that the MGN compliant surveys would not be completed until the application submission".</p> <p>The MGN 543 Checklist has not been provided at this stage as far as we can see, and we would welcome early opportunity to comment on the draft Checklist to ensure all aspects have been adequately addressed as the project progresses.</p>			
S42_0040_003	MCA	<p><b>Traffic Levels</b></p> <p>It is clear from the current NRA that there are significant levels of traffic observed within and in close proximity of the site, and the development area carries a significant amount of through traffic.</p> <p>We note the NRA states "The offshore wind farm structures also present a risk for vessels, whilst cable protection may reduce the navigable water depth in some areas. The main commitments relevant to shipping and navigation are the marking of all installed infrastructure on charts, marking and lighting of structures, and the commitment to agreeing wind farm layout principles with the Maritime and Coastguard Agency. With these commitments in place, no significant adverse effects on shipping and navigation are predicted.</p> <p>This statement needs to be further explored noting that the current NRA does not yet provide the full traffic picture, and only when we have considered the full NRA in accordance with MGN 543 can we be reassured that this statement is correct.</p> <p>We note that there is a prominence of commercial vessels within the traffic survey data assessed for the Hornsea Four array area, which are likely to be</p>	I	Io	<p>The potential for impacts on safety and navigation are fully assessed in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> with the complete vessel traffic baseline considered.</p> <p>The impacts on commercial vessel routeing has been extensively considered in the Navigational Risk Assessment, whilst impacts in relation to commercial interests are described in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>. The Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments.</p> <p>The Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex</a></p>

		<p>impacted by routing. The MCA will have an interest where there is an impact on safety. We would expect further consultation to be undertaken with those effected by routing, particularly in heavy weather ensuring shipping can continue to make safe passage without significant large-scale deviations. We note that the cumulative main route deviations as part of the Cumulative Effect Assessment will be undertaken post PEIR and submitted alongside the final ES.</p>			<p><a href="#">3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives.</a></p>
S42_0040_004	MCA	<p><b><u>Impact Identification</u></b></p> <p>Section 21 of the NRA confirms that FSA has been undertaken which does appear to contradict the introduction in Section 1.2 which states FSA has not been undertaken. Section 19.3 confirms that a hazard log will be created post PEIR and will be in the final NRA. This is part of FSA and will feed into mitigation measures (hazard control list), so some of the conclusions drawn in the Shipping &amp; Navigation chapter must remain under discussion.</p> <p>It is noted that the scope and assessment of impacts will be reassessed following section 42 consultation, further discussions with stakeholders, outputs of the hazard log, completion of the MGN 543 and updates to the baseline following the July/August 2019 vessel surveys. The MCA welcomes this approach to further reassessment of impacts through discussion with local stakeholders regarding possible mitigation, noting that the Shipping and Navigation chapter already draws conclusions on the significance of impacts. Possible mitigation may include a shipping corridor or helicopter refuge area for example.</p>	I	lo	<p>The Hazard Log was omitted from the draft Navigational Risk Assessment, and therefore the Formal Safety Assessment was not submitted as part of the Preliminary Environmental Information Report. All outstanding information has been provided in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> which the MCA has been consulted on. A Hazard Workshop was undertaken, the outputs of which were used to inform environmental impact assessment. The finalised Hazard Log is included in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> as well as additional vessel traffic survey data, consultation, collision and allision risk modelling.</p> <p>The need for defined helicopter refuge areas has been considered in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>.</p>
S42_0040_005	MCA	<p><b><u>Shipping and Navigation</u></b></p> <p>Section 8.11.2.38 of the Shipping and Navigation Chapter says: "MCA guidance (MGN 543 (MCA,</p>	Y	lo	<p>The Navigational Risk Assessment included in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> supports the case that fewer than</p>

		<p>2016)) states that a UK developer can seek to demonstrate that fewer than two lines of orientation in the array layout are acceptable. As per Commitment Co96 layout Principles will be agreed with the key regulators (MCA and TH) to ensure that the final layout is within parameters considered safe for surface navigation (see Volume 4, Annex 4.7: Layout Principles). Experience shows that vessels do not navigate within rows when transiting internally and will often take the shortest route. As with any passage this will depend upon the prevailing conditions and vessels are expected to passage plan accordingly in line with Chapter V of SOLAS (IMO, 1974).</p> <p>The MCA would like to add that vessels do tend to transit in straight lines and multiple lines of orientation, and turbines in straight lines, provide the best means to accommodate safe passage. In addition, the multiple lines of orientation are not just for the purposes of surface navigation. A helicopter is likely to be the choice of asset for search and rescue, considering the distance offshore of the proposed site. The SAR helicopter must be able to conduct an effective search within the windfarm. Further details are provided in the layout and SAR sections below.</p> <p>There are some occasions the use of 'where appropriate' will need to be explained further in the final ES submission, e.g. the use of a guard vessels for the Safety Zone. On this occasion we would expect alternative arranges to be detailed as they are only effective if there are monitoring arrangements in place.</p>			<p>two lines of orientation are tolerable for navigational safety with mitigation under the FSA methodology.</p> <p>The effect of applying a single line of orientation upon the safety of surface navigation and search and rescue helicopter capability will be further assessed and justified through the submission of a detailed safety justification as per the MGN 543 guidance. This safety justification will be discussed and agreed with the Maritime and Coastguard Agency and Trinity House alongside the DCO examination process.</p> <p>The inclusion of layout principles in <a href="#">Volume A4, Chapter 4, Annex 7: Layout Principles</a> also gives confidence to the stakeholders that post consent the layout will mitigate key concerns through compliance.</p>
S42_0040_006	MCA	<p><b>Layout</b></p> <p>We note that the NRA has assessed worst case which includes just one line of orientation and appears to accommodate a continuation of layout</p>	Y	Change	<p>The effect of applying a single line of orientation upon the safety of surface navigation and search and rescue helicopter capability will be further assessed and justified through the</p>

		<p>design from Hornsea One and Hornsea Two. This will require further discussion with MCA at an early stage, as we do not currently consider Hornsea Four to be subject to the same restrictions and constraints as seen with the earlier projects. Please also be aware that MCA can only agree to a single line of orientation where detailed safety justification is provided (as per MGN 543) for both surface navigation and search and rescue capability. The NRA itself does not provide that but would be used to inform the safety justification as well as any results from surveys and other constraints leading to just one line of orientation in the layout design. The consideration of the impact on SAR with just one line of orientation must also be taken into account. The turbine layout design will require MCA approval prior to construction to minimise the risks to surface vessels, including rescue boats, and Search and Rescue aircraft operating within the site. As such, MCA will seek to ensure all structures are aligned in straight rows and columns, including any platforms. Any additional navigation safety and/or Search and Rescue requirements, as per MGN 543 Annex 5, will be agreed at the approval stage.</p>			<p>submission of a detailed safety justification as per the MGN 543 guidance. This safety justification will be discussed and agreed with the Maritime and Coastguard Agency and Trinity House alongside the DCO examination process.</p> <p>Turbine layout design approval is considered a project commitment (Co96) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p>
S42_0040_007	MCA	<p><u>Design Principles</u></p> <p>The MCA has worked with the applicant on the development of the design principles and these remain under discussion as there are still items not yet addressed. Although we understand the reasons behind their use, we do not want to see these replace the MCA approval process for the layout. The Design Principles document currently states "The intention of these principles is to ensure that the MMO (MMO) can easily sign-off the final layout by simply confirming that the final proposed layout complies with the principles, without the need to re-consult with the MCA. The MCA would not agree to this statement alone, as we need to be able to assess the layout in line with MGN 543 before it is</p>	I	10	<p>The Applicant notes this comment and has consulted with the Maritime and Coastguard Agency and Trinity House on the layout principles described in <a href="#">Volume A4, Chapter 4, Annex 7: Layout Principles</a>.</p>



		signed off, we cannot rely on the principles to be sufficient for MCA purposes. We note that the document does continue to state "It should be noted that the establishment of these layout principles does not preclude additional principles from discussion. MCA and TH require final layout sign off in line with MGN 543 and its annexes.			
S42_0040_008	MCA	<p><u>Hydrographic Survey Data</u></p> <p>MGN 543 Annex 2 Paragraph 6 requires that hydrographic surveys should fulfil the requirements of the International Hydrographic Organisation (IHO) Order 1a standard, with the final data supplied as a digital full density data set, and survey report to the MCA Hydrography Manager. This information will need to be submitted, ideally at the ES stage.</p>	I	New	The Applicant confirms hydrographic survey data and reporting covering the DCO order limits will be supplied to the MCA prior to the start of construction.
S42_0040_009	MCA	<p><u>Cable Routes</u></p> <p>Export cable routes, cable burial protection index and cable protections are issues that are yet to be fully developed. However due cognisance needs to address cable burial and protection, particularly close to shore where impacts on navigable water depth may become significant. Any consented cable protection works must ensure existing and future safe navigation is not compromised. The MCA would accept a maximum of 5% reduction in surrounding depth referenced to Chart Datum. Where burial depths are not achieved consultation will need to take place with MCA regarding the locations, impact and potential risk mitigation measures.</p>	Y	Change	Adherence to MGN 543 with respect to reductions in under keel clearance by no more than 5% has been considered a project commitment (Co81) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> .
S42_0040_010	MCA	<p><u>Safety Zones</u></p> <p>Safety Zones during the construction, maintenance and decommissioning phases are supported, however it should be noted that operational safety zones may have a maximum 50m radius from the</p>	I	N/A	Safety zones of up to 500 m will be applied during construction, maintenance and decommissioning phases. Where defined by risk assessment, guard vessels will also be used to ensure adherence with

		individual turbines. A detailed justification would be required for a 50m operational safety zone, with significant evidence from the construction phase in addition to the baseline NRA required supporting the case.			Safety Zones or advisory passing distances to mitigate impacts which pose a risk to surface navigation during construction, maintenance and decommissioning phases. This has been considered a project commitment (Co139) detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> . A safety zone statement is provided in <a href="#">Volume F1, Chapter 2: Safety Zone Statement</a> which sets out the anticipated requirements.
S42_0040_01 1	MCA	<p><b>Search and Rescue Implications</b></p> <p>A SAR checklist must be discussed with MCA as the project progresses to track all requirements detailed in MGN 543 Annex 5 v2 available on our website.</p> <p>An Emergency Response Cooperation Plan will be required prior to construction. The ERCoP is an active operational document and must remain current at all stages of the project including during construction, operations &amp; maintenance, and decommissioning.</p>	I	N/A	<p>The Search and rescue checklist has been consulted with the Maritime and Coastguard Agency and impacts fully considered in <a href="#">Volume A5, Annex 7.1: Navigational Risk Assessment</a>.</p> <p>The submission of an Emergency Response Cooperation Plan (ERCoP) is noted in <a href="#">Table 8.2 of Volume 2, Chapter 7: Shipping and Navigation</a> of the Preliminary Environmental Information Report, where it was noted the ERCoP is a condition of the deemed Marine Licence.</p>
S42_0040_01 2	MCA	<p><b>Aviation Lighting</b></p> <p>The boundary turbines, where they are more than 900m apart, must be lit with a single 2000 candela, red aviation light, flashing Morse 'W' in unison with all other turbines so lit. All other turbines must be fitted with a 200 candela, red aviation hazard light, with fixed illumination, visible through 360° for SAR purposes. Further consultation with the CAA and MCA should be sought by the applicant where additional mitigation may be identified.</p> <p>We would expect consistency with lighting and</p>	I	N/A	<p>The Applicant notes this comment. Further consultation with the Civil Aviation Authority and Maritime and Coastguard Agency will be sought should additional mitigation be identified post-consent.</p>

		marking as appropriate between Offshore Windfarms.			
S42_0040_013	MCA	<p><b>Mooring Arrangements</b></p> <p>It is understood that floating wind turbines are not being considered for this project.</p>	N/A	N/A	The Applicant notes this comment.
S42_0040_014	MCA	<p><b>Development Consent Order</b></p> <p>The MCA has several comments to make on the draft Development Consent Order Deemed Marine Licence, to bring it in line with both the standard navigation conditions applied across all renewable projects – please see attached.</p> <p>We would also expect to see a Traffic Monitoring Report conditioned as part of the post consent to validate the results of the NRA and ensure the risk mitigation proposed to bring the risk to ALARP remains appropriate and as predicted. We would expect this to be listed on the Commitment Register.</p>	Y	Change	<p>The Applicant acknowledges this comment and confirms all comments to the draft Development Consent Order and deemed Marine Licences have been incorporated and considered within the draft DCO as appropriate (<a href="#">Volume C1, Chapter 1: Draft DCO</a> including Draft DML).</p> <p>Vessel traffic monitoring by use of Automatic Identification System (AIS) data will be undertaken for the duration of the construction period to monitor any changes in pre-construction vessel routes and to validate the predictions made in the Application (including those of the NRA). This commitment (Co98) is detailed in <a href="#">Volume A4, Annex 5.2: Commitment Register</a>.</p>
S42_0043_001	UK Chamber of Shipping	<p><b>Introduction</b></p> <p>The Chamber fully supports the Government’s targets for offshore renewable energy, whilst recognising the vital role the ports and shipping industries play in enabling those targets to be achieved by providing bases and vessels for construction, operation &amp; maintenance, and decommissioning. However, the planning and consultation system must support both the UK’s offshore renewable goals and the shipping industry to ensure that navigational safety is not</p>	N/A	N/A	The Applicant notes this comment.

		<p>compromised nor economic contribution from the shipping industry jeopardised. This is stated within Paragraph 2.6.162 of NPS EN-3 and it is the Chamber's opinion that this balance is not presently struck with regard to Hornsea Four Wind Farm.</p>			
S42_0043_002	UK Chamber of Shipping	<p><b>Planning &amp; Consultation Process</b></p> <p>The Chamber has concerns over the pace of consultation within the planning process. Open and transparent consultation with key stakeholders who are invited to discuss the project and its potential impacts is fundamentally pivotal to ensure conflict does not unnecessarily arise. The Chamber of Shipping was first informed and invited as a stakeholder on 4 June 2019 to share its views, at the Navigational Risk Hazard Workshop to be held on 27 June 2019.</p> <p>This is in contrast to the Environmental Impact Assessment: Scoping Report was published in 8 October 2018, however consultation was only made with the Maritime &amp; Coastguard Agency (MCA) and Trinity House during this scoping process despite the report correctly recognising that in 6.9.3.3 "A number of significant shipping routes pass through the Hornsea Four array area." Upon recognition of such significance, for Orsted not to consult with potentially impacted stakeholders and the Chamber of Shipping at the earliest possible opportunity shows a lack of due courtesy for maritime stakeholders.</p> <p>DFDS, an operator of multiple scheduled navigationally significant international Roll on-Roll off (RoRo) ferry services passing through the proposed Hornsea Four array area, was not consulted with in person by Orsted until 2 April 2019, a full six months after the publication of the Scoping Report. DFDS operate three routes, namely Immingham to Esbjerg, Immingham to</p>	I	N/A	<p>The Applicant confirms all statutory consultees were engaged at EIA Scoping. Only once site-specific shipping traffic data was available, were regular operators identified and invited to participate in consultation including for example a Hazard Workshop as part of the Navigation Risk Assessment process. This is standard practice for offshore wind farm EIA development and the Applicant believes all potentially impacted stakeholders, alongside The Chamber of Shipping and other interested stakeholders, were sufficiently consulted at the most appropriate stage in the development of the Hornsea Four proposals.</p> <p>A Hazard Workshop was first undertaken on 27 June 2019, the outputs of which were used to inform the PEIR. The finalised Hazard Log is included in <a href="#">Volume A5, Annex 7.1 of the ES: Navigational Risk Assessment</a>. Additional regular operator consultation has been undertaken with limited response from operators undertaking routes to Scandinavia and Eastern Europe. However, in response to consultation of the PEIR, an additional round of pre-application consultation and Hazard Workshop with regulator</p>

		<p>Gothenburg/Brevik and Immingham to the Oslo River, which pass directly through the proposed array and would require significant deviation. A fourth service, Newcastle to Ijmuiden, would also require deviation of route.</p> <p>The Chamber therefore believes that level of consultation with affected maritime stakeholders has fallen below the desired level at this stage, leading to a situation whereby the navigational safety and economic viability of scheduled international RoRo ferry services across the North Sea may be significantly negatively impacted.</p> <p>The Chamber is aware that Orsted have since been consulting with DFDS independently, regarding the potential for significant deviation of their routes and would like to stress that there are other operators facing similar navigational risk challenges and route viability difficulties accessing the Baltic, Scandinavia and Russia, which the Chamber hopes are duly consulted.</p>			<p>operators, shipping and navigation industry stakeholders and statutory bodies was undertaken in 2020. The Applicant has therefore undertaken significantly more consultation with potentially impacted stakeholders and the Chamber of Shipping than is usually anticipated. A full account is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a>.</p>
S42_0043_003	UK Chamber of Shipping	<p><b><u>Navigational Risk</u></b></p> <p>The Hornsea Four zone is in an area of high importance to the commercial shipping sector. Traffic densities in and around the proposed Hornsea Four site are high as recognised by Chapter 8: Shipping and Navigation.</p> <p>The Chamber has concerns over the increased risk to navigational safety relating from the proposed suggested deviation for routes displaced northwards towards the Dogger Bank. The Dogger Bank area is of particular concern to the Chamber and its members given the dangerous navigation conditions that are present, notably over falls (underwater cliffs and other sudden changes in depth, which can cause turbulent conditions). For suggested deviation routes to pass by, especially in adverse weather,</p>	I	N/A	<p>The Applicant can confirm the distance between the Hornsea Four array and the Dogger Bank feature is of sufficient passage for vessels on affected routes to safely avoid transiting close to Dogger Bank and therefore safety is not compromised by this route.</p> <p>Adverse weather routes identified in the region already avoid the Hornsea Four array area (as indicated in <a href="#">Section 16 of Volume 5, Annex 7.1: Navigational Risk Assessment</a>) and therefore are not anticipated to be impacted by the presence of project.</p> <p>The effect of applying a single line of</p>

		<p>unnecessarily increases navigational risk to the shipping community.</p> <p>In relation to Commitment ID Co96, the Chamber has concerns regarding the intended layout to only contain a single line of symmetry/orientation for turbines. Typically for other developments it has been best practice to include two lines of orientation so that for Search and Rescue capability and service provision are not compromised and the Chamber wishes to ensure the MCA and Trinity House are content with the safety justification.</p> <p>The Chamber notes Commitment ID Co99 stating that "Hornsea Four will ensure compliance with MGN 543 where appropriate" with concern. To include a caveat to compliance with MGN 543 is not customary and the Chamber would hope that Orsted ensures compliance with the MGN in full.</p>			<p>orientation wind turbine layout upon the safety of surface navigation and search and rescue helicopter capability will be investigated in full within a safety justification that will be discussed directly with the Maritime and Coastguard Agency.</p> <p>MGN 543 is a guidance document and includes a combination of requirements and recommendations. Therefore, its contents are not all applicable or mandatory. It is therefore appropriate and consistent to use this terminology.</p>
S42_0043_004	UK Chamber of Shipping	<p><b>Commercial and Environmental Impact</b></p> <p>As outlined in Volume 2, Chapter 8: Shipping and Navigation, a summary of NPS EN-3 policy on relevant decision making is provided. Paragraph 2.6.162 of NPS EN-3 states: "Site selection should have been made with a view to avoiding or minimising disruption or economic loss to the shipping and navigational industries."</p> <p>This summary goes on to state that Section 8.12 "includes an analysis of the potential for disruption and economic loss to the shipping and navigational industries." Section 8.12 whilst discussing the Cumulative Effect Assessment (CEA), as yet to be undertaken, includes no reference to economic loss to the shipping industry of the proposed development. Given this process therefore has not yet taken place, the Chamber extends its support to the CEA so that potential direct and indirect economic losses to the shipping and navigational</p>	I	N/A	<p>The impacts on commercial vessel routing has been extensively considered in the Navigational Risk Assessment, whilst impacts in relation to commercial interests are described in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>. The Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments.</p> <p>The Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and</a></p>

industries of the proposed Hornsea Four development may be included and considered in full.

Section 8.11.2.24 acknowledges “the impact on high value regular routes which could have commercial consequences for the operators”. Such “high value regular routes” exist for a number of operators, which the Chamber hopes will be fully examined, however DFDS’s routes to/from Immingham provide useful specific examples. DFDS operate three routes which directly pass through the proposed array area. The routes are navigationally significant scheduled international RoRo services which have been in operation for decades serving the Humber, Humberside hinterland and wider UK economy.

Volume 2, Chapter 8: Shipping and Navigation highlights two of these routes from AIS data recorded as part of the Navigational Risk Assessment (NRA), providing a calculated increase in route length for Routes 1 and 2 of 15.3nm and 11.1 nm respectively. This increase in sailing distance due to potential required deviation would negatively impact the routes in a variety of ways.

Firstly, passage time would be increased, and difficulty would arise for maintaining published schedules on services. This would impact upon berthing times and occupation at Immingham, where berth space is limited, and at the respective port pairings.

Scheduled RoRo services operate as part of a highly efficient just in time supply chains, with raw materials, semi-manufactured, and manufactured products repeatedly crossing borders as part of the production process. Disruption to schedules and delays have a detrimental impact upon wider supply chains, decreasing customer satisfaction, and leading shippers to consider alternative

## Navigation and Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives.

The Applicant confirms all statutory consultees were engaged at EIA Scoping. Only once site-specific shipping traffic data was available, were regular operators identified and invited to participate in consultation including for example a Hazard Workshop as part of the Navigation Risk Assessment process. This is standard practice for offshore wind farm EIA development and the Applicant believes all potentially impacted stakeholders, alongside The Chamber of Shipping and other interested stakeholders, were sufficiently consulted at the most appropriate stage in the development of the Hornsea Four proposals.

To clarify, DFDS Seaways were identified as the principle regular operator and were the only contacted party to express an interest in participating in consultation, although the Applicant has made multiple efforts to engage with those operators noted by consultees through Section 42 consultation.

arrangements, including repositioning away from the Humber or modal shift. Similarly turn-around times in ports are optimised for the loading and discharge of cargo units and cannot necessarily be shortened due to increased passage time.

Secondly, the increase in route length would require more fuel to be burnt, therefore resulting in significant additional financial cost to the operator from the deviation whilst increasing environmental emissions. To corroborate this, the Chamber understands DFDS intend to share preliminary costings for the forecasted increase in fuel costs on deviated routes. Were DFDS to attempt to maintain schedules despite the increased route length, travelling at higher speeds would be required, resulting in the additional use of fuel above that already outlined. This further introduces additional financial cost to the operator and increased environmental emissions.

It should be noted that ships are specifically designed to sail at set speeds at which they are most economical, operating them out of such parameters increases costs, inefficiency and may not be technically feasible due to the introduction of specific environmental legislation to the shipping industry requiring the reduction in engine power. Vessel operators may therefore may not have the opportunity to increase speeds to maintain schedules but forced to disrupt them with knock-on effects to the wider supply chain.

The Chamber hopes that along with the economic impact as yet to be considered, the environmental impact of proposed route deviations and increased journey distances are will also be fully examined. There is a degree of irony here with the main purpose of the offshore wind farm development, to decarbonise the UK economy and reduce dependence on fossil fuels, and the Chamber hopes



		<p>that this will be fully considered.</p> <p>It should be noted that shipping is the most environmentally and carbon efficient way to transport goods and cargo globally. Encumbrances to routes undermine this efficiency, potentially leading to alternative routes being sought, and modal shift onto other less efficient means.</p>			
S42_0043_005	UK Chamber of Shipping	<p><b>Cumulative Impact</b></p> <p>The Chamber has concerns and wishes to see further consideration given to the cumulative impact for shipping and navigation of the proposed Hornsea Four array area. Hornsea Four lying within part of the former Hornsea Zone, with the preceding three wind farms (Hornsea One, Hornsea Two, and Hornsea Three) at various stages of development, is an area of seabed in excess of 2,326 square kilometres which shall be no longer safe sea room from normal commercial navigational for larger vessels, as well as of limited access to other marine stakeholders.</p> <p>Orsted notes in 6.9.3.10 of the EIA Scoping Report that there is likely to be a cumulative impact on shipping and navigation receptors when all of these projects and others in the vicinity are considered collectively. Accordingly, Volume 4, Annex 5.3: Offshore Cumulative Effects of the PEIR attempts to categorise and evaluate “the combined effect of Hornsea Four in combination with the effects of a number of different projects, on the same single receptor/resource.”</p> <p>The Chamber has considerable reservations over this document. The document does not consider the Cumulative Effects upon shipping and navigation, and for in relation to Ports in the vicinity (200km buffer), they are recorded as “Included as part of the topic baseline and hence not considered within the</p>	I	N/A	<p>Additional cumulative effect assessment is presented in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A5, Annex 7.1: Navigational Risk Assessment</a>.</p> <p>Given the distance from shore, there is not considered to be any direct impact to ports and therefore the Applicant has engaged directly with potentially directly affected regular operators. This is consistent with the approach taken for other offshore wind farm developments.</p>

		<p>cumulative impact assessment". The Chamber contends that this cannot be the case should commercial port operations (throughput and vessel callings) be negatively impacted due to the diminished viability of merchant shipping routes in the North Sea calling at ports within the buffer area.</p> <p>Reviewing Volume 5, Annex 8.1: Navigational Risk Assessment, a methodology for Cumulative Effect Assessment is provided with it stated that the impacts are included within Volume 4, Annex 5.3: Offshore Cumulative Effects. As previously indicated, this cannot be correct since shipping and navigation is not included within Volume 4, Annex 5.3.</p> <p>The Navigational Risk Assessment does consider changes to routing at a cumulative level within a 10 nm buffer of the Hornsea Four array area, i.e. within the Hornsea Four shipping and navigation study area. The Chamber has concerns at the very limited nature of the study area noting the other wind farm developments in the area and considerable deviation for some routes identified. Such deviations, as already highlighted in this response, negatively impact navigational safety by requiring routing measures to pass the southern extent of Dogger Bank. As such the Chamber considers the NRA and Cumulative Effect Assessments to be inadequate at assessing the wider impact on shipping and navigation and calls for more investigation into the impacts of navigational safety.</p>			
S42_0043_006	UK Chamber of Shipping	<p><b>Transboundary Effects</b></p> <p>As noted in Volume 1, Chapter 6: Consultation, a need exists to consider transboundary effects and consult with potentially affected EEA states. This has been embodied by the United Nations Economic Commission for Europe Convention on EIA in a</p>	I	N/A	All European Economic Area (EEA) states that share a maritime boundary with the UK have been considered within the Preliminary Environmental Information Report (PEIR) in the transboundary assessments for those offshore topics

		<p>Transboundary Context (commonly referred to as the 'Espoo Convention'). As recognised by the October 2018 Scoping Report, shipping and navigation, was identified as an area to which significant transboundary effects could arise.</p> <p>As identified in the NRA the proposed Hornsea Four development would require the deviation for three navigationally significant international scheduled RoRo ferry routes to a degree where it may not be possible to keep to schedules, berth and turnaround times. Such impacts are significant with many members raising concern over accessibility to trading partners in Continental Europe and the Baltic. Accordingly, the Chamber wishes to learn the extent of consultation Orsted has undertaken or intends to undertake with the relevant maritime administrations to discuss the transboundary effects to navigation and international shipping.</p>			<p>that were screened in through the transboundary screening process (fish and shellfish ecology, marine mammals, ornithology, commercial fisheries, shipping and navigation, and aviation and radar). In October 2019 the Planning Inspectorate, on behalf of the Secretary of State, contacted neighbouring European states for the purposes of transboundary screening under Regulation 32 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Notice was provided to member states of all application documents including the PEIR, draft Report to Inform Appropriate Assessment and associated plans, maps and reports available via the Hornsea Four website. In addition, the Applicant contacted said member states directly, welcoming consultation feedback. Further details can be found in <a href="#">Volume A4, Annex 5.7: Transboundary Screening Report</a>.</p>
S42_0043_007	UK Chamber of Shipping	<p><b>Further Mitigation Measures</b></p> <p>The Chamber along with the MCA and DFDS attended a Navigational Risk Assessment Hazard Workshop on 27 June 2019 where the possibility of a navigational corridor through Hornsea Four was suggested to safely allow vessels passage through the wind farm whilst minimising deviation. The suggestion was rebuffed by Orsted at the time.</p> <p>Furthermore, the Chamber is aware that at a meeting between DFDS and Orsted on 30 July 2019, DFDS put forward again the suggestion for a navigational corridor to be constructed in</p>	I	N/A	<p>The Applicant clarifies a dedicated shipping corridor was not considered appropriate at the dates referred, based on early consultation with the regular operator and the safety assessment undertaken. The impact of deviations were put in the context of navigational safety, as is the purpose of the Hazard Workshop.</p> <p>The safety of vessels is not adversely impacted by the development of Hornsea Four and therefore the</p>

		<p>accordance with the MCA guidance as set out in MGN 543. Again, it is understood that this was rebuffed as “not feasible for this project”, without further explanation provided.</p> <p>The Chamber has not seen evidence of a feasibility study for a navigation corridor carried out by Orsted to provide evidence, and without such evidence being made available, the Chamber asserts that a navigational corridor in compliance with MGN 543, as twice suggested by industry, is an appropriate form of mitigation to consider.</p> <p>The Chamber is aware of close dialogue and collaboration between the Dutch Authorities and Rijkswaterstaat with operators regarding a navigational corridor and successful negotiation of routeing solutions which suitably mitigate ship deviations. This consultatory approach the UK may wish to consider for appropriate comparison and action.</p>			<p>Maritime and Coastguard Agency will comment only upon safety impacts.</p> <p>The impacts in relation to commercial interests are described in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>. The Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments.</p> <p>The Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a>.</p>
S42_0043_008	UK Chamber of Shipping	<p><b>Conclusion</b></p> <p>The Chamber welcomes this opportunity to respond to the PEIR consultation and trusts that the comments provided are of use and help in shaping future dialogue and engagement with maritime stakeholders. The Chamber has outlined a broad range of concerns for the merchant shipping industry, believing that the navigational and economic cost to the industry has not been fully considered, and views the current proposed mitigation measures as inadequate. Therefore, whilst the Chamber is in overall support for offshore wind developments, it presently cannot support Hornsea Four on the provided information.</p>	N/A	N/A	The Applicant notes this comment.

		<p>The Chamber therefore looks forward to working closely together with Orsted and other stakeholders post-PEIR to address these concerns. If you have any further questions on points raised or would like clarification, please do not hesitate to contact the Chamber.</p>			
S42_0052_1.78	Natural England	<p>"Monitoring of vessel traffic for the duration of the construction period". Clarification will be needed on if there is the intention to report on vessel traffic, if the information will be used to validate the ES assumptions or how this can influence and feedback into future operations.</p> <p><i>NER: Clarify the purpose of the monitoring</i></p>	I	Change	<p>The Applicant confirms that the intention is to report on vessel traffic. The wording of commitment Co98 in <a href="#">Volume A4, Annex 5.2: Commitment Register</a> has been updated to provide this clarification.</p>
S42_0053_001	DFDS	<p>The commercial impact to DFDS</p> <p>Ørsted's PEIR document, states in Volume 2, Chapter 8: Shipping and Navigation – "8.11.2.23 Vessels are generally important to the regional and national economy but, given the open sea area available in which vessels can navigate and the commitments included as part of Hornsea Four it is not expected that significant hot spots reflecting increased vessel encounters will be created even with the deviations expected, therefore mitigating the potential for collision risk.</p> <p>Significance of the effect 8.11.2.24 The receptor is deemed to be of (sic) somewhat vulnerable, have good recoverability once vessels are familiar with the new routes and high value. However given the impact on high value regular routes which could have commercial consequences for the operators the sensitivity of the receptor is considered to be medium until further consultation can be undertaken as part of the Section 42 Consultation process.</p>			<p>The potential for impacts on safety and navigation are fully assessed in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> with the complete vessel traffic baseline considered.</p> <p>The impacts on commercial vessel routeing has been extensively considered in the Navigational Risk Assessment, whilst impacts in relation to commercial interests are described in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>. The Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments.</p> <p>The Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by</p>

		<p>Further mitigation</p> <p>8.11.2.26 Further consultation will be required to mitigate impacts for Regular Operators noting that the impacts are commercial in nature and Volume 5, Annex 8.1: Navigational Risk Assessment demonstrates that the vessels still have safe operational routes. Following this further consultation the impact is anticipated to be of minor adverse significance". [Emphasis added].</p> <p>As an operator on high value routes these "commercial consequences" are a cause of grave concern to us.</p> <p>Since the Immingham to Esbjerg, Immingham to Gothenburg and Immingham to the Oslo River services all pass through, or in close vicinity to, the proposed Hornsea Four array area, they will each have to make notable deviations from their current routes if The Applicant is developed as planned.</p>			<p>refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a>.</p>
S42_0053_002	DFDS	<p>While we note that no consideration of these matters is included in PEIR, we consider that the impact on DFDS (and other operators) will be significant. We trust that the following summary will lead Ørsted to reassess its anticipated conclusion that the impact on operators will be of "minor adverse significance". Broadly speaking, our concerns fall into the following categories –</p> <ul style="list-style-type: none"> <li>· The difficulties caused to our existing schedules</li> <li>· Customer satisfaction</li> <li>· Additional costs caused by longer journeys</li> <li>· The threat of delay to the routes</li> <li>· The impact on Humberside</li> <li>· Navigational Risk (e.g. Dogger Bank)</li> </ul>			<p>The Applicant notes this comment.</p>
S42_0053_003	DFDS	<p><u>The difficulties caused to our existing schedules</u></p> <p>The schedules and the terminal operations in each port have been fully optimized to deliver the best possible service to the market and our customers.</p>			<p>The Applicant notes this comment.</p>

Any increase to crossing times will make it difficult for us to maintain schedules at the port of Immingham, where berth numbers are limited, with a knock-on effect to port pairings.

Taking the Esbjerg route by way of example, our captains have calculated that sailing north of Hornsea Four will increase the voyage by around 13 nautical miles while sailing south will increase the voyage by around 12 nautical miles. It is estimated that either deviation will add an extra 40-45 minutes to each sailing. Hornsea Four would also lead to increases to the Gothenburg and Oslo River voyages.

An increased crossing time of 40-45 minutes for each vessel will make it impossible to unload and load the vessels within the timeslot available. This means our vessels will be unable to produce a full round trip in 2 days, as they do currently. We would then have to add a third vessel to the route to deliver the same service as today. The cost of a third vessel would result in the route operating at a loss which, ultimately, could lead to us stopping the route. As a consequence, there would no longer be a direct ferry service between Denmark and the UK and this would obviously have a negative effect on the general trade pattern between the two countries and, of course, on jobs.

We also operate 5 freight services weekly between Immingham and Cuxhaven in Germany and 8 freight services weekly between Immingham and Rotterdam (Vlaardingen). While Hornsea Four will not have a direct impact on these services it will have an indirect impact on each. This is because any delay on the Esbjerg / Gothenburg routes means our vessels will, at some point, reach Immingham at the same time and cause the already limited berths to be further congested. If this were to happen, we would have severe difficulties in operating all the

		vessels at the same time and this would cause delay to the Cuxhaven and Rotterdam routes.			
S42_0053_004	DFDS	<p><u>Customer satisfaction</u></p> <p>We provide our customers with an optimised, just-in-time, service. For instance, in respect of our Swedish service, there is a 7-hour turn-around in Immingham and a longer period in Gothenburg when cargo is unloaded from the vessel and new cargo loaded onto it. It is unlikely this turn-around period can be reduced because we are constrained by the need to accommodate our customers. For instance, a shorter stay in Gothenburg is not possible because we must wait for cargo to be delivered to the port. A longer stay at Immingham is not possible because our customers expect lorries to be loaded and unloaded in short order. It is not possible, therefore, to (say) reduce the time spent in Gothenburg in order to spend more time in Immingham.</p> <p>Any delay in the service we provide will clearly be unattractive to our customers who operate to their own schedules. We are concerned that the delay will result in customers looking elsewhere for a similar freight service. For instance, there is a significant risk they could look at sea-container alternatives in the south of the UK. While this could benefit ports such as Felixstowe, it would have a negative impact on Immingham and, in any event, would lead to increased costs to the UK, increased freight costs and, of course, job losses.</p>			The Applicant notes this comment.
S42_0053_005	DFDS	<p><u>Additional costs caused by longer journeys</u></p> <p>There will also be a financial cost caused by having to deviate from current routes. While the cost of fuel varies, based on the average August 2019 fuel price, for the Esbjerg route travelling north of Hornsea Four would result in extra fuel costs of at least 1.05m USD per year; travelling south of Hornsea Four an extra 0.95m USD per year. The Gothenburg and Oslo River services will be similarly affected.</p>			The Applicant notes this comment.



		<p>The only way to make up for lost time caused by the deviation will be to work our vessels harder by travelling faster. Our vessels currently sail at their most efficient speed of 20 knots, with a realistic maximum speed of 21 knots. Thus they are limited to the extent they can make up for lost time by travelling faster.</p> <p>Any increase in speed will require additional fuel and this will result in a financial cost which will be in addition to the one described in paragraph 20 above. The burning of additional fossil fuel will also have a detrimental effect on the environment.</p>		
S42_0053_006	DFDS	<p><u>The threat of delay to the routes</u></p> <p>The ferry services to and from Immingham have significant benefits for exports and imports between the UK and Europe. If daily departures were not possible due to a longer crossing times, a significant proportion of time-sensitive goods, such as meat/poultry and dairy products, would have to use alternative modes of transport. For instance, time-sensitive cargo would have to be transported by road across the continent and then to the UK across the Channel or by Eurotunnel. This would obviously have a negative environmental impact and would also increase congestion on the roads.</p> <p>As well as having an impact on DFDS itself, the absence of ferry routes between the UK and Denmark, Sweden and Norway will also have a negative impact on UK-Nordic trade. For instance, the Office for National Statistics states<sup>1</sup> that the total trade between the UK and Denmark in 2016 was worth £11.2billion. Between the UK and Sweden, the figure for 2016 was £19.3billion and, for the UK and Norway, it was £20.6billion.</p>		The Applicant notes this comment.
S42_0053_007	DFDS	<p><u>The impact on Humberside</u></p> <p>The Port of Immingham is owned and operated by</p>		The Applicant notes this comment.

		<p>Associated British Ports (“ABP”) and ABP describes it as –  “... the UK’s largest port by tonnage, handling around 46 million tonnes of cargo every year. It connects businesses across the UK and the world and is a leader in handling a wide range of cargo, including Ro-Ro, containers (Lo-Lo), dry bulks and liquid bulks serving key sectors across the economy.  ...  ... a critical link in the supply chains of businesses throughout Britain ... [which] supports 10,500 jobs nationally and contributes over £700 million to the economy every year”</p> <p>In respect of DFDS’s operation at Immingham, ABP states –  “Immingham has eight Ro-Ro berths, handling more than 30 sailings each week to and from Northern Europe and Scandinavia with DFDS Seaways.  ...  Global shipping company DFDS, which operates 34 services a week into the Port of Immingham and are projecting significant growth in the volumes they handle in the coming years. To meet the challenges of their projections, ABP has committed to investing £2.8 million in expanding the land and services available to support the operations of DFDS in the port”.</p> <p>DFDS have little doubt that delays to existing ferry services will result in Humberside being seen as a less attractive option for Scandinavian freight. This could have a wider impact on trade-flow between the UK and Scandinavia and would have a detrimental impact on jobs, as described earlier in this response, and on the port of Immingham itself.</p>			
S42_0053_008	DFDS	<p><u>Navigational Risk (e.g. Dogger Bank)</u></p> <p>The suggested displacement routes heading north towards Dogger Bank are of particular concern given the dangerous navigation conditions that are</p>			The Applicant can confirm the distance between the Hornsea Four array and the Dogger Bank feature is of sufficient passage for vessels on affected routes to safely avoid

		<p>present there, particularly in adverse weather. These do not need to be rehearsed exhaustively, however, it is widely known that the unfavourable conditions include –</p> <ul style="list-style-type: none"> <li>· over falls i.e. underwater cliffs and other sudden changes in depth, which can cause turbulent conditions;</li> <li>· waves breaking at lower depths, thus increasing the risk of damage to the hull, crew and cargo. Since the lowest areas of Dogger Bank go down to 15 metres, it follows that high waves will break there; and</li> <li>· depths which are lower than 20 to 30 metres. The lower depths in particular need to be avoided due to the “squat” effect which leads to reduced speed and increased fuel consumption.</li> </ul> <p>Contrary to Ørsted’s anticipated conclusion, it is clear that the effects of the diversions will be significant.</p>		<p>transiting close to Dogger Bank and therefore safety is not compromised by this route.</p> <p>Adverse weather routes identified in the region already avoid the Hornsea Four array area (as indicated in <a href="#">Section 16 of Volume 5, Annex 7.1: Navigational Risk Assessment</a>) and therefore are not anticipated to be impacted by the presence of project.</p>
S42_0053_009	DFDS	<p><u>Ørsted’s previous consultation exercise</u></p> <p>Ørsted will be aware that, for over 30 years, it has been expected that public consultation in the UK will be conducted in accordance with the so-called “Sedley principles”<sup>3</sup> which, in brief, provide that –</p> <ol style="list-style-type: none"> <li>i. Consultation must take place when the proposal is still at a formative stage</li> <li>ii. Sufficient reasons must be put forward for the proposal to allow for intelligent consideration and response</li> <li>iii. Adequate time must be given for consideration and response</li> <li>iv. The product of consultation must be conscientiously taken into account</li> </ol> <p>It will be noted that while the Environmental Assessment: Scoping Report was published on 8 October 2018, DFDS was not consulted on the Hornsea Four proposals until 2 April 2019.</p>		<p>The Applicant confirms all statutory consultees were engaged at EIA Scoping. Only once site-specific shipping traffic data was available, were regular operators identified and invited to participate in consultation including for example a Hazard Workshop as part of the Navigation Risk Assessment process. This is standard practice for offshore wind farm EIA development and the Applicant believes all potentially impacted stakeholders, including DFDS Seaways and other interested stakeholders, were sufficiently consulted at the most appropriate stage in the development of the Hornsea Four proposals.</p> <p>A Hazard Workshop was first undertaken on 27 June 2019, the</p>

		<p>As UKCS state in their response to the current consultation –          “The Chamber therefore believes that level of consultation with affected maritime stakeholders has fallen below the desired level at this stage, leading to a situation whereby the navigational safety and economic viability of scheduled international RoRo ferry services across the North Sea may be significantly negatively impacted”.</p> <p>To put it at its lowest, it is unclear that the Sedley principles were adhered to during the Scoping Report consultation.</p> <p>Going forward, therefore, it is essential that Ørsted work closely with DFDS and other maritime stakeholders to ensure that future rounds of consultation are conducted in accordance with established practice.</p>		<p>outputs of which were used to inform the PEIR. The finalised Hazard Log is included in <a href="#">Volume A5, Annex 7.1 of the ES: Navigational Risk Assessment</a>. Additional regular operator consultation has been undertaken with limited response from operators undertaking routes to Scandinavia and Eastern Europe. However, in response to consultation of the PEIR, an additional round of pre-application consultation and Hazard Workshop with regulator operators, shipping and navigation industry stakeholders and statutory bodies was undertaken in 2020. The Applicant has therefore undertaken significantly more consultation with potentially impacted stakeholders than is usually anticipated. A full account is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a>.</p>
S42_0053_010	DFDS	<p>The absence of mitigation proposed by Ørsted</p> <p>At a meeting concerning Hornsea Four between DFDS and Ørsted on 30 July 2019, we recommended that a navigation corridor be constructed to allow ships to navigate safely through the windfarm site. The corridor would need to be constructed in compliance with MCA guidance set out in MGN 543. Ørsted’s minute of the meeting states –          “The Applicant notes that a navigation corridor, compliant with MCA guidance, was not feasible on this project. It is currently envisaged a gap will be left in the site of 1 nm; an understanding of whether this distance was acceptable for navigation was requested by Hornsea Four.”</p> <p>We have not seen any feasibility study prepared by Ørsted in respect of the appropriate extent of a</p>		<p>Following extensive consultation the Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a>.</p>

navigation corridor. Absent such a study, and in the light of the detrimental impact of Hornsea Four on DFDS (and other operators), we maintain that a navigation corridor, fully compliant with MGN 543, is an appropriate form of mitigation.

We note that paragraph 8.7.2.7 of Hornsea Project Four: Preliminary Environmental Information Report ("PEIR") Volume 2, Chapter 8: Shipping and Navigation states –

"For the 14 days' desktop data analysed in the summer survey period, there were an average of 33 unique vessels per day recorded within the study area, recorded on AIS. In terms of vessels intersecting the Hornsea Four array area itself, there was an average of 15 unique vessels per day".

DFDS will have, at most, 3 daily vessels (one from each route, with two transits a day) sailing in the area in question. It is clear that other operators will also be affected, and this reinforces the case for a navigation corridor which complies with MGN 543.

While a navigation corridor would increase the distance our vessels would have to travel (estimated at between 1 and 2NM), this would not be detrimental to existing services and is preferable to either sailing north or south of Hornsea Four. The navigation corridor would benefit DFDS and each of the other companies, including tramp operators, trading between the Humber and the Baltic and Scandinavia.

We also note that paragraph 8.14ff of Volume 2 Chapter 8 refers to us having raised the potential effect on adverse weather routing. We consider that the adverse weather routes for our Immingham services would be used between 5% and 10% of the time. It is therefore essential that the commercial consequences of Hornsea Four on the usual

		Immingham routes are assessed since these are the routes that will be used for 90% to 95% of sailings.			
S42_0053_01 1	DFDS	<p><u>Conclusion</u></p> <p>DFDS's primary concern is that the proposed development will mean we are unable to maintain our current schedules between Immingham and Scandinavia. As described above, this would have a detrimental impact on our business, our customers, and on our employees. It is essential that appropriate mitigation, in the form of a navigational corridor, is provided. We look forward to working closely with Ørsted to ensure this is realised.</p>			The Applicant notes this comment.

## EIA topic area: Aviation and Radar

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/ New or N/A)	Applicant Response
S42_0027_00 1	Civil Aviation Authority (CAA)	The proposed development is for up to 180 turbines with a maximum blade tip height above LAT of 370m. We believe the preliminary proposals identify the majority of the relevant issues that require to be addressed, however owing to the proposed height (maximum tip height 370m), we would highlight that, in respect of requirements for obstacle lighting, the standards and recommended practices contained with Annex 14 to the Chicago Convention, published by ICAO, cover wind turbines up to 315 m overall tip height. Therefore, the CAA requests that a specific study is undertaken to determine what additional marking and lighting to ensure that the turbines remain conspicuous to offshore helicopter operations, search and rescue as well as military activity both during the day and at night, while not causing confusion or difficulties for maritime users.	I	N/A	<p>The Applicant consulted with offshore helicopter operators and the UK Maritime and Coastguard Agency, providing aviation stakeholders with information regarding the position and extent of Hornsea Four, and to invite comments on lighting and electronic conspicuity interests that aviation stakeholders may have regarding the development.</p> <p>Only the MCA and Wiking Helicopters responded to the consultation request. The MCA stated that they had no additional comments to make. Only Wiking Helicopters provided a direct response to the question on the fitment of aviation lighting and additional electronic conspicuity. The ANO provides the</p>

					<p>requirements for the fitment of aviation lighting to offshore wind turbines and Wiking Helicopters comments are in line with the requirements of the ANO.</p> <p>Consultation lead to no requests for additional marking and lighting or electronic conspicuity be utilised to assist users in poor weather conditions. Any additional requirement for marking and lighting will be agreed in consultation with the CAA. This consultation is further detailed in <a href="#">Volume A2, Chapter 8: Aviation and Radar</a>.</p>
S42_0027_002	CAA	In addition, the development may impinge on standard routing heights for helicopters operating offshore and may also require changes to the Minimum Safety Altitude. In order to facilitate situational awareness, we request that a study is undertaken into a form of electronic conspicuity/identification of the towers that might be suitable for use by airspace users which will assist to minimise operational impacts during poor weather conditions.	I	N/A	As described above, additional consultation lead to no requests for additional marking and lighting or electronic conspicuity be utilised to assist users in poor weather conditions. Any additional requirement for marking and lighting will be agreed in consultation with the CAA. This consultation is further detailed in <a href="#">Volume A2, Chapter 8: Aviation and Radar</a> .
S42_0027_003	CAA	There is an international civil aviation requirement for all structures of 300 feet (91.4 metres) or more to be charted on aeronautical charts. The PEIR notes that the SAR helicopter bases will be supplied with accurate information on the Hornsea Four wind turbine positions, this will also be required to inform the UK's database of tall structures (the Digital Vertical Obstruction File).	Y	Change	Search and rescue helicopter bases will be supplied with accurate information on wind turbine positions. This information will also inform the UK's database of tall structures (the Digital Vertical Obstruction File) to ensure they are charted on aeronautical charts. This commitment (Co102) is detailed in <a href="#">Volume A4, Annex 5.2 of the ES: Commitment Register</a> .

S42_0034_001	Ministry of Defence (MOD)	<p>The MOD has completed an assessment and has identified that the turbines will be detectable to the air defence (AD) radars at Remote Radar Head's (RRH) Trimmingham and Staxton Wold. The MOD therefore has concerns with this development.</p> <p>Volume 5, Annex 9.1 of the PIER report includes an Aviation and Radar technical report. Section 3.1.3 provides details of the MOD's radar systems. A radar line of sight analysis has been completed for the RRH Brizlee Wood and RRH Trimmingham AD radars. The analysis indicates that the turbines at 370m to tip in height would be detectable to the RRH Trimmingham AD radar in the southern part of the array area. We agree that the turbines will not be detectable to the radar at RRH Brizlee Wood.</p>	N/A	N/A	
S42_0034_002	Ministry of Defence	<p>No consideration has been given to the AD radar at RRH Staxton Wold in the report and no line of sight analysis has been undertaken. The report states that an analysis will be undertaken once information regarding the radar at RRH Staxton Wold is made available. The AD radar at RRH Staxton Wold is a relevant consideration and will need to be taken account of and mitigated. The basis for any modelling relating to RRH Staxton Wold should use the TPS77 air defence radar criteria.</p> <p>Mitigation to address the impacts on the AD radars at both RRH Trimmingham and RRH Staxton Wold will be required. It will be necessary for an appropriate technical mitigation to be provided for both sites.</p>	Y	N/A	<p>Consideration and line of sight analysis of air defence radar at Remote Radar Heads (RRH) Trimmingham and Staxton Wold are considered in <a href="#">Volume A5, Chapter 8, Annex 1 of the ES: Aviation and Radar Technical Report</a>. Discussion with the MOD is ongoing in relation to relevant mitigation required to address significant adverse impacts.</p>
S42_0034_003	Ministry of Defence	<p>The requirement for aviation warning lighting fitted to offshore structures has been considered in the report. The MOD requests that the development be fitted with MOD accredited aviation safety lighting in accordance with the</p>	Y	1o	<p>Provision of aviation warning lighting is detailed within <a href="#">Volume 2, Chapter 8: Aviation and Radar</a> of the Environmental Statement. Aids to navigation (marking and lighting) will</p>



		Civil Aviation Authority, Air Navigation Order 2016.			be deployed in accordance with the latest relevant available standard industry guidance and as advised by Trinity House, MCA and Civil Aviation Authority (CAA) and MoD as appropriate. This will include a buoyed construction area around the array area and the HVAC booster station in consultation with Trinity House (Co93) as detailed in <a href="#">Volume A4, Annex 5.2 of the ES: Commitment Register</a> .
S42_0034_004	Ministry of Defence	The offshore cable route will come ashore on the Yorkshire coast south of Bridlington. This location and the onshore cable route which will connect the wind farm to the national grid at Creyke Beck Substation does not pass through any MOD statutory safeguarding zones or pass through any MOD estate or interest. There are therefore no safeguarding concerns with the onshore element of this proposal.	N/A	N/A	The Applicant notes this comment.
S42_0064_001	Norwegian Shipowners' Association (NSA)	<p><b><u>Introduction</u></b></p> <p>NSA strongly recommend adjusting the layout of the Hornsea 4 wind farm, arguing that this should be done in compliance with the MGN 543 (Marine Guidance Note – Safety of Navigation), and establish a navigational corridor of at least 2.2 nautical miles through the planned Hornsea 4.</p> <p>DFDS operate three regular RoRo routes with strict schedules: Immingham - Esbjerg, Immingham - Gothenburg/Brevik and Immingham - Oslo Fjord, which pass directly through the proposed array and would require significant deviation. A fourth service, Newcastle - Ijmuiden, would also require a deviation of the route. Sea-Cargo and Misje Rederi have regular port calls to Immingham and other ports in the area with</p>	I	N/A	<p>Following extensive consultation the Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives</a>.</p> <p>DFDS Seaways shipping routes are described and fully considered in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume 5, Annex 7.1:</a></p>

		routes that also would require a deviation around Hornsea 4.			<p><b>Navigational Risk Assessment</b> which assesses the safety impacts to shipping and navigation.</p> <p>Sea-Cargo were classified as a regular operator at PEIR and invited to participate in consultation but did not respond. No vessels in Misje Rederi's fleet were recorded in the vessel traffic data.</p>
S42_0064_002	Norwegian Shipowners' Association (NSA)	<p><b>Risk assessment – Hornsea 4</b></p> <p>The Hornsea Four zone is in an area of high importance to the commercial shipping sector and the implications to shipping could be considerable. NSA would like to voice our concerns over the increased risk to navigational safety relating from the proposed suggested deviation for routes displaced northwards towards the Dogger Bank. Furthermore, any deviations would have commercial consequences resulting in increased fuel consumptions and emissions. Our main concerns are outlined in the below paragraphs.</p>	I	N/A	<p>The Applicant has not identified an increased risk to navigational safety from the development and clarifies that the distance between the Hornsea Four array and Dogger Bank feature provides sufficient passage for vessels on affected routes to safely avoid transiting close to the Dogger Bank feature.</p> <p><b>Volume 2, Chapter 7: Shipping and Navigation</b> and <b>Volume 5, Annex 7.1: Navigational Risk Assessment</b> fully assess safety impacts to shipping and navigation.</p>
S42_0064_003	Norwegian Shipowners' Association (NSA)	<p><b>Navigation</b></p> <p>NSA is concerned that any non-compliance with MGN 543 would jeopardize the safety of navigation and should thus be adequately reconsidered.</p> <p>The North Sea can be difficult to navigate in adverse weather conditions such as winter storms, which may make it necessary to deviate considerably from the planned route for hours while maintaining a minimum steering speed and course into the direction of wind and waves for the safety of the passengers, crew and ship.</p> <p>A ship's safe navigation in relation to wind farms can be affected by a number of factors such as, but not limited to: manoeuvres to avoid collisions, the minimum passing distance to installations and</p>	I	N/A	<p>The Applicant notes the comments and clarifies MGN 543 is guidance and includes a combination of requirements and recommendations. Therefore, its contents is not all applicable or mandatory to comply with, so it is appropriate to use this terminology; instead, these requirements are agreed directly with the MCA through the MGN 543 checklist.</p>

		<p>structures, navigating in adverse weather, engine failure and/or black-out etc.</p> <p>NSA notes Commitment ID Co99 stating that "Hornsea Four will ensure compliance with MGN 543 where appropriate" with concern. To include a caveat to compliance with MGN 543 is not customary and we would hope that Ørsted ensures compliance with the MGN in full. That would mean the establishment of a navigational corridor of at least 2.2 nautical miles will be required in order to ensure the safety of the ships and the wind farm in case of one of the situations as mentioned in the above paragraph.</p>			
S42_0064_004	Norwegian Shipowners' Association (NSA)	<p><b>Commercial &amp; Environmental</b></p> <p>NSA share the concerns of Danish Shipping and the UK Chamber of Shipping that the proposed deviations to shipping routes will have a negative effect on the commercial viability of DFDS and other operators in their efforts to operate in the area.</p> <p>Firstly, passage time would increase, and difficulty would arise for maintaining published schedules on services. This would impact upon berthing times and occupation at Immingham where berth space is limited and at the respective port pairings.</p> <p>Scheduled RoRo services operate as part of a highly efficient just-in-time supply chains with raw materials, semi-manufactured and manufactured products repeatedly crossing borders as part of the production process. Disruption to schedules and delays have a detrimental impact upon wider supply chains, decreasing customer satisfaction and leading shippers to consider alternative arrangements. That would include repositioning away from the Humber or modal shift. Similarly turn-around times in ports are optimised for the loading and discharge of cargo units and cannot necessarily be shortened due to increased passage time.</p> <p>Secondly, the increase in route length would lead</p>	I	N/A	<p>The potential for impacts on safety and navigation are fully assessed in <a href="#">Volume 5, Annex 7.1: Navigational Risk Assessment</a> with the complete vessel traffic baseline considered.</p> <p>The impacts on commercial vessel routeing has been extensively considered in the Navigational Risk Assessment, whilst impacts in relation to commercial interests are described in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>. The Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments.</p> <p>The Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex</a></p>

		to increased fuel consumption and increased environmental emissions. This means additional financial cost to the operator and in the end the customer. Last but not least this is a less environment friendly solution. By attempting to maintain the schedule by sailing at higher speed, the result will be the same as just outlined.			<a href="#">3.3, and Chapter A1, Chapter 3: Site Selection and Consideration of Alternatives.</a>
S42_0064_005	Norwegian Shipowners' Association (NSA)	<p><b>Conclusion</b></p> <p>NSA would strongly recommend adjusting the layout of the Hornsea 4 wind farm and establish a navigational corridor of at least 2.2 nautical miles through the planned area to be in compliance with MGN 543.</p> <p>NSA, together with Danish Shipping and UK Chamber of Shipping, would welcome the opportunity to engage in further dialogue on this matter in order to address these mentioned concerns.</p>	I	N/A	The Applicant notes this comment.
S42_0067_001	UK Major Ports Group	<p>UKMPG has been disappointed to learn of the experience of ABP tenants and partners during the current phases of development of plans for the Hornsea Project Four Offshore Wind Farm – specifically the proposed re-routing of regular shipping lanes and possible practical constrains on access to the developed area for search and rescue resources.</p> <p>Our understanding is that the proposed re-routing of regular shipping lanes will cause significant adverse economic and – importantly, given the aims of renewable energy development – environmental effects from long distances and impacts on speeds.</p> <p>We understand also that the proposed new routes towards Dogger Bank have navigational safety concerns and that some aspects of the design of the development area, i.e. one rather than two lines of symmetry/orientation for turbines, have implications for search and rescue.</p>	I	N/A	<p>The impacts on commercial vessel routeing has been extensively considered in the Navigational Risk Assessment, whilst impacts in relation to commercial interests are described in <a href="#">Volume 2, Chapter 7: Shipping and Navigation</a>. The Applicant identified a commercial impact relating to the cumulative deviation of vessels due to the presence of structures associated with Hornsea Four and other offshore developments.</p> <p>The Applicant has committed to mitigating commercial transboundary impacts to the shipping industry through a reduction in the developable array area by refinement of the Hornsea Four order limits. This process is detailed in <a href="#">Volume A2, Chapter 7: Shipping and Navigation</a> and <a href="#">Volume A4, Annex 3.3, and Chapter A1, Chapter 3: Site</a></p>

We have been particularly disappointed to hear reports that the process of engagement with the shipping lines has not been adequate and that proposals brought forward to mitigate the issues highlighted above have been summarily dismissed.

UKMPG has generally been happy to act together with Orsted on initiatives such as collective approaches to maritime regulators. We absolutely understand the importance of offshore renewable energy development. But such developments must be able to accommodate existing marine sectors without significant adverse impact.

We welcome the commitment in paragraph 8.11.2.23 to consult further on the commercial consequences of the development. We believe that there should be adequate regard to the cumulative consequences and don't believe that the impact of ports and shipping should be dismissed as a part of a baseline, when we believe that you've received quite detailed representations on economic and environmental adverse impact.

Clearly the behaviour of Orsted as the industry leader and on a flagship project like Hornsea Four sets both precedent and tone for the broader development landscape. That is why we're writing on a ports sector level – whilst the impact on individual shipping lines and ports may in itself be significant, there's a bigger picture to be considered.

## **Selection and Consideration of Alternatives.**

The Applicant confirms all statutory consultees were engaged at EIA Scoping. Only once site-specific shipping traffic data was available, were regular operators identified and invited to participate in consultation including for example a Hazard Workshop as part of the Navigation Risk Assessment process. This is standard practice for offshore wind farm EIA development and the Applicant believes all potentially impacted stakeholders and other interested stakeholders, were sufficiently consulted at the most appropriate stage in the development of the Hornsea Four proposals.

Regular operator consultation has been undertaken with limited response from operators undertaking routes to Scandinavia and Eastern Europe. However, in response to consultation of the PEIR, an additional round of pre-application consultation and Hazard Workshop with regulator operators, shipping and navigation industry stakeholders and statutory bodies was undertaken in 2020. The Applicant has therefore undertaken significantly more consultation with potentially impacted stakeholders than is usually anticipated. A full account is detailed in [Volume A2, Chapter 7: Shipping and Navigation](#)

					<p>The effect of applying a single line of orientation upon the safety of surface navigation and search and rescue helicopter capability will be further assessed and justified through the submission of a detailed safety justification as per the MGN 543 guidance. This safety justification will be discussed and agreed with the Maritime and Coastguard Agency and Trinity House alongside the DCO examination process.</p> <p>The Cumulative Effect Assessment is presented in <b>Volume 5, Annex 7.1: Navigational Risk Assessment</b>. Given the distance offshore there is not considered to be any direct effect on ports due to Hornsea Four. The Applicant is however dealing directly with the operators of vessels using ports, which is in line with the approach taken for other offshore wind farm developments.</p>
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## EIA topic area: Marine Archaeology

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change? (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0065_003	Historic England	<p><b>Volume 1, Chapter 4: Project Description:</b></p> <p>We note from Section 4.11 'Operation and Maintenance' that the following activities are to be included within the Development Consent Order (DCO) application; seabed surveys, component replacement, painting transition pieces, marine growth/guano removal,</p>	I	N/A	The Applicant acknowledges that Historic England has no objections to the Operation and Maintenance approach in general and notes their preference for the mitigation approaches agreed for pre-construction and construction phases to be applied to the life of the

replacement of access ladders, anode replacement, j-tube repair/replacement, remedial burial, cable protection replacement, cable repairs. We have no objections to this approach in principle, but it should be noted that impacts from the mitigation phase should include consideration of the need for mitigation measures to be applied to the life of the project, and appropriate mechanisms to secure such mitigation.

Additionally, we note from this chapter and from Volume 2, Chapter 10 'Marine Archaeology' that the impact assessment does not include consideration of the impacts from cable repair and remediation activities. We request that such consideration is given as such activities have the potential to impact new area of seabed, especially in the event that new cable is laid which may not be possible on the original cable route and would therefore potential impact new areas within the DCO limit.

project. Mitigation strategies for potential impacts during the Construction, Operation and Maintenance phases are detailed in Table 9.8, Table 9.10 and Section 9.11 of **Volume A2, Chapter 9: Marine Archaeology**. Future monitoring is explained further in **Volume F2, Chapter 4: Outline Marine WSI** which states in Section 1.1.1.5 that; "There is also consideration of potential mitigation during the operational phase of the wind farm and during future decommissioning works" and in Section 5.5.1.2 that; "Future planned works potentially impacting on potential archaeological receptors will require detailed Method Statements to be agreed by the relevant curator/s."

The Applicant discussed the consideration of the impacts from cable repair and remediation activities with Historic England during Marine Archaeology Technical Panel meeting #2 on 13/11/19. Historic England provided clarity on the comment which was resolved by amending the wording of impact MA-0-7 for the Operation and Maintenance phase, following advice from Hornsea Four's cable specialist team. Historic England agreed the amended wording to read as follows: "Scour, penetration, draw down and compression effects caused by (a) the presence of WTG substation foundations, and (b) the exposure and replacement of inter-array and

					export cables or the use of cable protection measures (such as remedial cable burial), impacting archaeological receptors and exposing such material to natural, chemical or biological processes and causing or accelerating loss of the same"
S42_0065_004	Historic England	<p><b>Volume 2, Chapter 10: Marine Archaeology:</b></p> <p>We note that Table 10.5 'Summary of site-specific survey data' describes that the surveys undertaken in 2018 and 2019 extend across the array area and export cable corridor, but were of limited coverage, and that further geophysical and geotechnical surveys are planned at key project stages to inform further archaeological assessment prior to construction. We are content with the programme as set out in this table, and the mechanisms for securing these surveys through the DCO, Deemed Marine Licences (DMLs), and WSI.</p> <p>We are appreciative of the inclusion of Historic Seascape Characterisation assessment within the Marine Archaeology chapter, which enables this chapter to better act as a standalone report. We note the assessment considered that no significant effect in isolation or cumulatively is expected from Hornsea 4.</p> <p>We note that Table 10.8 'Impacts scoped out of assessment and justification' and Table 10.10 'Maximum design scenario for impacts on marine archaeology' present the impacts that are not considered significant in Environmental Impact Assessment (EIA) terms, and those that have been considered within the EIA respectively. Given the further detail provided in terms of the assessment undertaken to reach this conclusion, the commitments presented to mitigate impacts and the securement of these commitments within the</p>	I	Io	The Applicant notes this comment.



		DCO and associated DMLs, we are content with this approach.			
S42_0065_006	Historic England	<p><b>Volume 5, Annex 10.1: Marine Archaeology Technical Report:</b></p> <p>We are pleased within the summary of the baseline archaeological environment as presented within the Marine Archaeology Technical Report, and the assessment of the geophysical and geotechnical data that is currently available. We note the data limitations and look forward to seeing further information presented in due course, once further data has been collected.</p> <p>We are pleased to see the inclusion of consideration of the Yorkshire Archaeology Research Framework within the Marine Archaeology Assessment, in particular with reference to the prehistory archaeology within the ECC.</p> <p>From the desk-based assessment and from the initial geoarchaeological studies undertaken by MSDS and COARS, it seems likely that there will be Upper Palaeolithic and Mesolithic deposits within the study area. (From Subsection 3.2.2 'Early Prehistory: Palaeolithic (c.800,000 - 10,000BC)' and specifically paragraph 3.2.2.6). We are pleased with this assessment and look forward to the input of further data into the analysis as it is collection and assessed going forward.</p> <p>In particular, we note that there is evidence of Mesolithic activity at Fraisthorpe Sands, which lies within the PEIR boundary. This would need to be explicitly considered within investigations of the landfall area, in order to ensure adequate mitigation. We are, however, pleased by the current mitigation measures set out in Section 5 'Mitigation', based on the current baseline assessment and impact assessment.</p>	1	N/A	<p>The Applicant notes Historic England's comments and is pleased they are content with: the summary of the baseline archaeological environment and the assessment of the geophysical and geotechnical data that is currently available; the consideration of the Yorkshire Archaeology Research Framework; the initial geoarchaeological studies undertaken by MSDS and COARS and the mitigation measures set out in Section 5, which will be taken forward to ES. The Applicant is keeping Historic England informed of future geophysical and geotechnical survey campaigns and <b>Volume A5 Annex 9.1</b> of the ES has been updated with further geophysical data gained between PEIR and ES.</p>

<p>S42_0065_7.1</p>	<p>Historic England</p>	<p><b>Annex F2.4: Outline Marine Written Scheme of Investigation:</b></p> <p>In general, we are content with the outlined structure of the Outline Marine WSI, however, we consider that further detail is required on a number of matters prior to the acceptance of a WSI as a certified document as part of the examination process.</p> <p>In particular, it would be useful to include within the WSI a log of completed and proposed geophysical and geotechnical investigations, to facilitate the understanding of both project staff and the archaeological curator of the data previously collected and a clear summary -of works still outstanding. This should include details of the date, resolution, coverage, quality assessment, confidence statement, and associated reports for each survey as a minimum.</p> <p>Further detail is required in the WSI with regards to the implementation, amendments and removal of AEZs and TEZs, in particular the relevant parties from whom advice should be sought (i.e. the Retained Archaeologist and the Archaeological Curator).</p> <p>Further detail is also required on the timescales for the production of reports, their delivery to the archaeological curator for review, their deposition to archival institutes, and the production of method statements prior to survey works.</p> <p>The contacts listed within paragraph 2.3.1.1 needs to be amended as follows:</p> <ul style="list-style-type: none"> <li>· Pip Naylor, Historic England Marine Planning Unit; and</li> <li>· Dr Keith Emerick, Historic England North East and Yorkshire.</li> </ul>	<p>I</p>	<p>N/A</p>	<p>The Applicant notes this comment and discussed how to update the WSI accordingly with Historic England during Marine Archaeology Technical Panel meeting #2 on 13/11/19. As a result, the following updates have been made to <b>Volume F2, Chapter 4: Outline Marine Written Scheme of Investigation:</b></p> <ul style="list-style-type: none"> <li>- Table 1 is being added to Section 3: Development Scheme Details. This includes a summary of completed and proposed geophysical and geotechnical investigations. Table 6, outlining the proposed geophysical and geotechnical investigations, is being updated to include date, resolution, coverage quality assessment, confidence statement, and associated reports where known;</li> <li>- Further detail with regards to the implementation, amendments and removal of AEZs and TEZs are being added to Sections 5 and 6;</li> <li>- Further detail with regards to the timescales for the production of reports, their delivery to the archaeological curator for review, their deposition to archival institutes, and the production of method statements prior to survey works are being added to Section 7;</li> <li>- The contacts in section 2.3.1.1 are being updated;</li> <li>- The errors in paragraphs 3.1.1.1, 4.6.1.2 and Table 4 are being corrected;</li> <li>- Reference to Historic England Geophysical guidance and geoarchaeological guidance is being added to section 7;</li> </ul>
<p>S42_0065_7.2</p>	<p>Historic England</p>	<p>There are errors within the first line of paragraph 3.1.1.1, the last bullet point of</p>	<p>I</p>	<p>N/A</p>	<p></p>

	<p>paragraph 4.6.1.2, and the heading of Table 4 which require correction. The standards set out in Section 7 'Scheme of Investigations' could usefully reference the HE Geophysical guidance and geoaerchaeological guidance.</p> <p>Appendix A:</p> <p>Sections 8 'All staff - this should be expanded to include provisions for further members of staff, in particular those most likely to encounter material of archaeological potential during the tasks, to undertake specific protocol training as well as simply 'being made away'.</p> <p>Table A.2 'Summary of handing recommendations' - title needs correcting and there needs to be further detail to describe that finds should not be cleaned or 'emptied', and to keep associated.</p>		<ul style="list-style-type: none"> <li>- Section 8 has been updated to clarify the need to undertake PAD training; and</li> <li>- The title in Table A 2 has been updated and further lines have been added to the table to add further detail regarding the cleaning/emptying of finds.</li> </ul>
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## EIA topic area: Seascape, Landscape and Visual Resources

Comment ID (consultation _response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/ New or N/A)	Applicant Response
S42_0052_6.90	Natural England	<p><u>Preamble to SLVIA Comments</u></p> <p>Natural England (NE) welcomes this opportunity to comment on the defined landscape, seascape and related visual documents of the PEIR as they relate to the offshore aspects of the scheme. In keeping with our previous comments on the potential landscape, seascape and visual effects likely to arise from the development we will limit our comments to those aspects of the scheme which have the potential to effect the special character of the Flamborough Head Heritage Coast (FHHC) and its seascape setting.</p>	N	N/A	It is the Applicant's view that the Flamborough Head Heritage Coast is not a national, statutory designation and it does not have the same level of protection as AONBs and National Parks, which are nationally designated by Natural England and are given the highest protection through the NPPF. Heritage Coasts are defined by agreement between the relevant maritime local authorities and Natural England and are protected by local policy through

		<p>For landscape and seascape effects both within and outside of the FHHC we advise that close attention is paid to the comments and advice provided by the relevant Local Planning Authorities in order to ensure that the ExA can reach a fully informed determination of this scheme.</p> <p>National Policy Statements make no reference to Heritage Coasts. National Policy Statements do however make reference to schemes located outside of designated landscapes 'which may have impacts within them' (for instance EN1 at para. 5.9.12 page 97). The NPPF (2018) makes reference to Heritage Coasts in paragraph 173. The PEIR acknowledges (PEIR document 06 Volume 1 Chapter 2 Planning and Policy Context para. 2.3.3.2, page 17) that the NPPF may be considered a relevant matter in the determination of the scheme. NE consider that in this instance para. 173 of the NPPF (2018) is a relevant matter and note the amended wording (to that used in NPPF: 2012) in respect of those Heritage Coasts located outside of a designated landscape.</p>			<p>the development plan. NPPF (2018) at para 173 relates to development occurring within a Heritage Coast where it is not also designated as an AONB or National Park, which is in fact the case with the majority of areas defined as Heritage Coast.</p> <p>The Applicant is in agreement with Natural England that the offshore structures within the array area would have no significant adverse effects on the Flamborough Headland Heritage Coast and proposes that the effects these structures are not considered further in the ES.</p>
S42_0052_6.91	Natural England	<p>NE offers its comments and advice without prejudice. Our comments and advice on the defined landscape, seascape and visual effects of the offshore elements of the scheme may change as further evidence and information emerges from further assessments undertaken by the applicant as a part of the EIA process. NE may also collect its own evidence to inform our comments and advice and may continue to do so until the end of the examination process.</p> <p>Our comments are based solely on the documents provided by the applicant. The relevant documents are;</p> <ul style="list-style-type: none"> <li>- Non-Technical Summary</li> <li>- Volume 1 Chapter 2 Planning and Policy Context</li> <li>- Volume 1 Chapter 4 Project Description</li> <li>- Volume 2 Chapter 11 Seascape, Landscape and Visual Resources</li> </ul>	N	N/A	<p>The Applicant is in agreement with Natural England that the offshore structures within the array area would have no significant adverse effects on the Flamborough Headland Heritage Coast and proposes that the effects these structures are not considered further in the ES.</p>

		<ul style="list-style-type: none"> <li>- Volume 5 Annex 1.11 SLVIA Technical Report</li> <li>- Volume 5 Annex 1.12 SLVIA Visualisations</li> <li>- Plans and Drawings Volume D1.1.2 Location Plan Offshore</li> </ul> <p>Natural England has reviewed the available information and offers the following comments.</p>			
S42_0052_6.92	Natural England	<p><b>Wind Turbines and Associated Offshore Structures within the Array Area</b></p> <p>The key issue for Natural England is the potential for the turbines and associated offshore structures to adversely affect the seascape setting of the FHHC. We note that the turbines could have a maximum height to blade tip of 370m and width of 12m whilst the height of the associated structures (offshore substations and accommodation platforms) could be up to 90m. The separation distance between the nearest onshore location of the FHHC (AOD 50m) and the western edge of the array is 65.7km. Due to the separation distance from the FHHC and height of the associated offshore structures within the array area Natural England has no further comments to make in respect of these structures as they will not be visible from this location and will in effect be located beyond the visible horizon when viewed from FHHC.</p> <p>We agree that turbines could potentially be seen during periods of excellent visibility (as defined in PEIR document 64 Volume 5 Annex 1.11 SLVIA Technical Report at para. 2.4.1.1 page 14) from the FHHC. The wireline diagram for Viewpoint 1 Flamborough Head (PEIR document 65 Volume 5 Annex 1.12 SLVIA Visualisations page 3) illustrates this. The ZTV diagram on page 12 of PEIR document 64 Volume 5 Annex 1.11 (Hornsea Four Array Area Blade Tip ZTV) provides an indication of the areas within the FHHC from which the blade tips may be visible.</p>	N	N/A	<p>It is the Applicant's view that the Flamborough Head Heritage Coast is not a national, statutory designation and it does not have the same level of protection as AONBs and National Parks, which are nationally designated by Natural England and are given the highest protection through the NPPF. Heritage Coasts are defined by agreement between the relevant maritime local authorities and Natural England and are protected by local policy through the development plan. NPPF (2018) at para 173 relates to development occurring within a Heritage Coast where it is not also designated as an AONB or National Park, which is in fact the case with the majority of areas defined as Heritage Coast.</p> <p>The Applicant is in agreement with Natural England that the offshore structures within the array area would have no significant adverse effects on the Flamborough Headland Heritage Coast and proposes that the effects these structures are not considered further in the ES.</p>

		Having considered this information and then compared this wireline diagram with other wireline diagrams for offshore arrays already located in the seascape setting of a designated landscape Natural England advises that the effect of Hornsea Four will be less than significant.			
S42_0052_IN T 2.7	Natural England	<p><b>Seascape</b></p> <p>The key issue for Natural England regarding seascape is the potential for HVAC offshore booster stations to adversely affect the seascape setting of the Flamborough Head Heritage Coast (FHHC) and therefore the special character of the coast in this location. Natural England therefore requests that the seascape, landscape and visual impact assessment (SLVIA) includes an assessment of the likely effect of the HVAC booster stations on the special character of the coast as this relates to the FHHC</p>	I	N/A	<p>The Applicant has addressed Natural England’s concerns regarding the impact of HVAC offshore booster stations on the special character of FHHC by consulting with Natural England and ERYC between PEIR and ES. NE recommended via written correspondence (dated 08/11/19 NE) that ERYC are best placed to decide the special character of the FHHC. ERYC provided document sources via email correspondence (dated 03/12/19), none of which referenced darkness, dark skies, or dark skies out to sea as being special characteristics of the FHHC landscape or its setting. Nevertheless, the Applicant worked with technical specialists to refine the lighting requirements of the HVAC booster stations and provided details to Natural England and ERYC via written correspondence of 17/04/20. This illustrated that, based on the new lighting requirements, the night-time effects of lighting from the HVAC Booster Stations on the setting and special characteristics of the FHHC are not significant. ERYC confirmed in email correspondence of 27/04/20 that they are in agreement that both the daytime effects and effect of lighting from the HVAC Booster Station on the setting and special characteristics of the FHHC</p>

					are not significant and are not required to be considered further in the Hornsea Four ES.
S42_052_7.1.1	Natural England	<p><b>HVAC Offshore Booster Stations</b></p> <p>The key issue for Natural England is the potential for HVAC offshore booster stations to adversely affect the seascape setting of the FHHC and therefore the special character of the coast in this location. We note that the three proposed structures will be up to 90m (100m to include helipad) in height, 180m in length and potentially located 25.1km from the nearest point (AOD 50m) of the FHHC. As configured they would combine to occupy (assuming a 100m gap between each structure) approximately 0.74km of the available horizon. The wireline diagram for Viewpoint 1 Flamborough Head (PEIR document 65 Volume 5 Annex 112 SLVIA Visualisations page 3) clearly shows that these structures will be visible in periods of very good visibility, forming distinct objects on the horizon.</p> <p>The map on page 18 of PEIR document 20 Volume 2 Chapter 11 Seascape, Landscape and visual Resources (Location of Hornsea Four and SLVR Study Area) shows other offshore platforms (both manned and unmanned) located within this study area. The closest existing offshore platform to the FHHC is located approximately 42km to the south south-east and therefore outside of the visible area of seascape (which from an elevation of 50m AOD extends to approximately 25km to the surface of the sea). The introduction of the 3 HVAC booster stations will therefore add a new element to what is otherwise an open and undeveloped seascape free of fixed man-made structures. The likely visible effect of these 3 structures is influenced by their relatively low height, their location on the visible horizon (when seen from the FHHC at 50m AOD), the narrow portion of the</p>	N	N/A	<p>Natural England are pleased that the Applicant has agreed to the use of 200 cd aviation warning lighting at all times when visibility is greater than 5km. This complies with CAA and MoD requirements and will result in the offshore structures being less conspicuous when viewed from Flamborough Head at night. Natural England agree that the reduced brightness of the lights used should reduce the adverse effects of night-time lighting to the extent that these effects are no longer significant.</p> <p>The Applicant has engaged with Natural England at the S42 consultation (PEIR) and subsequent ongoing dialogue which has resulted in many of the issues being resolved. Natural England now considers there to be no further outstanding matters regarding landscape, seascape and visual.</p>

# Hornsea 4



		<p>visible horizon they accompany and their horizontal mass. Our knowledge of similar existing structures (offshore substations) suggests that they are frequently lit at night; both with yellow marine navigational lighting and white personnel access lighting. At night and within an otherwise completely dark seascape this light (as it is intended too) is visible for a considerable distance. Dark skies are a part of the special seascape character of the FHHC and NE is concerned that this aspect of the scheme has the potential to adversely affect this.</p>		
S42_052_7.1.2	Natural England	<p>Natural England requests therefore that the SLVIA includes an assessment of the likely effect of the HVAC booster stations on the special character of the coast as this relates to the FHHC. The assessment should:</p> <p>Use the location of the structures within the HAVC Search Area as shown on the map on page 18 of PEIR 20 document Volume 2 Chapter 11 Seascape, Landscape and Visual Resources. In terms of the proximity to the FHHC this location represents the realistic worst case scenario. Include the creation of photomontages for both daylight and night time effects for periods of very good visibility which equate to the realistic worst case scenario for views out to sea from this location. Include the creation of a ZTV diagram for these structures.</p> <p>Use Viewpoint 1 (located within the FHHC) and as shown on various maps. Provide a narrative judgement clearly setting out how these structures interact with the special character of the FHHC and whether or not this interaction is detrimental to that character.</p> <p>The evidence generated by this assessment should then be used to inform the final location of these</p>	N	N/A



		structures post consent (as described in para. 4.8.2.14 PEIR document 8 Volume 1 Chapter 4 Project Description, p.29) and be considered in conjunction with the other potential constrains on siting as set out in this paragraph. Should a significant effect be concluded by the assessment Natural England would wish to see this effect migrated by locating these structure further eastwards and therefore further away from the FHHC. In all instances the effect on the special character of the FHHC should be minimised as far as is practical.			
S42_052_7.2	Natural England	<p>In formulating these comments the following documents have been considered:</p> <ul style="list-style-type: none"> <li>- Volume 1 Chapter 4 Project Description</li> <li>- Volume 5 Annex 23 Marine Conservation Zone Assessment.ashx</li> </ul> <p>Natural England welcomes the commitment to avoid direct impacts on Holderness Inshore and Holderness Offshore MCZs, however, as identified within the MCZ assessment, there remains the potential for indirect impacts on both sites.</p> <p>Natural England has provided a number of comments in relation to marine process and benthic ecology that are relevant to the MCZ assessment that may have a bearing on the conclusions, and consequently, we do not support the conclusions of the assessment at this time.</p> <p>Rather than repeat the comments we have previously made in Annex 2 and 3 above, we propose that the MCZ assessment is updated once they have been addressed. In particular, Natural England would draw attention to our comments relating to nearshore and longshore sediment flow and their potential influence on designated sites, and it should be noted that potential impacts on coastal erosion are also relevant considerations in</p>	I	N/A	<p><b>Volume 5, Annex 2.3: Marine Conservation Zone Assessment</b> has been updated to reflect the most up-to-date conclusions of the wider Environmental Statement.</p> <p>Specific consideration regarding 'the Binks' is considered in <b>Volume 5, Annex 2.3: Marine Conservation Zone Assessment</b>.</p>

	<p>this regard.</p> <p>As a specific comment we would highlight that the potential impacts on the geological feature of Holderness Inshore 'the Binks' should be fully considered.</p> <p>As a minor point, in terms of providing a proportionate level of information it may be simpler to signpost to the MMO guidance on MCZ assessment than to repeat it in the Methodology section.</p>			
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## EIA topic area: Infrastructure and other users

Comment ID (consultation _ response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/ New or N/A)	Applicant Response
S42_0003_001	Actis Oil and Gas (now Painted Wold Resources)	Request for shapefiles in the downloads that give the position of the gathering array, cable system or PEIR boundary.	N/A	N/A	The Applicant provided Actis Oil & Gas with a full set of shapefiles in response on 23 August 2019.  Letter of No Objection signed by Painted Wold Resources.
S42_0005_001	Perenco	<p>We are reviewing the documents you sent as part of the S42 consultation and have tried to use the included map to determine where the proposed work would impact our infrastructure.</p> <p>As the map has only been georeferenced based on 2 points, we are not confident in its correctness. As such, please can you confirm the specific coordinates of the planned development?</p>	N/A	N/A	The Applicant provided Perenco with full set of shapefiles in response on 23 August 2019.

S42_0012_001	Perenco	<p>There are existing (and proposed) line-of-sight microwave radio links that will be impacted by the Hornsea Project 4. These are as follows:  RN&lt;&gt;Trent – Existing radio Link  RN&lt;&gt; Kilmar – Proposed - License application with OFCOM  RN&lt;&gt; Garrow – Proposed - License application with OFCOM.</p> <p>At the meeting in June that my colleagues (Alex Findlow and Carl Ashpole) attended at the Orsted office in London, the above links were highlighted to the project and noted. Alex explained that whilst a 'corridor' will definitely need to be provided between Ravenspurn North and Trent, it may be more cost effective for the project to facilitate (financially) the following links:  CLE&lt;&gt;Garrow   Garrow&lt;&gt;Kilmar   Kilmar&lt;&gt;Trent, to avoid having to provide corridors for the planned Kilmar&lt;&gt;Trent and Garrow&lt;&gt;Trent radio inks.</p> <table border="1"> <thead> <tr> <th></th> <th>Lat</th> <th>Long</th> </tr> </thead> <tbody> <tr> <td>Trent</td> <td>54 17 58N</td> <td>01 39 35E</td> </tr> <tr> <td>Kilmar</td> <td>54 17 26N</td> <td>01 20 10E</td> </tr> <tr> <td>Garrow</td> <td>54 16 23N</td> <td>01 59 47E</td> </tr> <tr> <td>Rav North</td> <td>54 01 53N</td> <td>01 06 08E</td> </tr> </tbody> </table>		Lat	Long	Trent	54 17 58N	01 39 35E	Kilmar	54 17 26N	01 20 10E	Garrow	54 16 23N	01 59 47E	Rav North	54 01 53N	01 06 08E	I	N/A	<p>The Applicant notes this response and has undertaken an assessment of the impact on microwave radio links which has been shared with Perenco.</p> <p>This is presented in <a href="#">Volume A2, Chapter 11 of the ES: Infrastructure &amp; Other Users</a> and <a href="#">Volume A5 Annex 11.1 of the ES: Offshore Installation Interfaces</a>. The Applicant is engaging with Perenco to ensure the issues are addressed.</p>
	Lat	Long																		
Trent	54 17 58N	01 39 35E																		
Kilmar	54 17 26N	01 20 10E																		
Garrow	54 16 23N	01 59 47E																		
Rav North	54 01 53N	01 06 08E																		
S42_0017_001	Perenco	From a marine logistics perspective, we do not believe there are any concerns	N/A	N/A	The Applicant notes this comment.															
S42_0018_001	Perenco	Perenco's helicopter operator has explained that without exact locations of individual wind turbines it is hard for them to give a specific response. However they have said that Perenco should object to having wind turbines within 7 NM of a platform because if they come within 7 NM there are likely to be days when (dependent on weather conditions and wind direction) helicopters can't safely approach the platform. This is because if one or more wind turbines are within 7 NM of a platform it will start to have an impact on	N/A	N/A	<p>Following Perenco's consultation response, the Applicant held a specific aviation workshop to address the objections regarding proximity of wind turbines to their platforms.</p> <p>Since that time there have been further meetings and workshops to address helicopter access concerns. The applicant has also commissioned a Helicopter Access report by an</p>															

		operations to that platform in Instrument Meteorological Conditions (IMC). When they fly an Airborne Radar Approach (ARA) the flight path extends approximately 6 miles downwind of the platform and they need to maintain at least 1 NM clear of any radar contacts.			aviation expert which looked specifically at Perenco's platforms.  The impacts on Perenco's helicopter operations are considered within the helicopter assessments in <a href="#">Volume 2, Chapter 11: Infrastructure &amp; Other Users of the ES (A2.1.1)</a> and <a href="#">Volume 5, Annex 11.1: Offshore Installation Interfaces</a> . The Applicant is engaging with Perenco to try and find a resolution to this issue.
S42_0007_001	The Coal Authority	Dear Mr Carolan  Section 42 of the Planning Act 2008 and Regulation 13 of Infrastructure Planning (Environmental Impact Assessment) Regulations 2017  Thank you for your notification dated 08 August 2019 in relation to the proposed offshore wind farm: Hornsea Project Four Offshore Wind Farm  I have checked the site location plan identified on your interactive map viewer against our coal mining information and I can confirm that, whilst the proposed development site falls within the coalfield; to the south west of Barmston, East Riding of Yorkshire and out towards the North Sea, it is located within the Development Low Risk Area. Therefore, there are no recorded coal mining legacy hazards at shallow depth that need to be considered as part of the future development within this area. Accordingly, there is no requirement for the applicant to consider coal mining legacy as part of the Environmental Impact Assessment.	N	N/A	The Applicant acknowledges the Coal Authority's consideration of the PEIR. No further action is required.
S42_0008_001	National Air Traffic Services (NATS)	NATS are pleased to note that the PEIR endorses our stated position that the proposed development would degrade the performance of our installed radar infrastructure and therefore	N	N/A	Potential effects on the interests of NATS radar are assessed in <a href="#">Volume 2, Chapter 8: Aviation and Radar of the Environmental Statement</a> . The

		negatively affect our ability to provide a safe and efficient air traffic service in the vicinity of the turbines. NATS is able to confirm that we believe mitigation to be possible however would like to point out that in terms of timescales the two phases of the proposed mitigation would have to be delivered in the reverse order, i.e. the airspace change is a pre-requisite of the radar blanking.			Applicant has commenced and will continue to engage with NATS on an appropriate mitigation solution where significant impacts are identified.
S42_0010_001	Harlaxton Energy Networks Ltd.	Harlaxton Energy Networks Ltd. at this time have no assets within 200m of the area and will not be implementing any in the near future, therefore Harlaxton has no comment to make on this project.	N/A	N/A	The Applicant notes this comment.
S42_0011_001	Cadent Gas	I can confirm that this project's onshore elements are outside of Cadent's network and therefore we have no interests affected by proposals.	N/A	N/A	The Applicant notes this comment.
S42_0022_001	National Grid	<p>Electricity Infrastructure:</p> <ul style="list-style-type: none"> <li>▪ National Grid's Overhead Line is protected by a Deed of Easement/Wayleave Agreement which provides full right of access to retain, maintain, repair and inspect our asset</li> <li>▪ Statutory electrical safety clearances must be maintained at all times. Any proposed buildings must not be closer than 5.3m to the lowest conductor. National Grid recommends that no permanent structures are built directly beneath overhead lines. These distances are set out in EN 43 – 8 Technical Specification for "overhead line clearances Issue 3 (2004) available at: <a href="http://www.nationalgrid.com/uk/LandandDevelopment/DDC/devnearohl_final/appendixIII/a.pplll-part2">http://www.nationalgrid.com/uk/LandandDevelopment/DDC/devnearohl_final/appendixIII/a.pplll-part2</a></li> <li>▪ If any changes in ground levels are proposed either beneath or in close proximity to our existing overhead lines then this would serve to reduce the</li> </ul>	N	N/A	<p>The Applicant has engaged with National Grid regarding the interrelation between Hornsea Four and National Grid's above and below ground cables. This engagement will continue throughout the DCO process and post-consent.</p> <p>Statutory electrical safety clearances will be adhered to with project infrastructure, plant and machinery located outside of the limitations set out in EN 43 – 8.</p> <p>Any landscape planting in proximity to National Grid's infrastructure will be designed in accordance with National Grid guidance.</p> <p>The Applicant has included Protective Provisions for the benefit of National Grid Electricity in Part 3 of</p>

	<p>safety clearances for such overhead lines. Safe clearances for existing overhead lines must be maintained in all circumstances.</p> <ul style="list-style-type: none"> <li>▪ Further guidance on development near electricity transmission overhead lines is available here:  <a href="http://www.nationalgrid.com/NR/rdonlyres/1E990EE5-D068-4DD6-8C9A4DOB06A1BA79/31436/Developmentnearoverheadlines1.pdf">http://www.nationalgrid.com/NR/rdonlyres/1E990EE5-D068-4DD6-8C9A4DOB06A1BA79/31436/Developmentnearoverheadlines1.pdf</a></li> <li>▪ The relevant guidance in relation to working safely near to existing overhead lines is contained within the Health and Safety Executive's (<a href="http://www.hse.gov.uk/">http://www.hse.gov.uk/</a>) Guidance Note GS 6 "Avoidance of Danger from Overhead Electric Lines" and all relevant site staff should make sure that they are both aware of and understand this guidance.</li> <li>▪ Plant, machinery, equipment, buildings or scaffolding should not encroach within 5.3 metres of any of our high voltage conductors when those conductors are under their worse conditions of maximum "sag" and "swing" and overhead line profile (maximum "sag" and "swing") drawings should be obtained using the contact details above. ▪ If a landscaping scheme is proposed as part of the proposal, we request that only slow and low growing species of trees and shrubs are planted beneath and adjacent to the existing overhead line to reduce the risk of growth to a height which compromises statutory safety clearances.</li> <li>▪ Drilling or excavation works should not be undertaken if they have the potential to disturb or adversely affect the foundations or "pillars of support" of any existing tower. These foundations always extend beyond the base area of the</li> </ul>		<p>Schedule 9 of the Order. In addition, the Applicant's solicitors has commenced negotiations with National Grid's solicitor, bespoke protective provisions and a side agreement which will address all other matters.</p> <p>An undertaking for National Grid's costs was provided on 10 August 2021</p>
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		<p>existing tower and foundation (“pillar of support”) drawings can be obtained using the contact details above</p> <ul style="list-style-type: none"> <li>▪ National Grid Electricity Transmission high voltage underground cables are protected by a Deed of Grant; Easement; Wayleave Agreement or the provisions of the New Roads and Street Works Act. These provisions provide National Grid full right of access to retain, maintain, repair and inspect our assets. Hence, we require that no permanent / temporary structures be to be built over our cables or within the easement strip. Any such proposals should be discussed and agreed with National Grid prior to any works taking place.</li> <li>▪ Ground levels above our cables must not be altered in any way. Any alterations to the depth of our cables will subsequently alter the rating of the circuit and can compromise the reliability, efficiency and safety of our electricity network and requires consultation with National Grid prior to any such changes in both level and construction being implemented.</li> </ul>			
S42_0022_002	National Grid	<p><b>Gas Infrastructure</b></p> <ul style="list-style-type: none"> <li>▪ National Grid has a Deed of Grant of Easement for each pipeline, which prevents the erection of permanent / temporary buildings, or structures, change to existing ground levels, storage of materials etc.</li> </ul> <p><b>Pipeline Crossings:</b></p> <ul style="list-style-type: none"> <li>• Where existing roads cannot be used, construction traffic should ONLY cross the pipeline at previously agreed locations.</li> <li>• The pipeline shall be protected, at the crossing points, by temporary rafts constructed at ground</li> </ul>	N	N/A	<p>The Applicant notes this comment.</p> <p>The Applicant has included Protective Provisions for the benefit of National Grid Gas in Part 3 of Schedule 9 of the Order. Furthermore, Applicant’s solicitors has commenced negotiating with National Grid’s solicitors, bespoke protective provisions and a side agreement which will address all matters.</p> <p>An undertaking for National Grid’s costs was provided on 10 August 2021</p>

		<p>level. The third party shall review ground conditions, vehicle types and crossing frequencies to determine the type and construction of the raft required.</p> <ul style="list-style-type: none"> <li>• The type of raft shall be agreed with National Grid prior to installation.</li> <li>• No protective measures including the installation of concrete slab protection shall be installed over or near to the National Grid pipeline without the prior permission of National Grid.</li> <li>• National Grid will need to agree the material, the dimensions and method of installation of the proposed protective measure.</li> <li>• The method of installation shall be confirmed through the submission of a formal written method statement from the contractor to National Grid.</li> <li>• Please be aware that written permission is required before any works commence within the National Grid easement strip.</li> <li>• A National Grid representative shall monitor any works within close proximity to the pipeline to comply with National Grid specification T/SP/SSW22.</li> <li>• A Deed of Consent is required for any crossing of the easement</li> </ul>			
S42_0022_003	National Grid	<p><b>Cable Crossings:</b></p> <ul style="list-style-type: none"> <li>• Cables may cross the pipeline at perpendicular angle to the pipeline i.e. 90 degrees.</li> <li>• A National Grid representative shall supervise any cable crossing of a pipeline.</li> </ul>	N	N/A	The Applicant notes this comment.



		<ul style="list-style-type: none"> <li>• Clearance must be at least 600mm above or below the pipeline.</li> <li>• Impact protection slab should be laid between the cable and pipeline if cable crossing is above the pipeline.</li> <li>• A Deed of Consent is required for any cable crossing the easement.</li> <li>• Where a new service is to cross over the pipeline a clearance distance of 0.6 metres between the crown of the pipeline and underside of the service should be maintained. If this cannot be achieved the service shall cross below the pipeline with a clearance distance of 0.6 metres.</li> </ul>			
S42_0022_004	National Grid	<p><b>General Notes on Pipeline Safety:</b></p> <ul style="list-style-type: none"> <li>• You should be aware of the Health and Safety Executives guidance document HS(G) 47 "Avoiding Danger from Underground Services", and National Grid's specification for Safe Working in the Vicinity of National Grid High Pressure gas pipelines and associated installations - requirements for third parties T/SP/SSW22.</li> <li>• National Grid will also need to ensure that our pipelines access is maintained during and after construction.</li> <li>• Our pipelines are normally buried to a depth cover of 1.1 metres however; actual depth and position must be confirmed on site by trial hole investigation under the supervision of a National Grid representative. Ground cover above our pipelines should not be reduced or increased.</li> <li>• If any excavations are planned within 3 metres of National Grid High Pressure Pipeline or, within 10 metres of an AGI (Above Ground Installation), or if</li> </ul>	N	N/A	

		<p>any embankment or dredging works are proposed then the actual position and depth of the pipeline must be established on site in the presence of a National Grid representative. A safe working method agreed prior to any work taking place in order to minimise the risk of damage and ensure the final depth of cover does not affect the integrity of the pipeline.</p> <ul style="list-style-type: none"> <li>Excavation works may take place unsupervised no closer than 3 metres from the pipeline once the actual depth and position has been confirmed on site under the supervision of a National Grid representative. Similarly, excavation with handheld power tools is not permitted within 1.5 metres from our apparatus and the work is undertaken with NG supervision and guidance.</li> </ul> <p>To view the SSW22 Document, please use the link below:  <a href="http://www.nationalgrid.com/uk/LandandDevelopment/DDC/GasElectricNW/safeworking.htm">http://www.nationalgrid.com/uk/LandandDevelopment/DDC/GasElectricNW/safeworking.htm</a></p> <p>To download a copy of the HSE Guidance HS(G)47, please use the following link:  <a href="http://www.hse.gov.uk/pubns/books/hsg47.htm">http://www.hse.gov.uk/pubns/books/hsg47.htm</a></p>			
S42_0022_005	National Grid	<p><b>Further Advice</b></p> <p>We would request that the potential impact of the proposed scheme on National Grid’s existing assets as set out above is considered in any subsequent reports, including the Environmental Statement, and as part of any subsequent application.</p> <p>NGET is currently in discussions with the promoter about the proposed substation connection and works required to facilitate the Scheme. NGET is concerned that the draft DCO should include</p>	Y	N/A	The Applicant has allowed for additional land encapsulating the NGET Creyke Beck substation to facilitate Grid Connection works (see <a href="#">DCO Order Limits D1.2.2 and Works Plans D1.4.2</a> ). The DCO defines the nature of these works which include sufficient land within the red line boundary to enable the necessary grid connection works.

		<p>sufficient land within the red line boundary to enable the necessary works.</p> <p>The information in this letter is provided not withstanding any discussions taking place in relation to connections with electricity or gas customer services.</p>			<p>The Applicant and NGET commenced the negotiation of Heads of Terms in respect of a Lease of Easement.</p> <p>Furthermore the Applicant has included Protective Provisions for the benefit of NGET in Part 3 of Schedule 9 of the Order. The Applicant's solicitors has also commenced negotiations with National Grid's solicitors, bespoke protective provisions and a side agreement which will address all matters concerned.</p> <p>An undertaking for National Grid's costs was provided on 10 August 2021</p>
S42_0025_001	Shell	<p>Following a review of the Statutory Consultation Plans, we have identified one Shell operated pipeline (PL1570 - Shearwater Elgin Area Line) which the proposed Offshore Location Plan will affect. This major trunkline transports gas from the Elgin Franklin and Shearwater offshore platforms to the Shell operated Bacton Gas plant. I am therefore writing to request that this pipeline and the pipeline corridor (the area 250 meters either side of the pipeline) are avoided in developing designs and in carrying out any sampling, investigations or works in connection with Hornsea Four.</p> <p>I would also be grateful if you could please notify me of any sampling, investigations or works to be undertake within 300 metres either side of each pipeline corridor.</p> <p>Furthermore, we will require a protective provision and/or that Orsted enters into a side agreement with Shell U.K. Limited to ensure that PL1570 (Shearwater Elgin Area Line) is appropriately</p>	N/A	10	<p>The Applicant is engaging with Shell regarding the Shearwater pipeline and is taking it into consideration within the project design, as illustrated in <b>Volume A4, Annex 4.1: Offshore Crossing Schedule</b>.</p> <p>The Applicant intends to document our coexistence with a commercial agreement covering crossings and asset protection and the inclusion of a Protective Provision within the DCO, should this be deemed necessary.</p> <p>The Applicant acknowledges the requirement for notification of any sampling, investigations or works to be undertaken close to their pipeline corridor and will ensure such notification is given prior to any works.</p>

		protected from the potential impacts of the construction, maintenance and operation of the works to authorised by the Development Consent Order. We would be happy to provide a draft of the side agreement for your review in due course.			The Applicant is in the final stages of negotiating a Side agreement with Shell that will cover future engagement.
S42_0029_001	Conoco (now Harbour Energy)	As previously noted, crossing and/or proximity agreements will be required in the event that pipeline crossings are required and/or operations are conducted proximate to ConocoPhillips (U.K.) Limited (ConocoPhillips) operated infrastructure. In this regard we welcome the commitments summarized in Table 12.12 regarding crossing/proximity agreements. However following revision of the PEIR boundary there is no longer any direct overlap between Hornsea Four and ConocoPhillips operated infrastructure, and as such there should be no crossings of ConocoPhillips operated pipelines. We would reiterate that any Hornsea Four construction or operational activity should not act as an impediment or interfere with ConocoPhillips' required (marine and/or aviation) access to the platforms/pipelines for operating, maintenance and/or decommissioning purposes. The execution of offshore agreements may be required to appropriately address the above issues; similar agreements have been entered into previously between the parties. It should be noted that any such agreements will also require to be reviewed and accepted by the other infrastructure owners, on behalf of whom ConocoPhillips operate.	N/A	10	<p>The response has been noted and included within the <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users</a>.</p> <p>Since there is no longer a direct overlap between Hornsea Four and Conoco operated infrastructure, no crossing agreements will be required. The Applicant will continue to liaise with Harbour Energy (previously Conoco) during the construction and operation phase of Hornsea Four to ensure minimal interference to access their assets, and negotiate offshore agreements if necessary.</p>
S42_0030_001	Network Rail	<p><b>Impact on Network Rail Infrastructure</b></p> <p>Network Rail has been reviewing the information to date and note that proposals include the construction of an undertrack crossing on the railway north of Beverley and also works adjacent to the railway boundary south of Beverley (sheets 18 and 32 of the provided Onshore Works Plan) and at this stage there is not sufficient detailed to</p>	N/A	N/A	Network Rail's comments are noted in relation to the level crossings. The Applicant has engaged with Network Rail Asset Protection and the Property Team on the technical, commercial and consenting aspects related to the railway crossing North of Beverley.

	<p>fully assess potential impacts of the scheme on the railway and further information will be required to properly respond on the likely impacts of the proposed scheme.</p> <p>In order to ensure that the scheme does not impact on operational railway safety, the developer must liaise closely with Network Rail Asset Protection and Property Teams to acquire the necessary licences/land ownership rights to implement the scheme and also to ensure that the design and construction of the proposed scheme will not have an adverse impact on railway operations. It should also be noted that there are a number of railway level crossings in the area these must be taken into account for any routes for haulage and particularly construction traffic associated with this scheme. It is therefore assumed that a condition of the Order would be that detailed specifications and plans of the undertrack crossing and works adjacent to the railway are to be provided and agreed in writing before development can commence.</p> <p>We understand that the developer has already undertaken discussions with Network Rail and that these matters are in hand.</p> <p>Network Rail will be seeking protection from the exercise of compulsory purchase powers over operational land either for permanent or temporary purposes. In addition, Network Rail will wish to agree protection for the railway during the course of the construction works and otherwise to protect our undertaking and land interests. Network Rail reserves the right to produce additional and further grounds of concern when further details of the application and its effect on Network Rail's land are available. In addition, any rights for power or other lines under, over or alongside the railway line will require appropriate</p>		<p>The Applicant has requested copies of the protective provisions Network Rail would like to have us consider and are working towards a commercial agreement including these and a suitable lease or easement.</p> <p>The Applicant commenced discussions with Network Rail in April 2019. The Applicant and Network Rail are currently drafting an Option Agreement and a Lease of Easement over the land having verbally agreed heads of terms in July 2021.</p> <p>The Applicant has included Protective Provisions for the benefit of Network Rail in Part 4 of Schedule 9 of the Order and are currently negotiating bespoke protective provisions and a framework agreement with Network Rail to address matters raised.</p> <p>An undertaking for Network Rail's costs was provided on 6 July 2021.</p> <p>The Applicant has secured both Technical and Business Clearance from Network Rail and has applied for a Basic Asset Protection Agreement for which discussions relating to the timing of the BAPA implementation are ongoing.</p>
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		<p>asset protection measures deemed necessary by Network Rail to protect the operational railway and stations. We have standard protective provisions which will need to be included in the DCO as a minimum therefore contact should be made to Emily Christelow, email: [REDACTED]@networkrail.co.uk to obtain a copy of the relevant wording In addition a number of legal and commercial agreements will need to be entered into, for example, asset protection agreements, , method statements, connection agreements, property agreements and all other relevant legal and commercial agreements. This list is not exhaustive and will need to be reviewed once more details of the scheme are discussed between the parties.</p> <p>Consideration should be given to ensure that the construction and subsequent maintenance can be carried out without adversely affecting the safety of, or encroaching upon Network Rail's adjacent land. In addition, security of the railway boundary will require to be maintained at all times. In any event you must contact Network Rail's Asset Protection Engineers as soon as possible in relation to this scheme on the following e-mail address AssetProtectionLNEEM@networkrail.co.uk.</p> <p>Network Rail is prepared to discuss the inclusion of Network Rail land or rights over land subject to there being no impact on the operational railway, all regulatory and other required consents being in place and appropriate commercial and other terms having been agreed between the parties and approved by Network Rail's board.</p> <p>Network Rail also reserves the right to make additional comments once we have evaluated the proposals in more detail.</p>			
S42_0032_001	Premier Oil (now Harbour Energy)	<u>Johnston Field</u>	1	10	The Applicant is engaging with Harbour (formerly Premier Oil) regarding asset and survey

	<ul style="list-style-type: none"> <li>• Safe and efficient gas production would be significantly hindered through access constraints affecting the ability to undertake inspections, maintenance interventions and emergency repairs of the Johnston subsea infrastructure and pipelines.</li> <li>• Access for the decommissioning of the Johnston subsea infrastructure and pipelines has not been considered. No date has been set for the decommissioning of this infrastructure and such operations, or part thereof, may take place during or after the construction of Hornsea Four.</li> <li>• Proximate piling would interfere with the safety of diving operations that may be required at the Johnston subsea infrastructure.</li> <li>• Vessels supporting inspection, maintenance or decommissioning of the Johnston subsea infrastructure and pipelines would have insufficient room to operate. This includes the installation of a drilling unit and its associated anchor spread over the Johnston subsea infrastructure.</li> <li>• Future exploration and production activities in the area of the Hornsea Four array would be impeded, thereby sterilising the hydrocarbon resource in the area.</li> </ul>		<p>interactions. In particular, the Applicant is arranging technical workshops to discuss the coexistence of both sets of infrastructure and potential plans for decommissioning. The parties are working in good faith to reach agreement on how this might best be achieved.</p> <p>Interactions between Hornsea Four and activities within the Johnston field are assessed within <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p> <p>This includes:</p> <ul style="list-style-type: none"> <li>• Assessment of the impact of Hornsea Four's activities on the ability of the Johnston field to produce gas, be maintained and repaired;</li> <li>• Technical solutions for how Johnston can be accessed for decommissioning, given the presence of Hornsea Four; and</li> <li>• Assessment of the impact of Hornsea Four on the safety of diving operations in and around the Johnston field.</li> </ul> <p>The Applicant has consulted regularly with Premier Oil (now Harbour), and understands that future exploration and production within the Johnston field is unlikely.</p>
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<p>S42_0032_00 2</p>	<p>Premier Oil (now Harbour Energy)</p>	<p><b>Tolmount field and Tolmount East Field</b></p> <ul style="list-style-type: none"> <li>Reference is made in the consultation materials to the 'potential development' of the Tolmount field. Given that the development of the Tolmount field is fully approved and sanctioned with construction well underway, development of the Tolmount field should not be viewed as potential and all planned infrastructure for this field should be factored into all assessments.</li> <li>Proximate piling would interfere with the safety of diving operations that may be required at the Tolmount field platform and/or Tolmount East platform.</li> <li>Vessels supporting inspection and maintenance of the Tolmount field platform, Tolmount East platform, subsea infrastructure, and pipelines would have insufficient room to operate. This includes setting up and being on standby outside of 500 metre safety zones, working in 'drift off' positions and being accessible by helicopter.</li> <li>The proposed Hornsea Four export corridor may hinder the installation of a drilling unit and units associated anchor spread for future drilling and well workover activities.</li> <li>The proposed location of the HVAC booster station area will impact helicopter access to (a) the Tolmount field platform and Tolmount East platform; and (b) any vessels supporting activities on such platforms and associated subsea infrastructure and pipelines. Simultaneous operations (SIMPOPS) assessments will have to be carried out in respect of Premier Oil's helicopter operations</li> </ul>	<p>Y</p>	<p>1o</p>	<p>The Applicant has updated documentation and Tolmount is considered fully within this application. Infrastructure within the Tolmount field is being assessed within <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a></p> <p>The impact of Hornsea Four activities on the safety of diving operations in and around the Tolmount Main and Tolmount East platforms is being assessed in <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a></p> <p>The impact on vessel access to the Tolmount Main and Tolmount East platforms is assessed in <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>. The Applicant has considered relevant buffer distances to ensure safety zones are adhered to. Discussions were held with Premier Oil (now Harbour) following this s42 response and following this, the Applicant has already refined the boundary of the HVAC booster station search area to take Premier Oil's (now Harbour) proposed 2km buffer into consideration.</p> <p>The impact on drilling within the Tolmount field is considered in <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p> <p>The Applicant understands there will not be an impact on helicopter access to platforms and vessels within the Tolmount field.</p>
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		<p>in support of the construction and maintenance of Hornsea Four.</p> <ul style="list-style-type: none"> <li>• Third party shipping is likely to be displaced more closely to the Tomount Field platform and Tolmount East platform. Vessel traffic is likely to increase proximate to these platforms due to the cumulative effect of increasing vessel numbers from displaced shipping vessels and Hornsea Four vessels. This could have significant implications for Premier Oil's marine operations, including collision risk management system, which needs to be fully assessed with proportionate mitigations measures being identified if required.</li> <li>• Premier Oil intends to apply for further acreage around the Tolmount field and Tolmount East licensed area in future oil and gas licensing rounds. Future E&amp;P activities in the area of the Hornsea Four ECC and HVAC booster station will be impeded, in particular in and around the HVAC booster stations.</li> <li>• It is noted from the consultation materials and the interactions we have had with Orsted regarding Hornsea Four to date and little detailed assessment has been carried out in terms of the impact of Hornsea Four on the Tomount field and Tolmount East field to address the concerns identified above.</li> </ul>			<p>The risk from displacement of with third party shipping are assessed in the Allision Report Appended to <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p> <p>The Applicant is engaging in regular discussions with Premier Oil (now Harbour) regarding the Tolmount Field and associated interactions between the two developments. In particular, the Applicant is arranging technical workshops to discuss the coexistence of Tolmount, future developments within the field and interactions with Hornsea Four. The parties are working in good faith to reach agreement on how this might best be achieved.</p> <p>A detailed assessment of the interactions between Hornsea Four and the Tolmount field will be included within <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a> to address all of Premier Oil's (now Harbour) stated concerns.</p>
S42_0032_003	Premier Oil (now Harbour Energy)	<p><b>General Matters</b></p> <ul style="list-style-type: none"> <li>• We require to fully understand and assess the cumulative and in-combination issues associated with Hornsea Four and the development of several windfarms in the geographical area.</li> </ul>	1	10	<p>Cumulative and in-combination issues are addressed in the Cumulative Effects section of <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users</a>.</p> <p>The Applicant is engaging with Premier Oil (now Harbour) and will</p>

		<ul style="list-style-type: none"> <li>We must be able to assess the proximity of all Hornsea Four survey, construction and maintenance operations to Premier Oil's infrastructure as well as any construction or maintenance vessels to determine the requirement for any additional protection measures.</li> <li>The effect of HVAC cables crossing and/or being proximate to Premier's pipelines, including electrical interference with any pipeline cathodic protection system or control umbilical and the effect of multiple crossing will require to be assessed. The agreement and design of any required crossing should be dealt with in a crossing agreement and we would be happy to engage on how best cooperate in future on this.</li> </ul>			<p>keep them informed of all survey works, ensuring they are updated with details of construction and maintenance operations proximate to Premier Oil's infrastructure.</p> <p>An assessment of the interactions between Hornsea Four activities (surveys, construction, operation and maintenance) and Premier Oil's (now Harbour) infrastructure will be included within <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p> <p>The effects of cable crossings are considered in Volume A2, Chapter 11: Infrastructure &amp; Other Users of the ES and <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p> <p>The Applicant will liaise with Premier Oil to ensure appropriate agreements are put in place for crossings with cables.</p>
S42_0041_001	Dogger Bank Projects	The Project Description identifies that the proposed offshore export cable for Hornsea Project Four will cross the offshore export cables for the Creyke Beck Projects approximately 5km – 20km from the landfall location, and it is likely to be east of Smithic Sands. Dogger Bank Wind Farms expect there to be continued engagement with Hornsea Project Four on their proposals for this crossing. A crossing agreement will be required between the projects.			<p>The Applicant notes this comment. The cable crossings between Hornsea Four infrastructure and the Creyke Beck Project export cables are presented in <a href="#">Volume A4, Chapter 4, Annex 1: Offshore Crossing Schedule</a>.</p> <p>Once the onshore coexistence negotiations are concluded the offshore crossing agreement will be prepared.</p>
S42_0041_002	Dogger Bank Projects	In relation to proximity to the cables, in Chapter 12 – Infrastructure and other users, Table 12.17	N/A	N/A	In relation to the consideration of the Creyke Beck A and B Export Cables

		<p>includes the Creyke Beck A and B export cables. However, in relation to Creyke Beck A it states the distance to the Hornsea Project Four Array areas as 0km and distance to the ECC as 8.46km. This is incorrect as the Creyke Beck A export cables do not interact with the Array site but do cross the Creyke Beck A export cable route. There is then descriptive text in the table for distance to the Booster Station rather than the distance the Creyke Beck export cables are from the Booster Station Search Area. This section should be updated to ensure the correct information is included. In addition, for the Creyke Beck B section of the table, the reason for inclusion in the CEA refers to Hornsea Two, this should also be updated.</p>			<p>within Table 12.17 "Project screened into the Infrastructure and Other Users cumulative effects assessment" of <b>Volume A2, Chapter 11: Infrastructure &amp; Other Users</b>:</p> <ul style="list-style-type: none"> <li>The Applicant notes an error in the alignment of the table submitted at PEIR. The correct values for Dogger Bank Creyke Beck A Export Cables should be as follows: distance to Hornsea Four Array – 25.13km; distance to Hornsea Four ECC – 0.00km; Distance to Hornsea Four HVAC Booster Station Search Area – 8.46km. It is noted that the "reason for inclusion in CEA" description is also in the incorrect column. This will be corrected in the table submitted at ES.</li> <li>For the Creyke Beck B section of the table, the Applicant notes that Hornsea Two has been referred to in error in the "reason for inclusion in the CEA" column, this should refer to Dogger Bank Creyke Beck. This has been updated in <b>Volume A2, Chapter 11: Infrastructure &amp; Other Users of the ES</b>.</li> </ul>
S42_0041_003	Dogger Bank Projects	<p>In relation to the Southern North Sea SAC for harbour porpoise, the in-combination tables shown are very precautionary regarding the Projects that could be piling at the same time as Hornsea Project Four. This shows unrealistic impacts on the Southern North Sea SAC. As the construction timings for other consented Projects become better defined, along with the likely construction</p>	Y	N/A	<p>The Applicant notes this comment.</p>

		timescales for Hornsea Project Four, we would expect the RIAA to be updated to reflect this.			
S42_0041_004	Dogger Bank Projects	<p>When considering the impacts of wind farms on the SPAs, a generic approach has been taken in the draft RIAA that assumes, for example, that the same percentage for attributing the birds to specific SPAs can be used for all sites, irrespective of distance from site. Based on the ongoing discussions on this topic and SNCB guidance on previous projects, we would expect the assessment to be updated to reflect the actual potential connectivity to the SPAs.</p> <p>Due to the interactions between the Creyke Beck projects and Hornsea Project Four ongoing interface meetings will be required to ensure necessary crossing agreements or other interactions are properly understood and managed.</p>	I		<p>The Applicant has made use of the industry guidance on apportionment of species within wider geographical zones with respect to estimating potential interactions between species from particular SPAs and OWFs. This approach allows for a level playing field to be used to identify potential interactions / impacts and as such is the basis for our assessments. Following the publication of the latest mean max foraging ranges for seabirds in Woodward et al (2019) the Applicant will apply any updated considerations, as and where appropriate for species of interest.</p> <p>Although the Order Limits for both projects overlap it is unlikely that the onshore apparatus will physically cross.</p> <p>The Applicant and Dogger Bank continue to liaise to document their onshore coexistence. The Applicant has included Protective Provisions in Part 7 of Schedule 9 of the Order for the benefit of Doggerbank.</p> <p>The Applicant is also proposing to amend the Dogger Bank Offshore Wind Farm Order 2015 to include protective provisions for the benefit of Hornsea Four.</p>

S42_0054_001	Alpha Petroleum	<p>The grounds of the response are that the proximity of the "array area" boundary is sufficiently adjacent to the Garrow and Kilmar offshore gas platforms owned and operated by Alpha Petroleum and Partners such that helicopter and attending vessels' operations may be affected by the presence of wind turbines. These concerns were raised at the Project Four Hazard Workshop 27th June 2019 at Ørsted's London office on 27th June but to date do not appear on the Hornsea 4 project Impacts Register or Commitments Register.</p> <p>Alpha and Partners formally raise an objection to having wind turbines within 7nautical miles of platforms and further submissions may be raised following the Hornsea 4 windfarm helicopter workshop organised by Ørsted to be held on the 27th September 2019.</p>	I	N/A	<p>The Applicant held a specific aviation workshop on 27th November 2019 to address Alpha Petroleum's consultation response regarding proximity of wind turbines to their platforms. Following this workshop, the Applicant undertook a helicopter assessment to analyse how nearby O&amp;G platforms may be affected by the presence of wind turbines. This was presented to Alpha ahead of a second helicopter workshop, held on 9th January 2020, where the Applicant furthered their understanding of what co-existence issues there may be between Alpha's developments and Hornsea Four. The helicopter assessment was subsequently updated to include Garrow and Kilmar, which is presented within the application as <a href="#">Volume A5, Annex 11.1, Appendix A</a>.</p> <p>The Applicant and Alpha Petroleum have subsequently signed a Letter of Comfort in relation to co-existence between Hornsea Four and the Kilmar &amp; Garrow gas fields.</p>
S42_0056_001	Spirit Energy (now NEO Energy)	<p><u>Shipping and Navigation</u></p> <ul style="list-style-type: none"> <li>· Vessels supporting Spirit Energy's proximate platforms, subsea infrastructure and pipelines require sufficient evaluation to demonstrate having sufficient sea room to operate.</li> <li>· Displacement of third party shipping and fishing has potential to be routed closer to Spirit Energy's assets and needs further consideration.</li> <li>· The radar coverage of Emergency Rescue and Recovery Vessels supporting the Babbage asset could become impaired. Therefore, implications for the increased risk to personnel and the asset will need thorough evaluation in accordance with the installation safety case, with consideration of mitigation measures being required to make the risk as low as reasonably practicable.</li> </ul>	I	N/A	<p>The Applicant acknowledges Spirit Energy's (now NEO) response. The impact of increased or displaced shipping on existing oil and gas assets is assessed in <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p>

S42_0056_002	Spirit Energy (now NEO Energy)	<p><u>Aviation</u></p> <ul style="list-style-type: none"> <li>· Helicopter operations could be impaired given the Babbage asset is 4.31 km from the Hornsea Four windfarm array and therefore, this needs to be thoroughly evaluated by helicopter operators.</li> <li>· Evacuation protocols may be compromised without suitable mitigation due to helicopters being the primary method of transporting personnel in the event of an emergency.</li> </ul>	I	N/A	The Applicant is regularly consulting with Spirit Energy (now NEO) to discuss their aviation concerns and work together towards successful coexistence. Helicopter assessments and risk analysis are encapsulated in <a href="#">Volume A2, Annex 11.1: Offshore Installation Interfaces</a> .
S42_0056_003	Spirit Energy (now NEO Energy)	<p><u>Proximity and Crossing of Assets</u></p> <ul style="list-style-type: none"> <li>· Further consultation is required to understand what formal agreements would be required, should there be any crossings or proximities to Spirit Energy asset infrastructure and pipelines including the potential need for exclusion zones.</li> </ul>	I	N/A	To address this point, the Applicant has produced a specific annex using traditional oil and gas methodology to address the safety case and associated risks. This is encapsulated in <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a> . The methodology has been shared with Spirit Energy (now NEO) in advance of submission to ensure their further comments are taken into consideration.
S42_0056_004	Spirit Energy (now NEO Energy)	<p><u>Risk Assessment Methodology</u></p> <ul style="list-style-type: none"> <li>· Discussion is needed on the approach and conclusions reached. Concerns that we may consider intolerable from a safety perspective are being scoped out.</li> </ul>	I	N/A	The Applicant is working with Spirit Energy (now NEO) to ensure our infrastructure can coexist without hindering the economic potential of recoverable petroleum. This has been addressed within <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users</a> and <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a> .
S42_0056_005	Spirit Energy (now NEO Energy)	<p><u>Maximising Economic Recovery</u></p> <ul style="list-style-type: none"> <li>· Discussion is needed on impacts of the proposed development on oil and gas companies' obligation to take the steps necessary to secure the maximum value of economically recoverable petroleum from the strata beneath UK waters.</li> </ul>	I		The Applicant is working with Spirit Energy (now NEO) to ensure our infrastructure can coexist without hindering the economic potential of recoverable petroleum. This has been addressed within <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users</a> of the ES and <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a> .

# Hornsea 4



S42_0056_006	Spirit Energy (now NEO Energy)	<p><u>Simultaneous Operations</u></p> <p>· The Babbage Platform has a designated 500m safety zone. No third-party vessel may enter this space at any time; without prior written agreement. Additionally, Spirit Energy may have vessels operating or at anchor outside of the 500m zone in an appropriate drift off position at any time and must be given appropriate sea room. A protocol to enable effective operational communications should be developed to facilitate the need for simultaneous operations between both parties.</p>			<p>The Applicant is working with Spirit Energy (now NEO) to ensure our infrastructure can coexist. This has been addressed within <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users</a> of the ES and <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p>
S42_0056_007	Spirit Energy (now NEO Energy)	<p>Communication with the Babbage Platform may be impacted. Therefore, this will need to be explored further.</p>	N/A	N/A	<p>The Applicant notes this comment.</p>
S42_0056_008	Spirit Energy (now NEO Energy)	<p><u>Conclusion</u></p> <p>Please note that concerns raised at this time are based on the issues currently presented. Additional concerns may be raised following review of technical detail and amendments or as new information becomes available. We also recognise that positive opportunities may exist for collaboration through operational synergies and technology development.</p>			<p>The Applicant notes this comment.</p>

S42_0069_001	Perenco	<p>It appears to Perenco that the majority of the proposed windfarm will be over open acreage around blocks 43/26, 43/27 and 43/28. It also appears the cable will be run around the south of Ravenspurn and Cleeton but north of Neptune. Things to note about this location:</p> <ul style="list-style-type: none"> <li>• The Johnston subsea development is in the middle of the windfarm location</li> <li>• The Johnston export line (12" Gas PL989 (with PL990, PL991 piggybacks)) and infield (PL2105 (with PLU2106 umbilical)) are covered by the proposed windfarm</li> <li>• The main windfarm covers parts of Ravenspurn - very close to the Ravenspurn North platform</li> <li>• The main windfarm covers parts of the Babbage field</li> <li>• A potential pipeline from TORS to Ravenspurn North would most likely have to cross the windfarm</li> <li>• The area for the windfarm export cable covers part of the Cleeton area and the Neptune area</li> <li>• The windfarm export cable will cross the following pipelines:             <ul style="list-style-type: none"> <li>o 36" Gas PL447</li> <li>o 16" Gas PL1934 (with 3" piggyback PL1936 and Umbilical PLU1939)</li> <li>o 16" Gas PL1684 (with 3" Methanol PL1685)</li> </ul> </li> <li>• There are a number of undeveloped discoveries in the area (see attached) which include Gunn and Kumatage in the windfarm location. Also Carna and Delamere in the nearby area which could be tied back across the wind farm</li> <li>• The RS 26/4 and A06 infill target locations are in/very close to the 'cable corridor' and could be drilled as vertical subsea wells and hence could have a top hole location in the area (see attachment 3)</li> <li>• The main windfarm area covers the area developed by the E02 and E06 wells (see attachment 3).</li> </ul>	N	N/A	<p>The Applicant has consulted with all oil and gas operators listed by Perenco and has considered the associated assets. The Applicant notes this comment, which is addressed within <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users</a> and <a href="#">Volume A5, Annex 11.1: Offshore Installation Interfaces</a>.</p>
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S42\_0060\_001

National Grid Ventures

## **Interaction with NGV interests**

Ørsted and NGV are engaged on the potential interaction between the proposed Hornsea 4 project and NGV interests.

As recognised in the consultation information, there is an interaction between the proposed Hornsea 4 project and the White Rose Carbon Capture Storage (CCS) project, in particular the Endurance Store in the North Sea. The Preliminary Environmental Information Report (PEIR) acknowledges this and scopes out the need to assess the potential impact on the basis that there are no CCS projects being progressed.

However, the UK's Committee on Climate Change (CCC) said earlier this year that deploying Carbon Capture Usage Storage (CCUS) at scale is essential if the UK is to meet its now legally binding target of net zero carbon by 2050. The Committee on Climate Change's Net Zero report also identified that at least one of the UK's Carbon Capture Usage Storage (CCUS) regional clusters should involve substantial production of low-carbon hydrogen by 2030 to stay 'on track' for net zero. It also recommends that infrastructure development for CCUS should start as early as possible, in all regional clusters with large industrial emissions.

In May 2019, NGV, Drax Group, and Equinor announced they had signed a Memorandum of Understanding committing them to work together to explore how a large-scale carbon capture usage and storage (CCUS) network and a hydrogen production facility could be constructed in the Humber in the mid-2020s. The Humber is the most carbon intensive region in the country. September 2019 saw the launch of Zero Carbon Humber, a campaign with the Humber

The Applicant has engaged in extensive informal consultation with BP and National Grid Ventures, representing the Northern Endurance Partnership (NEP), Net Zero Teesside (NZT) and Zero Carbon Humber (ZCH), in relation to the development of the Endurance CCS Site.

Further information on co-existence and the Endurance CCS Site, including a location plan for the proposed offshore sites and supporting information can be found in [Volume A2, Chapter 11: Infrastructure and Other Users](#).

		<p>Local Enterprise Partnership and CATCH, a trade body for industrials in the region. For more information see <a href="http://www.zerocarbonhumber.co.uk">www.zerocarbonhumber.co.uk</a></p> <p>In this context, the relevance of potential carbon storage options in proximity to the Humber prevails. The strategic significance of the Endurance store should be considered in order to inform the most appropriate way for leasing rights and licensed activities to be coordinated where they overlap in order that potential conflicts are managed and are capable of being resolved.</p> <p>There are also extant land rights associated with the White Rose project that interact with the Hornsea proposals. NGV and Ørsted have agreed to regulate and co-ordinate our activities where they overlap with a view to managing potential conflicts and resolving actual conflicts, therefore we would welcome further discussion between NGV and Ørsted on mechanisms that may facilitate this.</p> <p>NGV welcomes further engagement with Ørsted and a continuing commitment to co-ordinating our activities.</p>		
S42_0045_001	Speedwell Energy (Now Rockrose)	<p>As you know we are already in communication with members of your team regarding the planned development of our Cotton field located in UKCS block 43/21b.</p> <p>Cotton being a subsea tieback planned to require the placement of a pipeline and umbilical from our wellhead locations in block 43/21b straight to the Ravenspurn North platform. This will require entering and passing through the planned Hornsea 4 PEIR area.</p>		<p>Speedwell (now Rockrose) have advised they have relinquished their licence 43/21b and no longer have interests in the area.</p> <p>Speedwell's (now Rockrose) assets are considered in <a href="#">Volume A2, Chapter 11: Infrastructure &amp; Other Users and Volume A5, Annex 11.1: Offshore Installation Interfaces of the ES.</a></p>

At this time, the exact route our pipeline and umbilical will take has yet to be determined. We envisage firming up on this routing in the coming months and to continued dialogue with yourselves to minimise disruption to both planned developments.

From an environmental perspective we have no comment to make.

## EIA topic area: Cumulative and Transboundary Effects

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/New or N/A)	Applicant Response
S42_0016_001	Swedish Environmental Protection Agency	The Swedish Environmental Protection Agency would like to thank for the possibility to participate in the consultation procedure in the above stated project. Sweden decides to abstain from participating in the consultation procedure and have no further comments.	N/A	N/A	The Applicant notes this comment.
S42_0057_1.2.33	MMO	Table 5 appears reasonable although in Appendix A, it is noted that items have been screened out due to 'low data confidence'- this should be applied with caution i.e. to projects where there is limited information and not applied to biological receptors. Any projects screened out for this purpose should be fully justified in the final ES	Y	N/A	The Cumulative Long List has been reviewed and updated against the most up-to-date project information available and is presented in <a href="#">Volume A4, Annex 5.3: Offshore Cumulative Effects</a> .
S42_0057_1.2.34	MMO	Appendix A - it appears that some projects have been discounted due to 'low data confidence' whereas actually, 'No physical effect- receptor overlap' should be applied, i.e. for those OWFs in the Irish Sea.	Y	N/A	The Applicant notes this comment.
S42_0066_001	Belgium	As the Belgian federal Espoo focal point, I'm entitled to let you know that Belgium doesn't have any comments at this stage of the project development.	N/A	N/A	

S42_0044_001	Danish Environmental Protection Agency	<p>The Danish Environmental Protection Agency has now heard relevant Danish authorities about the plan for Hornsea Project Four Offshore Wind Farm. We have not received any consultation responses.</p> <p>Please let me know if it is not correct that:</p> <ul style="list-style-type: none"> <li>• this is the first information Denmark has received about Hornsea 4 and that we have not been notified earlier?</li> <li>• this is a preliminary consultation, will there be another consultation of Denmark after the Environmental Statement has been carried out?</li> </ul> <p>Do you need indication of desire to participate in the environmental impact assessment procedure in order to send more information after this consultation has ended?</p>	N/A	N/A	<p>As the project has the potential to give rise to environmental effects in neighbouring EEA States, EIA Regulation 32 (Infrastructure Planning (EIA) Regulations 2017) apply, which set out obligations on the UK Secretary of State/Planning Inspectorate to notify and consult other EEA states.</p> <p>All European Economic Area (EEA) states that share a maritime boundary with the UK have been considered within the Preliminary Environmental Information Report (PEIR) in the transboundary assessments for those offshore topics that were screened in through the transboundary screening process (fish and shellfish ecology, marine mammals, ornithology, commercial fisheries, shipping and navigation, and aviation and radar). In October 2019 the Planning Inspectorate, on behalf of the Secretary of State, contacted neighbouring European states for the purposes of transboundary screening under Regulation 32 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Notice was provided to member states of all application documents including the PEIR, draft Report to Inform Appropriate Assessment and associated plans, maps and reports available via the Hornsea Four website. In addition, The Applicant contacted said member states directly contacting the Ministry of the Environment and Food of Denmark (Ms. Karin Anette Pedersen) on 12</p>
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					August 2019 welcoming consultation feedback. Further details can be found in <a href="#">Volume A4, Annex 5.7: Transboundary Screening Report</a> .
S42_0057_1.2.32	MMO	<p><u>Offshore Cumulative Effects Assessment (A4.5.3):</u></p> <p>In Table 3, does 'aggregate dredging and disposal' include dredging and disposal? Vol.2, Chapter 1, has identified HU015 as a project/activity that could be cumulatively be impacted or have impacts.</p>	Y	N/A	It is clarified that 'aggregate dredging and disposal' includes dredging and disposal sites. The Cumulative Long List has been reviewed and updated against the most up-to-date project information available and is presented in <a href="#">Volume A4, Annex 5.3: Offshore Cumulative Effects</a> .
S42_0052_INT 1.4	Natural England	<p>Cumulative effect assessment (CEA) (alongside document 49 - <a href="#">Volume 4, Annex 5.5 Onshore Cumulative Effects</a>) - this has not been completed and it is required. We note that the cumulative assessment appears to focus on projects but not plans. Cumulative assessment should include allocations (and policies) from east riding local plan, waste and minerals plan, transport plan etc. No EA permits have considered for inclusion within the assessment.</p> <p><i>NER: Carry out a cumulative impact assessment that fully recognises all of the potential impacts.</i></p>	N	N/A	<p>The cumulative effects for the assessment of potential impacts on habitats have been considered in <a href="#">Volume 3, Chapter 3: Ecology and Nature Conservation</a> of the PEIR. The baseline data was incomplete at the point that the PEIR was submitted, as discussed with Natural England through the Evidence Plan Technical Panel meetings held on 8th April and 9th July. In these meetings, it was agreed that where sufficient baseline was available, the baseline technical reports would be provided at PEIR, but that no assessments were to be provided. Consequently, a full Cumulative Effects Assessment (CEA) was not undertaken at the time of the PEIR submission. Since the publication of the PEIR, a full CEA has been undertaken and presented in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.</p> <p>The overarching method followed in identifying and assessing potential cumulative effects in relation to the</p>

onshore environment for Hornsea Four is set out in [Volume A4, Annex 5.5: Onshore Cumulative Effect Screening Matrix](#) and [Volume A4, Annex 5.6: Location of Onshore Cumulative Schemes](#). The approach is based upon the Planning Inspectorate (PINS) Advice Note 17: Cumulative Effects Assessment (PINS, 2017). The approach to the Hornsea Four CEA has been made to be specific to Hornsea Four and takes account of the available knowledge of the environment and other activities around the Order Limits

The Hornsea Four CEA has considered the potential cumulative effects of plans and policies where information is publicly available.

## EIA topic area: Landowner

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (1o/Change/ New or N/A)	Applicant Response
S42_0002_001	JH Property Partnership (The Santhouse Pensioneer Trustee Company)	We are in receipt of a letter addressed to The Santhouse Pensioneer Trustee Company Limited. I am unable to identify what land/property this relates to and in order to review/comment I require further information. Do you have a Land Registry Title Number to help identify?	N/A	N/A	<p>The Applicant communicated that the title number that The Santhouse Pensioneer Trustee Company Limited is listed as a freeholder is HS268622.</p> <p>The Applicant also has them down as having a frontage interest (i.e.ad medium filum i.e. ownership of half-width of subsoil) of part Old Howe Lane where the title number HS268622 is adjacent to.</p>

S42_0042_001	KeyLand Developments	<p>Our Client owns the freehold title over land to the east of Creyke Beck Substation as shown edged red on the attached plan.</p> <p>Our client objects to their land being within the "400kV Export Cable Corridor Area" on the grounds that it would significantly prejudice their lands ongoing development and green energy strategy.</p> <p>Our client's main points for concern are:</p> <ul style="list-style-type: none"> <li>• The land is subject to an option with a battery storage site developer</li> <li>• The land has planning permission for a 49.5MW batter storage scheme (Phase 1)</li> <li>• The land is currently subject a planning application for a further 49.5MW battery storage site (Phase 2) with a decision expected to be made shortly. The link to the planning application is <a href="#">here</a></li> <li>• There is potential for a phase 3 development of a similar size</li> <li>• If the 400kV cable were to affect any part of our client's land, significant compensation to both our client and the developer would be payable</li> <li>• The battery storage development is our client's flagship green energy scheme, and is being developed to raise their "green credentials". If Hornsea Four were to have an impact on the development, there could be a wider impact on our client and its development strategy</li> </ul>	N/A	N/A	This area has now been removed from our DCO red line boundary as a result of your response.
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		<ul style="list-style-type: none"> <li>The land is already being affected by the Dogger Bank cable in the north of the land which they own. This cable route has been designed in a way that limits the impact on future developments, however as a result of this cable it is unlikely that any second cable could achieve a similar outcome.</li> </ul> <p>I attach a plan showing where phase 1, phase 2 and a potential phase 3 would be sited. I would be grateful if the plan was not made available to the wider public, however we believe it is important that you are aware of their locations.</p> <p>I would be grateful if you could take our concerns above into consideration when finalising the intended route of the cable. If the final design does run through our clients land it will cause significant financial impact and cause KeyLand to have to reconfigure their green energy strategy. We would therefore request that our clients land is not chosen as the preferred route for the 400kV Export Cable.</p>			
S42_0062_006	J W Thompson & Son	<ul style="list-style-type: none"> <li>The target depth of the cables is 1.2m which is not considered to be deep enough given the high-water table and soil types (including deep 'Carr' land and running sand) along the proposed route. By way of example, my client has recently deepened a field drain (around 550m run) which runs north/south through the proposed route to a depth of 3 metres to improve drainage. In addition, my client advises that in the past farm machinery has sunk down to a depth of 2m on land through which the cable is proposed to be laid;</li> <li>My client's land is interspersed with springs, the most notable in close proximity being</li> </ul>	N	N	The Applicant has conducted soil and drainage surveys along the on shore export cable route and at this location in order to understand the ground conditions. The results of which will help inform design of the cable and have demonstrate that the proposed onshore export cable route is viable. Due to the weight of the cables and the depth at which they will be burried, the cables will not require anchoring.



		<p>the 'Blue Keld' which supplies water to a nearby bottling plant. Given the level of the water table on parts of the route my client requires further information as to 'de-watering' if the cable is laid by open trench method in this location;</p> <ul style="list-style-type: none"> <li>• How will the cable will be anchored in position given the above? There is a very real chance that the cables will move if not securely anchored in place and my client requests further information in this regard;</li> <li>• My client has advised of archaeological finds on the land which have been recorded locally and would like confirmation that the historic interest is noted and has been taken into account.</li> </ul>			
S42_0063_001	CC Foreman & Sons	<ul style="list-style-type: none"> <li>• Further information is required as to pre and post construction drainage, including 'de-watering' particularly as the proposed route will effectively sever 2 different drainage schemes which have been installed by my client;</li> </ul>	N	1o	The <a href="#">Outline Onshore Infrastructure Drainage Strategy (Volume F2.6)</a> provides further information on pre-construction, construction and operational drainage for Hornsea Four. The Applicant has committed to developing a Construction Drainage Scheme (Co14) to ensure any existing land drainage is maintained. A land drainage consultant will be appointed, and the Construction Drainage Scheme will be developed in consultation with landowners and any relevant stakeholders.
S42_0063_002	CC Foreman & Sons	<ul style="list-style-type: none"> <li>• My client notes that access is proposed through Brigham and it is considered that this access, being narrow and winding is unsuitable for regular movements of heavy machinery. Please provide further information on the anticipated number of daily movements and type of machinery.</li> </ul>	N/A	N/A	The Applicant has undertaken an updated traffic assessment and an update on this position is provided in <a href="#">Volume A3, Chapter 7: Traffic and Transport</a>

**Table 2: Applicant regard to Section 42 Consultation Responses – The Land Interest Group” (LIG).**

Comment ID (consultation_response ID_subsection number)	Respondent	Comment	Project change (Y/N/I or N/A)	Project commitment (Lo/Change/New or N/A)	Applicant Response
S42_0071_001	LIG	<p><b>Proposed Construction</b></p> <p>The PEIR is based on the “maximum design scenario”.</p> <p><b>Export Cable Corridor</b> – proposed is a working width of 80metres with a permanent easement width of 60metres. This is based on HVAC technology.</p> <p>Can you please explain why HVAC is being favoured over HVDC as the overall benefits of HVDC option are significant such as reduced land take and link boxes. It is noted that a HVAC system would require up to three HVAC booster stations which are likely to be sited offshore. We would like assurances that no booster stations will be onshore. Commitment is sought from Orsted to select HVDC.</p>			Hornsea Four may use HVAC or HVDC transmission or could use a combination of both technologies in separate electrical systems. The Applicant is applying for HVAC and HVDC transmission to allow for suitable flexibility to ensure a low cost of energy to the UK consumer and to facilitate successful completion of Hornsea Four in a competitive market. . There will be no booster stations onshore.
S42_0071_002	LIG	<p><b>Capacity</b> – there is no reference to the capacity of the scheme. We understand at this current stage the maximum is 3.6 GW. Technology is improving rapidly and we would want to understand the capacity currently being sought and the potential increase in capacity as technology improves and consequences.</p>			The Applicant has committed to installing a maximum number of circuits (six circuits) as set out in the design parameters in the DCO, an approach supported by the Secretary of State on other DCO Applications.
S42_0071_003	LIG	<p><b>Link Boxes</b> – the PEIR states that there will be a maximum of 240 joint bays which would require a maximum of 240 link boxes. There is some confusion over the number of link boxes and jointing bays. Is there one joint bay per circuit?</p>			There will be a maximum of 240 link boxes. A link box is a surface chamber where access can be gained to the Cables (Electric or Fibre Optic) for operational and maintenance purposes. Voluntary agreements between landowners and Hornsea Four commit the

<sup>3</sup> The Land Interest Group constituted: National Farmers Union, Savills, Dee Atkinson Harrison, Cranswicks, Frank Hill & Son, Hornseys, Stephenson & Son, Leonards Hull, Cundalls, Clubleys, Brockthorpe, Michael Glover LLP and Brown & Co

		<p>It has been suggested that there will be the need for the equivalent number of chambers for fibre optic cables to accompany each circuit. There is no reference in the PEIR to these – please clarify. There is no detail as to where link boxes will be sited along the route. Link boxes will greatly interfere with agricultural operations and are a hazard to farm machinery. It is extremely important to have further information on the design of the link boxes, the number and the siting of them.</p>			<p>Applicant to consult on the locations and designs of surface apparatus but, where technical considerations do not allow, it may not be possible to locate all link boxes within field boundaries.</p>
S42_0071_004	LIG	<p><b>Access Points</b> – there has been minimal discussions with clients with regard to access routes across their holdings. There is concern with regard to how landowners and occupiers will access severed land during construction works.</p> <p>Please confirm. Many of the roads identified for access are mainly roads unsuitable for the vehicles associated with this size of scheme.</p> <p>There is no detail on any permanent access routes that may be required post construction.</p>			<p>The Applicant has conducted meetings with landowners and occupiers regarding accesses and has sent plans to each landowner and occupier who has an access across their holding. Access routes also formed part of the Project boundary for s42 consultation purposes. Our land agents, Dalcour Maclaren, are available to meet any landowners or occupiers who have concerns regarding access and potential severance during construction works. The accesses have been identified for construction purposes and are shown on the Access to Works Plan (<a href="#">Document Reference D1.5.1</a>), A right to use some these accesses will also be required for permanent operational and maintenance purposes.</p>
S42_0071_005	LIG	<p><b>Haul Road</b> – the possible construction specification is noted - crushed aggregate with a geotextile/other type of protecting matting being plastic, metal, plates or grating. Some landowners may prefer different constructions. Is this something that would be considered?</p> <p>There is no reference to how surface water will be treated or the extent of compaction to the land.</p>			<p>A stone haul road is the typical methodology utilised by contractors when constructing Nationally Significant Infrastructure Projects such as Hornsea Four. A stone haul road is therefore likely to be the preferred option. However, other access methodologies, such as steel trackway or bog mats, might be appropriate if necessitated by ground conditions.</p> <p>With regard to surface water, Hornsea Four Contractors will comply with the Environment Agency permissions and requirements including in particular the Guidance “Temporary dewatering from</p>

				<p>excavations to surface water".  <a href="https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water/temporary-dewatering-from-excavations-to-surface-water">https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water/temporary-dewatering-from-excavations-to-surface-water</a>).</p> <p>The CoCP outlines how surface water is to be handled.</p> <p>Soil management is to be undertaken in accordance with the CoCP which outlines the methodology to be adopted to minimise potential compaction.</p>
S42_0071_006	LIG	<p><b>Logistics compounds</b> – The use of the compounds is too wide and more concise use will be required. There has been minimal discussion on the location of compounds.</p>		<p>The Applicant via its DCO will be restricted in using logistics compounds solely for activities associated with the construction of the offshore windfarm and associated onshore infrastructure. Landowners have been consulted both formally and informally on the locations of logistics compounds. Please note that all logistic compounds are for temporary use and the Applicant is committed to reinstating these sites on completion of the works.</p>
S42_0071_007	LIG	<p><b>Cable Installation</b> – it is noted that the target depth of the cables is 1.2 metres. Please confirm depth to the protective tile. It is noted that in some areas it may be as shallow as 0.6 metres due to ground conditions. Please be advised that this depth will interfere with farm operations and the growing of certain crops as well as any existing drainage. The cables will meet utilities. As the majority of utilities are at between 0.9 metres to 1.2 metres it will be necessary for the export cables to go under these utilities to avoid impacting on farming operations. Please confirm.</p>		<p>The cable will be typically installed 1.2m below the current surface level of the land. Above the cable there will be a protective tile and protective tape. This will be below the depth of usual agricultural operations and will be designed to avoid existing land drains. Generally, the Project will HDD under utilities but, where appropriate clearances (through consultation with other utilities) are available and the Project can still achieve the minimum depth of 1.2m, the cables may be laid over other utilities.</p>
S42_0071_008	LIG	<p><b>Ducting</b> – it is noted that a decision is yet to be made whether the cables would be directionally laid or in ducts. There is concern from landowners in respect of the heat dissipation. The farmer's preference would be the option that mitigates this position.</p>		<p>The Applicant has committed to duct the cables along the entire onshore installation where technically feasible..</p>

S42_0071_009	LIG	<p><b>Soils</b> – it is noted that an Agricultural Liaison Officer will be appointed to engage with landowners in respect of agricultural land. It is important that the soil profile is established early in the project as there are some very challenging ground conditions along the route which will need serious consideration. Greater detail is required to understand how the cables are to be 'anchored' to prevent them raising to the surface which is a real possibility in certain location along the route.</p> <p>It is noted that Orsted believe the soil can be reinstated within 1 year. This is not realistic. Greater clarity is required on how the soils are to be treated. What is the weed control programme? How will soils be stored? Under what conditions will you undertake works including re-instatement? How do you propose to reinstate? What are the soil after-care provisions?</p>			<p>The Applicant has undertaken soil surveys of areas where ground conditions are considered to be sensitive. The surveys confirmed the viability of the cable route. Notwithstanding, the Applicant has a statutory duty to lay and maintain the cables in a safe manner. The further questions regarding soil storage and management will be addressed in <a href="#">Volume F2, Annex 2: Code of Construction Practice (CoCP)</a>.</p>
S42_0071_010	LIG	<p><b>Hedgerow Removal</b> – it is noted that hedgerows will need to be removed. A greater level of detail is required in terms of replacement and management following completion of scheme.</p>			<p>A plan showing the sections of hedgerow which are proposed to be removed for construction and to be replaced following construction has been included with the DCO Application (see the Tree Preservation Order and Hedgerow Plan (<a href="#">Volume D1.11.1</a>)). The Applicant has committed to reinstate and maintain hedgerows post construction (see <a href="#">Volume F2.3 Outline Ecological Management Plan</a>).</p>
S42_0071_011	LIG	<p><b>Health &amp; Safety</b> – there is no reference to bio-security measures to be undertaken by contractors in relation to livestock and crop production. Please can you confirm the provisions to be made for these situations.</p>			<p>The Applicant has included biosecurity provisions in the CoCP (see <a href="#">Volume F2, Annex 2: Code of Construction Practice (CoCP)</a>).</p>
S42_0071_012	LIG	<p><b>De-commissioning</b> – it is noted that jointing bays and link boxes will be removed if feasible. Please can you confirm when it would not be feasible. Orsted would comply with any relevant legislation and we would expect this to include an appropriate environment legislation in existence at the time.</p>			<p>The draft DCO follows the standard approach for offshore wind farms and includes a general requirement to provide a decommissioning plan at the relevant time. What that plan will ultimately say will depend on the requirements of the planning authority and applicable legislation and regulations at the relevant time, but current practice is for cables and other equipment</p>

					<p>etc more than 800mm below ground level to remain in situ in order to minimise disruption and damage to the environment and agricultural land.</p> <p>In the voluntary agreements for Hornsea Four and in the leases for the cable routes on each of the Hornsea 1, 2 and 3 projects, there is a requirement at the end of the lease for the tenant to make the cables safe in accordance with all statutory requirements and to comply with any decommissioning regime derived from statute, statutory bodies (such as the planning authority or any statutory undertakers) or industry standards and codes of practice current at the time.</p>
S42_0071_013	LIG	<p><b>Drainage</b> – we are pleased to see a drainage strategy. It is important that landowners are consulted on pre-construction, construction and any post construction drainage designs with the opportunity to seek professional advice from their drainage consultants. It is noted “drainage systems, however, will not be installed into areas where they are not currently present”. This blanket cover is not appropriate as it may be necessary for new systems to be installed post construction due to the presence of the export cables. We have specific wording on field drainage that we would like included in the voluntary agreement and COCP.</p>			<p>The Applicant is confident that the project can be built and drained with the rights sought. However, voluntary agreements entered into with landowners allow drainage to be installed with landowner agreement outside areas where drainage systems are not currently present. Additionally, the Applicant has updated the CoCP in response to comments from LIG.</p>
S42_0071_014	LIG	<p><b>De-watering</b> – it is noted there is a risk that drainage ditches and surface water flow routes could be adversely affected during construction and attenuation ponds will be required to restrict the runoff. There is no detail where these ponds/storage will be located.</p>			<p>The Contractor, once appointed, will comply with Environment Agency permissions and requirements including in particular the Guidance “Temporary dewatering from excavations to surface water”. More specifically, Hornsea Four would expect to utilise silt fencing, silt busters, silt traps, settlement tanks and other similar measures to ensure that only uncontaminated water is removed. Surplus water will either be pumped to existing water courses, to new or existing drainage systems, onto the easement or tankered away if required. A more detailed</p>

					methodology will be provided in the Contractor's Environmental Management Plan once the Contractor is appointed and in accordance with the CoCP.
S42_0071_015	LIG	<p><b>Code of Construction</b> – although this is outlined COCP we would have expected to have seen a section including details of the methodology and working practices of the scheme including soil management strategy, management of soil handling process, pre-construction survey works, details of soil stripping and storage, re-instatement and soil aftercare, bio-security, treatment of irrigation and private water supply, field drainage (as referred to above) as well as the role of the Agricultural Liaison Officer.</p>			The Applicant has addressed these items in in <a href="#">Volume F2, Annex 2: Code of Construction Practice (CoCP)</a>
S42_0071_016	LIG	<p><b>Horizontally Directional Drilling</b> – it is noted that it is your intention to HDD under road, rail and water courses. Confirmation is required to the exact locations of these works as they do not appear to be shown on a plan.</p> <p>Furthermore, they is concern with regard to HDD at landfall. There is no reference to the potential of sand pockets or any associated mitigation measures.</p>			The Applicant has shared details of proposed HDD locations with LIG and will continue to refine methodology as the Site Investigation and detailed design process is progressed. Details of the proposed HDD locations can be found in the Onshore Crossing Schedule ( <a href="#">Volume A4.4.2</a> )
S42_0071_017	LIG	<p><b>Electro Magnetic Fields</b> – there is considerable concern over the lack of detail in respect of EMF and the impact on health as well as the interference on soil sense technology, RTK and other agricultural software.</p>			The Applicant has provided further detail on EMF in <a href="#">Volume A4, Annex 4.3: EMF Compliance Statement</a> . Public Health England (PHE) have responded to consultation on EMF are expressed no concern with regards to human impact associated with the Cables.
S42_0071_018	LIG	<p><b>Alternative Routes</b> – a number of alternative routes are being discussed with clients which are not reflected in the PEIR.</p>			Following subsequent consultation, a number of minor revisions to the cable corridor have been made and have been shared with the affected parties and shown in the final Order Limits for the DCO application.
S42_0071_019	LIG	<p><b>Development</b> – a number of clients have development opportunities on their land and there have been no discussions with regard to re-routing to mitigate the impact on any future development.</p>			As part of the cable routing process, consideration has been given to potential future development. The Applicant, through consultation, has made amendments to the route where evidence of development potential has been provided.

S42_0071_020	LIG	<b>Dust</b> – there is no detail how you propose to mitigate dust soiling and impact on crops other than adopting the IAQM recommendations. Our client’s question if this is sufficient.			The Applicant has outlined its methodology for mitigating dust impacts in the CoCP.
S42_0071_021	LIG	<b>Heat Dissipation from Cables</b> – recent field trials have shown that cereal crops have a root depth in excess of 1metre. There is clear evidence from a recently completed offshore wind farm there is heat dissipation from cables. See photographs attached. The export cable has a capacity of only 317MW and it is clear to see the location of them following snowfall. What mitigation is proposed in this regard?			Hornsea Four will be unable to provide projected figures until the construction methodology (i.e. type of cables, AC or DC, voltage, cable separation distance etc.) has been confirmed. The Applicant has committed to duct the cables along the entire onshore installation where technically feasible.
S42_0071_022	LIG	<b>Environmental Designations</b> – There is reference to habitat creation although there has been no discussions with Landowners on location.			The Applicant has committed to a net gain strategy to enhance biodiversity at the OnSS. The Applicant has also committed to an enhancement strategy for the onshore export cable route where it has opportunities to do so and in accordance with gaining consent from landowners (see <a href="#">Volume F2, Chapter 14: Outline Enhancement Strategy</a> and <a href="#">Volume F2, Chapter 16: Outline Net Gain Strategy</a> ).
S42_0071_023	LIG	<b>Construction Programme</b> – it is noted that onshore works are expected to last up to 30 months. We would like to understand better the working methodology and timing of the installation of the cables.			The Construction programme is set out in Section 4.10: Project Construction Programme and detailed methodology is defined in <a href="#">Section 4.10: Onshore Infrastructure Construction of Volume A1, Chapter 4: Project Description</a> .
S42_0071_024	LIG	<b>Cumulative effects</b> - The PEIR concludes ‘No significant cumulative effects have been identified in relation to any of these other projects and it is also considered that the total cumulative effect from all projects will not result in any effect of any greater significance than assessed in isolation’. Experience gained from the involvement of other projects would indicative this statement is inaccurate. Further information and detail will be required to ensure appropriate mitigation measures are undertaken.			Since the publication of the PEIR, a full CEA has been undertaken and is presented in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a> of the Environmental Statement.
S42_0071_025	LIG	<b>Traffic Management</b> – There is concerns about the size and anticipated number of vehicles movements. Many of			The Applicant has provided <a href="#">Volume F2, Annex 2: Construction Traffic Management</a>



		the roads identified for use pass through villages and are minor roads unsuitable for vehicles associated with this size of scheme.			<a href="#">Plan(CTMP)</a> and made commitments not to allow construction traffic through specific locations of concern wherever possible. The routes selected for construction traffic have been assessed and are suitable for the size of the vehicle. The updated Commitments Register can also be found at <a href="#">Volume A4, Annex 5.2: Commitments Register</a> .
S42_0071_026	LIG	<p><b>Landfall</b> – It is noted the intention is to HDD at landfall (see above). It is understood that this will need to be a wider area, hence the fan shape of the working strip, to allow for HDDing. Can you confirm the width?</p> <p>Any Internal Drainage Board comments regarding protection of Earls Dyke seaend need to be taken into consideration. There is no access to landfall from the beach due to the continued threat of coastal erosion and trespass by quad bikers.</p>			The width of the HDD at landfall is likely to be a maximum of 200m. Hornsea Four has and will continue to consult with landowners and occupiers, statutory bodies and key land stakeholders. <a href="#">Section 4.10: Onshore Infrastructure Construction of Volume A1, Chapter 4: Project Description</a> sets out the proposed construction methodology and beach access.
S42_0071_027	LIG	<p><b>Receptors</b> – Many of the receptors are reported with a magnitude of minor impact where in reality we do not believe this to be accurate. What is being done to correct this?</p>			The Applicant notes this comment, but has confidence in the accuracy of its assessments undertaken to date.
S42_0071_028	LIG	<p>On behalf of our clients we expect to be fully informed on the above matters and provided with a lot more detail before the DCO is submitted. I trust you find this self-explanatory but if you have any queries please do not hesitate to contact us. In the meantime, can you please acknowledge safe receipt of this email.</p>			The Applicant notes this comment.

**Table 3: Applicant regard to Targeted Consultation [1] Section 42 Consultation Responses**

Comment	Project change? (Y/N/I or N/A) <sup>4</sup>	Project commitment ? <sup>5</sup> (I o/New/N/A )	Applicant response
<p>Thank you for contacting JNCC on this consultation. However offshore renewables is delegated to Natural England within offshore English waters and as such we will work with NE to support any response to this consultation as appropriate.</p>	N/A	N/A	This comment has been noted by the applicant.
<p>Your proposals for an alternative Export Cable Corridor (ECC) route option at Lockington Carr Cross, Minor Onshore Route Amendments and additional Operational Access Rights do not affect the interests of Highways England in respect of the Strategic Road Network [SRN]. I have nothing to add to our response of August 13 2019:</p> <p>In respect of your Offshore installations, Highways England have no comments to make.</p> <p>For Inshore installations, Highways England is only concerned with the impact that a development may have on the safety and smooth running of the Strategic Road Network [SRN]. The route which you have given does not appear to be near the SRN which in this area is the M62, A63 and A1033 south of the route you have indicated.</p> <p>The roads of significance for your project would appear to be the A165, A164, perhaps the A1079 and A1035, and possibly some minor roads. For these roads you should refer to the Highways Department at East Riding of Yorkshire Council</p>	N/A	N/A	This comment has been noted by the applicant.

<sup>4</sup> N/A = Comment is not requesting a project change to be made; Y = Amendments made to the project design as a result of feedback from consultation; N = The applicant has had regard to the comment but determined that a change is not appropriate / justified in the circumstances; I = The applicant has had regard to the comment and incorporated into or considered when producing the assessment

<sup>5</sup> I o = primary Commitment relevant to this response; Change = any change to the existing Commitment as a consequence of the feedback; New = any new commitment resulting from the comment

<p>(<a href="http://www2.eastriding.gov.uk/environment/roads-streets-traffic-and-parking/roads-pavements-and-traffic/">http://www2.eastriding.gov.uk/environment/roads-streets-traffic-and-parking/roads-pavements-and-traffic/</a>).</p> <p>Once Hornsea Four goes into construction, Highways England will want to be consulted about this phase, in particular we will want you to submit a Construction Transport Management Plan, and a Construction Workers Plan for our approval prior to commencement. As with other phases of the Hornsea Offshore Windfarm, it is likely that the development will require large loads (Abnormal Indivisible Loads) to be transported from Port of Hull to site, and these will use the A63 road which is our network. Highways England will need to be advised about these, both for timing and routing.</p> <p>Please come back to me if I can assist you further, but in this case I think East Riding are more relevant to your project.</p>			
<p>Historic England has no 'in principle' objection to the proposed Amendments, provided that an appropriate level of assessment of impact on heritage assets is undertaken for each element of the Amendments. This should include:</p> <ul style="list-style-type: none"> <li>- desk based assessment</li> <li>- geophysical survey</li> <li>- archaeological evaluation, and</li> <li>- updating of all impact assessment and statement of significance documents.</li> </ul>	N/A	N/A	This comment has been noted by the applicant.
<p>Having reviewed the proposed changes 1, 2 and 3, National Grid's comments remain unchanged from the response dated 11 September 2019 and which is shown below for your convenience.</p> <p>In respect of existing National Grid infrastructure, this will require appropriate protection for retained apparatus including compliance with relevant standards for works proposed within close proximity of its apparatus.</p> <p>Where the Promoter intends to acquire land, extinguish rights, or interfere with any of NGET's &amp; NGG's apparatus, both will require</p>	N/A	N/A	This comment has been noted by the applicant.

<p>appropriate protection and further discussion on the impact to its apparatus and rights.</p>			
<p>With regard to the compound which is proposed on the Trustees land, of which Mr James Morris and Mr Sam Morris are the tenants, my clients are concerned how they will access this land for farming. The existing access would appear to be rendered unusable due to the scheme. There is no other access into this land and if a temporary access was being considered to the north this is not felt to be suitable given the (locally notorious) 'bad' set of bends north of The Poplars through to the 'Brigham Straight'. Please therefore confirm how access will be retained to the land in a safe manner.</p>	<p>N/A</p>	<p>N/A</p>	<p>The access track in question is proposed to be used for operational purposes only. As such, the Applicant is not seeking rights to construct an access in this location, and instead seeks a permanent easement only. In the event that operational access is required this will be conducted in consultation with all interested parties, allowing any potential issues to be avoided or mitigated.</p> <p>During construction, if access is required across a working area or access track, a suitable crossing location will be agreed in consultation with the landowner and/or tenant. Gates would then be installed at the boundary of the working area to allow access. Heras fencing or an equivalent type of fencing would then be placed across the working area easement to ensure there is no interaction with any equipment or contractor personnel through the working area at the crossing point. Appropriate signage would also be posted at the location with contact and emergency information. In the event that suitable access cannot be provided or maintained, compensation will be payable for any losses reasonably incurred.</p>
<p>I write in reference to the proposed route across land at Dalton Estate which is occupied by my client Alistair Grant. The part of the route in question, as shown by the attached plan, is hugely impractical and inconvenient to my client and hinders his ability to effectively and efficiently farm the land. The field is a newly reseeded grass ley and has recently been refenced at considerable cost to make it fit for cattle grazing. The proposed route of the works not only makes a significant area of grass completely unavailable, but it also serves to cut off the only source of water to the remainder of the field which won't be used by the scheme. Without water, the land cannot be grazed by livestock.</p>	<p>I</p>	<p>N/A</p>	<p>The Applicant notes your preference for the northern route option on the basis that the impact on your arable enterprise will be less than on the beef enterprise which is being expanded on the land to the south of Station Road.</p> <p>After the delay to the DCO application submission date in 2021, the Applicant undertook an appraisal between the two options and dropped the additional option added between PEIR and DCO submission (Option B – northern</p>

<p>Mr Grant has been undertaking a long term phased plan to grow his cattle enterprise, and without this grazing land not only will he be short on grass for existing numbers, but his ability to increase cattle numbers will be severely compromised without the inconvenience and expense of finding more grazing land, which may well not even be available in a predominantly arable area. From a practical point of view in respect of the scheme, Mr Grant has advised an artesian well is situated within the proposed working area which causes much of the area, which is low lying anyway, to be wet. We have concerns that there will be further impact on the productivity of the land beyond the life of the works if the ground is heavily poached and rutted.</p> <p>Mr Grant had originally been sent a plan showing the working route running through a field to the north west of its existing route. This first route is far preferable to the more recent alternative as it runs through an arable field. Although this will still cause significant inconvenience, loss and disruption, the impact on the farm business will not be as long lasting as it would be if the route goes through as planned. Further, during a meeting with Dalcour Maclaran we have had sight of a BRAG plan which indicates that in terms of proximity to areas to be avoided, the initial route is more suitable. I strongly suggest that the route is realigned to the previous route.</p>			<p>route). This decision was primarily based on the BMV land classification of the northern route and traffic and transport related matters (including the potential for construction vehicles to cross a footpath on the north of Station Road to access the primary logistics compound, and the increased distance of the potential road widening at that location (with the associated construction access of the northern option located further to the west).</p> <p>Reference is made in your feedback to an artesian well which is understood to be located approximately halfway along the boundary hedge to the south of Station Road. The continuing presence of a mains water supply is also recognised as being of importance for your beef enterprise.</p> <p>Wherever possible, the Applicant will seek to locate private pipework and to ensure that existing water supplies are maintained. If necessary, this may involve the provision of a temporary supply for the duration of construction. In the event that it is not possible to make a temporary supply available, Hornsea Four would pay compensation for reasonable losses attributable to the loss of supply. On completion of the works, the Applicant will reinstate the newly reseeded gray ley having carried out a Pre-entry Schedule of Condition.</p> <p>The Applicant also notes that the potential impact on your drainage systems is of particular concern.</p>
<p>My clients have actively engaged with your Agents, Dalcour Maclaren in respect of the proposed route. My clients responded in October 2019 to the proposed alternative route alignment querying the logistics of how the land would be accessed and where the proposed crossing points would be. My clients felt that the least worst case scenario if the route</p>	<p>I</p>	<p>N/A</p>	<p>The public consultation on the Preliminary Environmental Information Report (PEIR) finished in late September 2019 and provided an opportunity for landowners, occupiers and the general public to comment and provide feedback on Ørsted proposals for the onshore and offshore elements of</p>

<p>alignment went ahead would be to HDD through the land given that there is both a canal and a dyke to cross in close proximity. They assumed that the whole length of the proposed route change in that location could be by that method. On behalf of my clients I asked Dalcour Maclaren in October what feedback there had been on the proposed route alignment. Neither my clients nor myself have been informed of anything since (although my clients had understood from neighbouring landowners that the route change was not being pursued). Therefore it was with some surprise to learn in March 2020 that the proposed material change is along the alternative route alignment.</p> <p>My clients concerns as to the cable crossing the land which is part of the material change still stand and given the lack of consultation do not feel that these have been adequately answered. They are also concerned as to how this land has been surveyed in accordance with the PEIR as there have been no walkover surveys carried out. I am informed by your Agents that there was sufficient desktop data to proceed with publishing the material change.</p>			<p>the Project. As a result of this consultation, the Hornsea Four ECC was straightened and moved further North West, to reduce the impact on the dairy holding and to move the logistics compound north of the B1249. The proposed new route was identified in the DCO update letter which we sent to you on 13th December 2019.</p> <p>The Applicant has considered the preference for a single HDD but has made a decision to proceed by way of two single HDDs under the Driffield Canal and Nafferton Drain. The methodology of utilising two single HDDs will result in a short section of open cut across your land which we estimate will be of the order of approximately 200m subject to detailed design work.</p> <p>Whilst noting your concerns regarding the lack of survey access, our understanding is that there is sufficient environmental information already available, from desk top studies and the results obtained from surveys of the surrounding land, to inform the routing decision.</p>
<p>I have attended your consultation display at Bridlington Town Hall – a process which I found to be shambolic and unsatisfactory for an infrastructure scheme of this magnitude by being left to myself to open the boxes and hunt out the paperwork I required, there being no proper display or representative of Orsted there to help me find what I was looking for.</p> <p>Your proposed works corridor crosses the entrance to Lissett Airfield from the A165 Lissett Lane main road between Beverley and Bridlington across land belonging to JH Tennant for whom I act as Land Agent.</p> <p>You have also shown a required extra proposed access onto the farm, airfield and windfarm access road which is maintained under agreement with the Airfield wind farm lessees Lissett Airfield Wind Farm Ltd owned</p>	N/A	N/A	<p>The Applicant notes these comments however a consultation event associated with this scheme has not been held at Bridlington Town Hall. The consultation documents were made available for public inspection at Bridlington Town Hall in accordance with the requirements of the 2008 Act and the APFP Regulations.</p> <p>The Applicant is in consultation with Ventient Energy regarding utilities in the area and maintaining the required access to Lissett Airfield Wind Farm. Generally during construction, if access is required across a working area or access track, a suitable crossing location will be agreed in consultation with the landowner and/or tenant, and any other affected interests, where required. Gates would then</p>

<p>by Ventient Energy.</p> <p>You have further shown the proposed site for a compound beside this access.</p> <p>Please be aware that the windfarm lessees have a right to unrestricted access over the road you wish to use and they also have major underground communications and power supply cables in the vicinity which will almost certainly be compromised both by the works corridor construction works but more importantly by the proposed compound. The Lessees have written to my clients expressing their concern that your proposals could prejudice their supply cables which my client is committed to protect as part of the lease requirements for the windfarm.</p> <p>I therefore write to draw this major concern to your attention with a requirement for you to honour my client's commitment and to agree to indemnify my client for any losses flowing from the slightest damage or delay caused to the lessees power and communications supplies and road access by your proposals.</p>			<p>be installed at the boundary of the working area to allow access. Heras fencing or an equivalent type of fencing would then be placed across the working area easement to ensure there is no interaction with any equipment or contractor personnel through the working area at the crossing point. Appropriate signage would also be posted at the location with contact and emergency information.</p> <p>The Applicant has proposed the location of the operational access to come through your land off Fisher Lane, whilst keeping to the boundary of the field. Please note that this access is only for operational purposes (not construction) and compensation will be payable for any losses reasonably incurred.</p>
<p>The Tennants do not want the additional track through the grass off Fisher lane to give Orsted access to the fields from Gransmoor drain (Glendon estate end) through to Gransmoor road before it enters into the Airfield.- you should be able to get straightforward entry to this area through the field entrance off Gransmoor Road without need to upset more of their grazing area as your additional track proposal is exactly where they move cattle from one side of the road to the other.</p>	N/A	N/A	<p>The Applicant notes these comments. In the event that this access is required it would be used for operational purposes only. As such, the Applicant is not seeking rights to construct an access in this location, and instead seeks a permanent easement only. If operational access is required this will be conducted in consultation with all interested parties, allowing any potential issues associated with cattle to be mitigation and/or avoided.</p>
<p>DCO Option A/Option B – Lockington Carr Cross</p> <p>When considering the preferred route the Estate needs to future proof against the long term effects to the land including future use, future agricultural policy and the Estate's long term objectives. The Estate's preferred route is Option A (southern route). For the reasons below:</p> <p>1. Future agricultural requirements are uncertain however it is clear top</p>	N/A	N/A	<p>It is noted that the Estate has a preference for Option A (southern route) at Lockington Carr Cross on the basis that this route has fewer potential impacts on the Estate's long term interests than Option B (northern route).</p> <p>After the delay to the DCO application submission date in 2021, the Applicant undertook an appraisal between the two options and dropped the additional option added</p>

<p>grade arable land will be required for production. Therefore it is essential to protect the top grade land across the Estate.</p> <p>2. The land to the north of the road is Grade 2 with the land to the south being Grade 3 and part Grade 2. The land that the compound is due to be sited on under Option A is poorer quality land compared to the land that would be sterilised for the compound under Option B.</p> <p>3. Option A takes less land out of production and reduces potential sterilised land for the future.</p> <p>4. By locating the compound to the south it only causes major disruption to one of the Estate’s tenants and less impact on the other rather than major disruption to two Estate tenants.</p> <p>5. Access - There is real concern about the proposed access routes, along Station Road, to access the working corridor/haul road so to avoid crossing the A164. The road network around the A164 is very narrow with no passing places and steep banks. Option A would require less land to be taken out of production as a temporary access route. There is no detail on any permanent access routes that may be required post construction.</p>			<p>between PEIR and DCO submission (Option B – northern route). This decision was primarily based on the BMV land classification of the northern route and traffic and transport related matters (including the potential for construction vehicles to cross a footpath on the north of Station Road to access the primary logistics compound, and the increased distance of the potential road widening at that location (with the associated construction access of the northern option located further to the west).</p> <p>It is also noted that the Estate has concerns about the proposed access routes, along Station Road, Lockington, to the Construction Strip. The Applicant has developed and will continue to develop the temporary access tracks in consultation with stakeholders such as East Riding of Yorkshire Council, and the likely significant effects are assessed in <a href="#">Volume A6, Chapter 7: Traffic and Transport</a>. Similarly, any likely significant effects on agricultural land area assessed in <a href="#">Volume A3, Chapter 6: Land Use and Agriculture</a>.</p>
<p><b>ECC.1.20 - Bryan Mills Field SSSI</b></p> <p>Although is it not clear from the maps, the consultation documents state that there are two different options (A and B). We have assumed that the new route (to the north of the original proposed route) is option B. Please contact us if we have misinterpreted the consultation documents.</p> <p>It is Natural England’s opinion that option B is preferable over option A. This is because option B takes the route further away from Bryan Mills Field SSSI. Please note that option B does not avoid impacts but it may reduce the likelihood or significance of any impacts. Therefore, for both options A and B, impacts and mitigation still need to be identified.</p>	N/A	N/A	<p>The Applicant notes these comments.</p> <p>After the delay to the DCO application submission date in 2021, the Applicant undertook an appraisal between the two options and dropped the additional option added between PEIR and DCO submission (Option B – northern route). This decision was primarily based on the BMV land classification of the northern route and traffic and transport related matters (including the potential for construction vehicles to cross a footpath on the north of Station Road to access the primary logistics compound, and the increased distance of the potential road widening at that location (with the associated construction access of the northern option located further to the west).</p>



			<p>Both options are assessed in the Environmental Statement, the details of which can be found Volume A3, Chapter 3: Ecology and Nature Conservation, and <a href="#">Volume A4, Annex 5.1: Impacts Register</a>.</p> <p>The Applicant has consulted with Natural England in relation to any likely significant effects on statutory designated sites, including Bryan Mills Field Site of Special Scientific Interest (SSSI).</p>
<p><b>Proposed change 2 (36 minor amendments to the onshore ECC) and 3 (27 new operational accesses)</b></p> <p>ECC.1.1.11, LC.1.4 &amp; TAT.1.6 - Burton Bushes SSSI</p> <p>The amended route in this area bring the works closer to Burton Bushes SSSI and the works now fall within Natural England's Impact Risk Zones. Impacts to the SSSI from air (dust) and water (runoff) pollution now need to be considered as part of the assessment. Mitigation, appropriate to the scale of the impact, needs to be identified.</p> <p>This change has not been identified in Annex 1.</p> <p>EC.1.1.17 - Birkhill Wood Ancient Woodland</p> <p>The proposed access road has now been moved further away from Birkhill Wood (ancient woodland) and this helps avoid a number of impacts. There may still be impacts from air (dust) and water (runoff) pollution without mitigation.</p> <p>Natural England would welcome further discussion of impacts on SSSIs and Ancient Woodland and potential mitigation options through the Evidence Plan Process.</p>	N/A	N/A	<p>The Applicant has consulted with Natural England through the evidence plan process, in relation to any likely significant effects on statutory designated sites, including Bryan Mills Field Site of Special Scientific Interest (SSSI) and Birkhill Wood ancient woodland. Subsequent updates on this position are summarised in <a href="#">Volume A3, Chapter 3: Ecology and Nature Conservation</a>.</p>
<p><b>September 2019 Statutory Consultation under Section 42 of the Planning Act 2008</b></p>	N/A	N/A	<p>The Applicant notes these comments. Hornsea Project Four is in consultation with Natural England in relation to the</p>

<p>Please note that with the exception of Birkhill Wood Ancient Woodland, the proposed amendments under this consultation do not address Natural England’s concerns made under the September 2019 consultation. Our comments, made in the September 2019 consultation, are still relevant to this proposal.</p>			<p>comments raised under the September 2019 consultation. Subsequent updates on this position are summarised in <a href="#">Chapter 12 of Volume 1, Chapter 1: Consultation Report</a>.</p>
<p>My client has engaged with your Agents, Dalcour Maclaren in respect of the proposed route. In my client’s opinion the preferred option would be for the cable to be routed adjacent to Rotsea Drain which would cause the least disturbance in terms of existing and future drainage as well as the least disruption from any above ground structures which maybe required and which will impact upon the use of the land. I understand from my client that he has been informed by your Agents that a route adjacent to the Drain had been discounted because it would pass through ‘Carr’ (peat) land. My client does not feel that this is a valid argument as the route passes through Carr land on other sections of the route and the route as planned through his land passes through a variety of soil types including sand, peat, clays and running gravel which will present as much an engineering challenge as passing through peat alone.</p> <p>In addition my client is concerned as to the number of above ground structures (manholes) which maybe necessary to provide inspection pits. As proposed potentially there could be 6 link boxes and 6 fibre optic chambers per circuit. My client would like further information as to the number and siting of the proposed manholes as his objective, should the scheme go ahead, is to be able to farm the land without having areas ‘sterilised’ by manhole covers once the cables have been laid.</p>	N/A	N/A	<p>The Applicant notes these comments. As a part of the route planning and site selection process Hornsea Four has aimed to avoid areas of peat land, wherever possible, as peat has the potential to pose technical challenges.</p> <p>The exact location of the link boxes (used for inspection) will be finalised during the detailed design stages pre-construction. Hornsea Project Four will locate any transition join bays and link boxes in consultation with landowners. However, where there may be technical or environmental constraints, for example, it may not always be possible to locate surface apparatus in less intrusive locations such as adjacent to field boundaries.</p>
<p>I note the slight change to the route which severs a smaller volume of my clients land and reduces the length of the temporary access. We support this.</p> <p>I also note the movement of the logistics compound into land outside my</p>	N/A	N/A	<p>This comment is noted by the Applicant.</p>

<p>clients tenancy. We have no objection to this. However, you should also consult Tom Watson of Cundalls (on behalf of Albanwise- landlord) as they may or may not desire compounds on the property. As a tenant, my client is not permitted to sublet.</p>			
<p>We were informed that documentation regarding the statutory consultation was sent to our clients on the 13th February 2020. Copies of the documentation were however only sent to Dee Atkinson and Harrison on the 6th March 2020 leaving limited time to provide a full and considered response on behalf of our clients. It is therefore considered that insufficient time has been provided in which to respond fully to the consultation.</p>	N/A	N/A	This comment is noted by the Applicant.
<p>GENERAL RESPONSES</p> <p>3.1 Heads of Terms for a Lease Agreement</p> <p>Documentation has been sent to our landowning clients in respect of a proposed Option for a lease arrangement granting the necessary rights through our clients' land to allow the developers of the Hornsea 4 Scheme to install cables for the off-shore windfarm to the National Grid. Deadlines have been set for the return of this documentation, otherwise our clients will face compulsory purchase action if a Development Consent Order for the Scheme is granted.</p> <p>3.2 The proposed Option and Lease agreement provides insufficient information in respect of the scheme which would allow our clients to make an informed decision on whether to enter the Option and Lease Agreement. To date the agents for the Hornsea 4 Scheme have been unable or unwilling to confirm, inter-alia, the following:</p> <ul style="list-style-type: none"> <li>• The size of the off-shore wind farm and amount of electricity to be transmitted through the cables;</li> <li>• The area of land through their holding which will be affected;</li> <li>• The exact payments our clients would receive under the proposed Option and Lease Agreement;</li> <li>• The size and specification of the cables to be installed through our clients' land.</li> <li>• The construction method for installation the cables through our clients'</li> </ul>	N/A	N/A	<p>The Applicant notes these comments and responses to individual points are given below.</p> <p>In regard to the general comments on the terms of the voluntary agreements, further discussions have taken place with all landowners and their agents as set out in Section 12 of the Consultation Report and the Statement of Reasons (<a href="#">Volume E1, Chapter 2</a>).</p>

<p>land together with the size or location of any above or below ground structures.</p> <ul style="list-style-type: none"> <li>• The risk of any electromagnetic fields emitting from the underground cables or heat dissipation.</li> </ul> <p>Page 3 of 5</p> <ul style="list-style-type: none"> <li>• The impact on land drainage schemes within the area of land between the cables once laid.</li> </ul>			
<p>Landowner Rights and Future Uses of Land</p> <p>The proposed Option and lease agreement make no provision for any 'lift and shift' clause in relation to the proposed apparatus once installed. This essentially deprives the affected landowners of any future benefit which may occur should their land be suitable for alternative uses in the future. The pace of change in relation to alternative land-uses is increasing with landowners actively encouraged to consider alternative uses of their land. It is feasible that areas of land affected by the proposed Hornsea 4 scheme could have potential for alternative uses other than agriculture in the short, medium and long term as landowners pursue innovative ways to make best use of their land and meet demand.</p> <p>3.4 Under the scheme proposals landowners are to be remunerated based on a formula applied applying a generic value for agriculture land and effectively de-barred from considering alternative uses in perpetuity thereafter. This is not considered fair or equitable when balanced against the potential benefits achieved by the developer of the scheme. If compulsory purchase powers are granted under the proposed Development Consent Order it is considered that these will deprive the affected landowners of their equitable legal rights of ownership, which only whole do not restrict their use of the land, provided any proposed alternative use receives the necessary planning permission and consent required. It is therefore request that the proposed Option and Lease agreement include a 'lift and shift' clause which landowners can implement should their land be suitable for alternative uses in the future, provided the necessary permissions for the alternative uses have been granted, as appropriate.</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant considers that the terms of the voluntary agreements are reasonable. This position is supported by the fact that the Applicant has entered into voluntary agreements, or documentation is in an agreed form and awaiting signature or completion, with 77.3% of landowners and 92.0% of occupiers for the onshore export cable route (representing 95.3% and 93.9% of the length of the onshore export cable route respectively).</p> <p>The justification for seeking compulsory acquisition powers for the rights necessary to construct, operate, maintain and decommission the onshore export cables is set out in detail in the the Statement of Reasons (<a href="#">Volume E1, Chapter 2</a>).</p>

<p>Heat Dissipation and Electromagnetic Fields</p> <p>Concerns have been raised with the agents (Dalcour Maclaren) for the Hornsea 4 Scheme and Orsted in relation Heat Dissipation and Electromagnetic Fields emitting from the proposed cables once installed. The concerns relate to the impact on agronomy, soil health, agricultural operations and technology used in the agricultural business, as well as the future uses of the land, together with any risk to human health. We understand that the thermal conductivity and resistivity of the soils in which the cables are installed needs to be considered in conjunction with the underground cable design and the construction method for installing the cables. To date, no information has been provided on the cable, sizes, amount of electricity to be transmitted through them, their design or the method of construction, preventing landowners from making an informed decision on the consequential impact of the scheme.</p> <p>3.6 Despite the lack of technical information, landowners are required to enter into a proposed Option for a Lease Agreement or be subject to Compulsory Purchase action. Despite this the proposed Option and Lease Agreement include a limit on any indemnity in favour of the cable operator in perpetuity, irrespective of the ultimate impact of the cables once installed.</p> <p>3.7 It is requested that sufficient technical information be provided to enable landowners to make an informed decision on the implications of the scheme and the project developers provide an unlimited warranty that there will be no impact from heat dissipation or electromagnetic fields in the future, with limit on the indemnity to be provided by the future operator of the cables removed from the proposed Option and Lease Agreement.</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant has provided further detail on EMF in <a href="#">Volume A4, Annex 4.3: EMF Compliance Statement</a>. Public Health England (PHE) have responded to consultation on EMF are expressed no concern with regards to human impact associated with the Cables.</p> <p>Clarification of the Maximum Design Parameters (MDS) for the onshore export cables and the proposed construction methodology has been provided in the Project Description (<a href="#">Volume A1, Chapter 4: Project Description</a>).</p>
<p>The <i>redacted</i> family operate a highly sophisticated dairy farm from their main farming base in Brigham where a substantial amount of investment has been undertaken recently. The proposes scheme involves</p> <p>Page 4 of 5</p> <p>installing cables essentially through the middle of the farm with the land currently used to support the dairy her by producing forage and provides grazing for the dairy cows and youngstock.</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant has committed to developing a Code of Construction Practice (CoCP) in accordance with the Outline CoCP (Co1.24). The Hornsea Four Outline CoCP (Volume F2.2) submitted at PEIR stated that an onshore biosecurity protocol will be developed post-consent and will form part of the CoCP that will be approved under the DCO application, and once a Principal Contractor and</p>

<p>4.2 The <i>redacted</i> family have worked hard to ensure that the herd are protected from disease and bio-security is a primary consideration and the consequential impact of any imported disease or infection could be devastating for the health of the dairy herd and ultimately the business. A strict herd health programme is practiced and this is central to ongoing success of the business. The presence of major works on farm present a significant risk to the biosecurity status of the herd.</p>			<p>Ecological Clerk of Works (ECoW) has been appointed. Similarly, the Outline CoCP submitted with the DCO contains an Outline Onshore Biosecurity Risk Assessment. The onshore biosecurity protocol sets out the measures to manage the biosecurity risks, including invasive non-native species, diseases and pathogens during the construction phase. The Applicant is in consultation with the Environment Agency in relation to biosecurity measures.</p>
<p>Combined with the biosecurity issues associated with the dairy herd the land included with <i>redacted</i> Farm has the following statutory designations:</p> <p>Designation Description</p> <p>Site of Special Scientific Interest (SSSI) – Impact Zone</p> <p>Nitrate Vulnerable Zone (NVZ)</p> <p>River Hull from Arram Beck to Humber Surface Water NVZ</p> <p>Yorkshire Chalk Groundwater NVZ</p> <p>Drinking Water Safeguard Zone</p> <p>Humber and Tophill Low</p> <p>National Forest Inventory</p> <p>Priority Habitat Inventory – Deciduous Woodland</p>			<p>The Applicant notes this comment. The assessment of any potential impacts of Hornsea Four on statutory designated sites can be found in the Environmental Statement, particularly in Volume A3, Chapter 3: Ecology and Nature Conservation, and <a href="#">Volume A4, Annex 5.1: Impacts Register</a>.</p> <p>The Applicant has consulted with Natural England in relation to any likely significant effects on statutory designated sites.</p>
<p>The proposed development will intersect the farm and is expected to directly impact on circa 18 acres (6.48 hectares) of land. In addition, there will be areas of the farm that are isolated and would not be able to be accessed for harvesting, cultivation etc. At the time of writing, the full extent of the development is yet to be finalised and the full impact is therefore difficult to quantify.</p>	<p>N/A</p>	<p>N/A</p>	<p>During construction, if access is required across a working area or access track, a suitable crossing location would be agreed with the landowner and/or tenant. Gates would then be installed at the boundary of the working area to allow access. Heras fencing or an equivalent type of fencing would then be placed across the working area easement to ensure there is no interaction with any equipment or contractor personnel through the working area at the crossing point. Appropriate signage would also be posted at the location with contact and emergency information, thereby allowing access to land outside of the working area.</p>

			<p>Further discussions have taken place with the landowners regarding the impacts on farming operations and the potential mitigation measures (as set out in Appendix B of the Statement of Reasons (<a href="#">Volume E1, Chapter 2</a>)).</p>
<p>Milk from the farm is supplied to Arla Foods on contract. The contract with Arla includes a payment for a dedicated supply chain to Aldi Stores. The business has been selected by Arla to supply Aldi and this is based on a number of strict criteria, including the track record of producing high quality milk (i.e. low somatic cell count and bactoscan), the location and the "quality" of the farm, based on the fit of the family to supplying such a premium contract. The Arla contract places great emphasis on business improvement and investment in the future. The business is part of a wider Arla initiative around this called R500, which is designed to improve business profitability and resilience for members. The group members are scored on a number of key areas and part of this is management of the environment of their farms.</p> <p>The <i>redacted</i> family have worked very hard to invest in their business and get it to a stage where Arla have invited them to be suppliers to the dedicated Aldi supply chain. Any disruption to the business as a consequence of the Hornsea 4 scheme could attract significant financial penalties under the milk contract and may ultimately risk loss of the contract which could jeopardise the business. Also, the potential loss of environmental value on the farm as a consequence of the scheme may have a negative impact on the milk contract and could also potentially lead to the loss of the Aldi contract.</p>			<p>The Applicant is committed to working with the the landowners to ensure that potential impacts on the Arla Foods contract are mitigated as far as possible. The entitlement to compensation for any loss or breach of an existing food contract is set out in full in Schedule 4 Compensation Provisions of the template Lease document, sent via email to the landowners' land agent on the 6th July 2020.</p>
<p>The installation of the pipeline will undoubtedly have negative effect on the inherent environmental value of the farm. On a more practical level it will make it more difficult for the farm to maintain the options that</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant is committed to working with the the landowners to mitigate any impacts on the environmental value of the farm. If there are any losses of grant or subsidy</p>

<p>have been selected on the Countryside Stewardship scheme agreement which runs until 2021. This could result in the business being fined for the monies paid under the scheme since 2011, threatening the viability of the business.</p>			<p>from the Rural Payments Agency or any successor organisation which are attributable to Hornsea Project Four, the Applicant will compensate for any substantiated losses. Compensation Provisions are set out in full in Schedule 4 of the template Lease document, sent via email to the landowners' land agent on the 6th July 2020.</p>
<p>The need to comply with Nitrate Vulnerable Zone legislation means that the business risks financial loss as a result of not being able to comply with nitrogen loading elements of the rules. The business could lose as much as 100% of the annual Basic Payment Scheme monies as a result of this, which could also threaten the financial viability.</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant will engage with the landowner to ensure that potential impacts on nitrogen loading are mitigated. If there are any losses of grant or subsidy from the Rural Payments Agency or any successor organisation which are attributable to Hornsea Project Four, the Applicant will make payment of compensation for any substantiated losses. Compensation Provisions are set out in full in Schedule 4 of the template Lease document, sent via email to the landowners' land agent on the 6th July 2020.</p>



<p>As a consequence of these risks, representations were made to the developers of the Hornsea 4 scheme to divert the scheme off the land includes with <i>redacted</i> Farm due to the scale of the consequential impact. Alternative to the proposed route were suggested either to the north or south of the holding and considered both feasible and viable. Only a minor route amendment has been proposed and the scheme proposals still include a main access onto the proposed cable route through <i>redacted</i> Farm from the public road, creating a significant bio-security risk to the business. It is requested that taking into account the above issues, the route of the proposed cables been diverted off the land included with <i>redacted</i> Farm completely.</p>	<p>Y</p>	<p>N/A</p>	<p>The Applicant notes these comments. As a result of the 2019 Section 42 consultation, the onshore export cable corridor (ECC) was straightened and moved further north west, and the logistics compound was moved north of the B1249, with the aim of reducing impact on this property.</p> <p>The Applicant has committed to developing a Code of Construction Practice (CoCP) in accordance with the Outline CoCP (Co124). The Hornsea Four Outline CoCP (Volume F2.2) submitted at PEIR stated that an onshore biosecurity protocol will be developed post-consent and will form part of the CoCP that will be approved under the DCO application, and once a Principal Contractor and Ecological Clerk of Works (ECoW) has been appointed. Similarly, the CoCP submitted with the DCO contains an Outline Onshore Biosecurity Risk Assessment. The onshore biosecurity protocol sets out the measures to manage the biosecurity risks, including invasive non-native species, diseases and pathogens during the construction phase. The Applicant is in consultation with the Environment Agency in relation to biosecurity measures. An update on this position is summarised in <a href="#">Chapter 13</a> of <a href="#">Volume 1, Chapter 1: Consultation Report</a>, and the updated Outline Onshore Biosecurity Risk Assessment can be found in <a href="#">Volume F2, Chapter: Outline Code of Construction Practice</a>.</p>
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<p>Planning consent for the proposed development of a petrol filling station at Mount Pleasant, Bishop Burton was refused by East Riding of Yorkshire Council, despite officer’s recommendation for approval, on 27 November 2019. An appeal against this decision will be submitted in the very near future.</p> <p>If the Council’s decision is overturned on appeal it is the developer’s intention to submit a further planning application for an extension to the petrol filling station to create further on site facilities. The second phase of development will see the petrol filling station extended to the east, which will potentially impact on the proposed amended route of the cables. I have attached a plan showing the extent of the second phase and how it overlaps the option area.</p>	<p>Y</p>	<p>N/A</p>	<p>The Applicant notes these comments, and in response has moved the onshore export cable corridor further east and away from the extended area for the proposed petrol station, provided by the consultee.</p> <p>Hornsea Project Four has continued to engage with all interested parties up until the point of application submission to ensure all latest comments have been addressed and incorporated into the project design where possible.</p>
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**Table 4: Key comments received during Targeted Consultation [2] (04 August - 08 September 2020).**

Comment	Project change? (Y/N/I or N/A) <sup>6</sup>	Project commitment? <sup>7</sup> (1o/New/N/A)	Applicant response
Skidby Parish Council considered this application at its meeting yesterday and has no objections to the proposals.	N/A	N/A	The Applicant notes this comment
Rowley Parish Confirm that they support a permanent access road.	N/A	N/A	The Applicant notes this comment
<u>Access Strategy</u>  Will the proposed access route from the A1079 have a security check in place at all times to ensure only construction and maintenance vehicles are using it?	I	N/A	We can confirm that security risk will be an important consideration through the development of the shared access design off the A1079. It is not in the interest of the Applicant for non-project related traffic to be using the access road and as such will be mitigated.
The volume of HGV's will greatly increase the congestion and traffic emissions on already congested local roads. There is no mention of the number of vehicle movements daily for the construction workers. The number of visits by staff undertaking maintenance and operation requirements is totally unrealistic. Not to mention of landscape and ground maintenance staff visits.	N/A	N/A	The number of peak traffic movement associated with the construction of Hornsea Four (including HGV traffic and construction employee traffic movements) are detailed in <a href="#">Volume A6, Annex 7.1: Traffic and Transport Technical Report</a> .  Operation and maintenance traffic movements associated with the OnSS are based on past experience of unmanned substations.

<sup>6</sup> N/A = Comment is not requesting a project change to be made; Y = Amendments made to the project design as a result of feedback from consultation; N = The applicant has had regard to the comment but determined that a change is not appropriate / justified in the circumstances; I = The applicant has had regard to the comment and incorporated into or considered when producing the assessment

<sup>7</sup> 1o = primary Commitment relevant to this response; Change = any change to the existing Commitment as a consequence of the feedback; New = any new commitment resulting from the comment

<p>Birkhill Wood is to benefit by 15m with the re-routing of the access road. Will any similar protection be given to the old oak trees on the skyline of the northern boundary of the temporary working area and other long established trees at Burn Park Farm?</p> <p>Further comments - we were unaware of any EBI on the site. At no meetings were (EBI) access requirements mentioned.</p>	N/A	N/A	<p>Two veteran trees have been identified on the northern boundary of the OnSS permanent and temporary working areas, which will be retained during construction with techniques to be used to safeguard the root protection zone (Co27).. No other veteran trees or protected woodland has been identified in the area surrounding the OnSS.</p>
<p><u>Flood Risk</u></p> <p>The proposed ONSS site is a natural flood area. Photos of the flooding of the site were taken by ourselves in November 2019, which our agent, Ralph Ward forwarded to Dalchour-Maclaren. Further photos were taken in February of 2020, when the site was visited on 20th February 2020 by a representative of Orsted.</p> <p>We are interested to know if there is any feedback on this flooding?</p>	I	N/A	<p>The Applicant would like to thank the relevant consultee for the photographs sent during times of flooding and can assure that they have been reviewed and considered.</p> <p>Co191 commits to the drainage design at the onshore substation to include Sustainable Drainage System (SuDS) measures including filter drains, swales, attenuation and flow control structures for the operational drainage of the OnSS. Surface water will be discharged from the site at a controlled rate which will be determined during the detailed design stage. Appropriate consideration will be given to maintaining the existing floodplain capacity and / or flow conveyance during extreme rainfall events. These principles are provided in the Outline Onshore Infrastructure Drainage Strategy (<a href="#">Volume F2, Chapter 6: Outline Onshore Infrastructure Drainage Strategy</a>) with which the Onshore Infrastructure Drainage Strategy will be developed.</p>
<p><u>Cover Letter</u></p> <p>Dear Sirs,          Development: Hornsea Project Four Offshore Wind Farm          Property: <i>redacted</i>          As you know, we are instructed by <i>redacted</i>.          We write in response to your letters of consultation addressed to our clients and dated 31 July</p>	N/A	N/A	<p>The Applicant notes this comment but does not accept that there has been a failure to properly consult the relevant landowners.</p>

<p>2020. We confirm that this letter (and its enclosures) constitute the response to those letters on behalf of both of our clients. Please note that our clients are also represented by Quod planning consultants and we enclose a detailed response from Quod under cover of this letter, making detailed representations and comments regarding your proposals (Enclosure 1). The relevant contact at Quod is <i>redacted</i>.</p> <p>Any correspondence relating to this response may be sent to Gordons LLP as follows:</p> <p>FAO: <i>redacted</i>          By email: <i>redacted</i>          By post: Gordons LLP          Riverside West          Whitehall Road          Leeds          LS1 4AW</p> <p>You will note that the response letter from Quod makes reference to procedural failings and failures to consult with our clients. In addition to the comments made in the detailed letter from Quod, we have also set out these failings in detail in our letters of 12 June 2020 and 13 July 2020.</p> <p>We enclose further copies of these letters for ease of reference (Enclosures 2 and 3) and to formally form part of this response. Our clients' position in relation to these failings is entirely reserved.</p> <p>Finally, please note that our clients anticipate that they will suffer losses as a result of the Development. Our clients intend to claim compensation for these losses at the appropriate time and we should be grateful if you could please ensure this is noted and confirm that this has been noted by way of response.</p>			
<p><u>S42 Representations</u></p> <p>Dear Sir/Madam</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant notes these comments and responses to individual points including the consultation process are given below</p>

<p>Hornsea Project Four Offshore Wind Farm - Statutory Consultation under Section 42 of the Planning Act 2008</p> <p>I write on behalf of my clients, Mr and Mrs Dransfield, and enclose objections to the above consultation regarding the Hornsea Four Offshore Wind Farm.</p> <p>My client resides at <i>redacted</i> (see Appendix 1) and will be directly and adversely affected by the proposed access route to the onshore substation by virtue of its proximity to their property, in addition to potential cumulative impacts arising from consented highways improvements to the A1079 that would revise their access arrangements.</p> <p>Access to the substation in close proximity to <i>redacted</i> was originally intended to be for construction only; however, it is now also proposed as a permanent route to serve the substation (post its construction). Despite being an 'interested party', and therefore subject to a statutory duty on the promoters to be consulted as part of the Development Consent Order (DCO) process, my client has not been notified of the proposed works previously and they have therefore not had the opportunity to comment on any aspect of this route to date.</p> <p>Consequently, alongside the proposed amendments to make this route permanent, the enclosed objections consider the principles of the access route more generally.</p>			
<p><u>Summary of Objections</u></p> <p>The enclosed objections set out that:</p> <ul style="list-style-type: none"> <li>▪ Transport analysis of five potential access options by Local Transport Projects (LTP) is flawed. It does not take account of committed highways improvements to both the A1079/A164 and the potential conflicts that could arise, including the creation of an additional (new) access to <i>redacted</i> in the same A1079 layby as is being proposed by the DCO.</li> </ul>	N/A	N/A	The Applicant notes these comments and detailed responses to each objection are given below

<ul style="list-style-type: none"> <li>▪ The LTP analysis has generated a “mandatory” requirement for substation access to be taken from the A1079 which is therefore unproven.</li> <li>▪ The LTP analysis has in turn informed the substation location. Consequently, the substation location is not founded on sound and appropriate evidence.</li> <li>▪ The consideration of alternative access routes to the onshore substation is not underpinned by any specific environmental or wider technical analysis of each option to directly determine their appropriateness.</li> <li>▪ There are a range of adverse (or at best unproven) impacts arising from the substation location and access route, and therefore both matters are not properly determined.</li> </ul> <p>With regard to <i>redacted</i>, the direct impact of the proposals on my client’s property has not been assessed. Without further evidence to address the lack of foundation to the case, we consider that the proposed approach is unsound, and we maintain our objections to the proposals.</p>			
<p>Relevant Background</p> <p>Access to the onshore substation is proposed via a new route that extends south/south-east from an existing layby on the A1079 via a new left-in, left-out junction. The road would route around <i>redacted</i> and at its closest will be just c. 100m east of the property boundary<sup>1</sup>, and much closer than the 150m which is suggested by the supporting consultation material.</p> <p>Immediately south of <i>redacted</i> lies <i>redacted</i>, beyond which is Jillywood Lane. Both are designated as ‘Candidate and Designated Local Wildlife Sites’ within the adopted Development Plan of East Riding of Yorkshire Council (ERoYC). The former is also an ‘Ancient Woodland’ whilst the area surrounding and including the layby to the A1079 is a designated ‘Mineral Safeguarding Area’.</p> <p>In-part, the proposed access route would run adjacent to the eastern boundary of both of these designations before entering the sub-</p>	N/A	N/A	The Applicant notes this comment and covers each of these points in subsequent responses in more detail.

<p>station compound. It is noted that the route has been modified very slightly east of Birkhill Wood as part of this consultation, but that this would remain only c. 15m from its boundary.</p> <p>Appendix 1 confirms the extent of the Development Plan allocations relative to <i>redacted</i> and the proposed access route.</p>			
<p><i>redacted</i> is currently accessed from the west via a junction with the A164 that provides ingress and egress in both directions. These arrangements are subject to change under a recent planning permission granted by ERoYC for highways improvements to both the A1079 and A164 (ref. 20/01073/STPL).</p> <p>These works have not been considered by the DCO and there are potential conflicts arising which have not been assessed. They have a bearing upon the proposed substation access and wider highway network and must be considered in the context of the enclosed representations. Notably, the existing access to <i>redacted</i> via the A164 would become egress only, with a new access created via the existing layby on the A1079 that will run in a broadly east-west direction.</p> <p>The precise access details are to be confirmed via condition (specifically Condition 22 of 20/01073/STPL), but it is notable that they utilise the same layby as is proposed for access to the Hornsea proposals. There has been no consideration of these proposals by Orsted, particularly whether the proposed access to the onshore substation is compatible with these works.</p> <p>Two relevant pieces of evidence have informed the onshore substation location and access route, being a 'RAG' (Red, Amber, Green) analysis of broad zones within which the substation could be located, and a consideration of five access routes to serve the most appropriate zone. Each is considered further below.</p>	Y	N/A	<p>At the time of undertaking the LTP access appraisal, the A164/Jocks Lodge Highway Improvement Scheme was in the early stages of development. Notwithstanding, the Applicant has been in contact with ERYC over the duration of the pre-application process regarding the interaction with Hornsea Four.</p> <p>ERYC identified the potential for interaction between the two projects early during consultation, expressing a preference for access off the A164 at this location to be avoided where possible.</p> <p>It remains that there would be a greater level of interaction with Hornsea Four if an access off the A164 had been selected, compared to the identified access off the A1079, by virtue of the proposals.</p> <p>As more information has become available, Hornsea Four has had early sight of relevant plans and drawings. The location of an access point associated with the Jocks Lodge Highway Improvement Scheme was not anticipated during the design development of Hornsea Four.</p> <p>After consultation with ERYC, undertaken as a result of this consultation response, the Applicant has amended the access location off the A1079 to avoid an overlap with the new access to be provided for this property. The updated access design has been subject to an</p>



		<p>independent highways safety audit, and developed in consultation with ERYC.</p> <p>ERYC have agreed that should there be an overlap in construction activities, measures and controls can be developed within the respective Construction Traffic Management Plans (CTMPs) to manage the potential for significant cumulative adverse impacts.</p> <p>The OnSS site selection process has been informed by a number of factors, including liaison and consultation with the local authority (ERYC) throughout the process to identify key considerations. This resulted in the early identification of a clear preference from ERYC to avoid taking access off the A164 where possible. This preference was informed by the high levels of baseline traffic on the A164 and resulting difficulties associated with turning on and off the A164. Additionally, the unknown timings associated with the Jocks Lodge Highways Improvement Scheme and the potential implications of traffic routeing once the improvement scheme was constructed (i.e. no right turn for northbound traffic) was also considered at the time.</p> <p>The zoned approach and RAG appraisal was the first stage in the site selection process post-EIA scoping and identified clear constraints to development. This approach identified zone 2 as the most suitable area to locate the OnSS. It is noted that the LTP access appraisal did not inform this zone selection, as indicated in <a href="#">Table 4: RAG Criteria – Zones in Volume 4, Annex 3.3</a>.</p>
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<p><u>Substation – Site Selection</u></p> <p>In determining where to locate the onshore substation, a 'RAG' analysis was undertaken of four broad potential zones (see Figure 1). This concluded that Zone 2 was the most appropriate location within which a subsequent detailed site-selection exercise should be undertaken.</p> <p>Alongside the RAG analysis, LTP were appointed to consider five potential access routes which is considered further in the following section below.</p> <p>The PEIR confirms<sup>3</sup> that, once Zone 2 had been established and the preferred access route (Option 4) had been confirmed by the LTP analysis, a more detailed assessment of potential substation sites was undertaken.</p> <p>This assessment was informed by "mandatory" and "preferred" site selection principles<sup>4</sup>, including the following of relevance:</p> <ul style="list-style-type: none"> <li>▪ Access from the A1079 (mandatory). This mandatory requirement was derived from the conclusions of the LTP analysis that it was the only appropriate option (considered further in the following section below).</li> <li>▪ Avoid siting under 400kV overhead power lines (preferred).</li> <li>▪ Avoid nationally or internationally designated ecological receptors, where possible (preferred).</li> <li>▪ Avoid residential properties (preferred).</li> </ul> <p>Two sites were initially identified within Zone 2 – Site A and Site B – and the application of the above principles led to the substation being sited in Site B (See Figure 2). The LTP analysis is therefore integral to the site selection process.</p> <p>It is notable that the proposed access route extends through Zone 3, despite this zone being dismissed for the substation location by the RAG analysis due to the presence of a high-pressure gas pipeline that runs through the entirety of the zone<sup>5</sup>.</p>	<p>N/A</p>	<p>N/A</p>	<p>It is noted that the 'mandatory' category assigned to access off the A1079 was not only informed by the LTP access appraisal, but also consultation with ERYC and the local population, citing a clear preference for access to be taken off the A1079. Despite this, however, the required access off the A1079 did not omit any potential OnSS sites, nor did it impact the BRAG results. This is identified in paragraph 2.3.4.2 of <a href="#">Volume A4, Annex 3.3: Selection and Refinement of the Onshore Infrastructure</a>, which states:</p> <ul style="list-style-type: none"> <li>• <i>"Construction access – Both sites would utilise the same access from the A1079 during construction and would require a similar junction and access road;</i></li> <li>• <i>Operational access – Both sites have similar operational access options;"</i></li> </ul> <p>It is therefore a misrepresentation of the process to state that <i>'the LTP analysis is therefore integral to the site selection process'</i>.</p> <p>Regarding the presence of a high pressure gas pipeline, there is a fundamental difference between the construction of above ground electrical infrastructure, and the construction of a linear access road. The Applicant has been in contact with the relevant owners of these assets to discuss the proposals.</p> <p><b>Consultation Process</b></p> <p>We note your comments in respect to consultation and wish to raise the following points:</p>
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<p>My client was not consulted on any of the above matters and has had no opportunity to raise his concerns to date, despite being an interested party who would clearly be affected by the proposals.</p>			<ul style="list-style-type: none"> <li>• As part of our statutory consultation on the proposed development consent order (DCO) application in August 2019, a letter dated 8 August 2019 was sent to the owners of this property seeking their comments on the proposed DCO application, including the preliminary environmental information. These letters complied with the requirements under s42 and s44 of the Planning Act 2008, please find copies enclosed.</li> <li>• In addition, the records indicate that your clients were also sent community consultation information including a consultation leaflet in August 2019, pursuant to s47 of the Planning Act 2008.</li> <li>• A consultation summary report was subsequently sent to your clients in December 2019 and an interim community newsletter was sent in May 2020.</li> <li>• Notwithstanding the numerous letters that have been sent to the owners of this property, Hornsea Four has proceeded on the basis that they have not been previously consulted. Therefore, a s42 consultation letter was re-sent to the owners of this property alongside a s42 targeted consultation letter with an extended consultation period of 35 days. This was accompanied by a plan detailing the current location of the proposed access route. A consultation response was received from the owners of this property on 7 September 2020. The Applicant therefore considers that it has complied with its consultation obligations under s42 and s47 of the Planning Act.</li> </ul>
<p><u>Consideration of Alternative Access</u></p> <p>Routes – LTP Report</p> <p>The PEIR notes that concerns were raised during the initial consultation rounds of routing construction traffic through Cottingham and from the A164, and consequently LTP were appointed to analyse five potential access options. This analysis is</p>	<p>N/A</p>	<p>N/A</p>	<p>It is noted that Quod concur with the discounting of most access options identified, based on independent review. Regarding access option 2, the clearest constraint on the utilisation of this access option is the potential interaction with the Jocks Lodge Highways Improvement Scheme. ERYC has expressed a clear preference for access to be taken from the A1079, avoiding the A164; which reduces the:</p>

explained within the 'Highways Access Options Report' prepared by LTP (November 2018).

Figure 3 below shows the location of these five access options with the chosen route being Option 4.

The PEIR confirms that, only following LTP's conclusion that Option 4 was the most suitable, was this discussed with ERoYC planning and highways officers and parish council representatives. It was agreed in these discussions that Zone 2 and Option 4 were the preferred options.

In their analysis LTP conclude that Options 3 and 5 have significant limitations in terms of road width, weight and width restrictions and were therefore dismissed on the grounds of unsuitability. My client's highway advisors (Fore Consulting) do not disagree with this judgement.

Both Quod and Fore Consulting consider that Option 1 would also be unsuitable as it would involve construction and operational vehicles routing along the existing access track serving *redacted*. This track is narrow in parts, signposted as a Public Bridleway and extends past a further residential property at Mouse Hill.

Options 2 and 4 are therefore the remaining options for access assessed by LTP. Appendix 4 of the LTP analysis outlines a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of these options (alongside the others) and suggests that there are very few fundamental differences between the two.

Indeed, it appears that Option 4 was promoted on the basis that the A164 is less preferable due to peak period traffic delays and the potential for conflict with the proposed improvement works to the A164.

In concluding that Option 4 would be the most appropriate route of the five assessed, LTP recognise that there are a number of constraints, including:

- Securing agreement of adjacent landowner(s).
- Local topography – it is noted that there are considerable level changes between the existing layby and adjacent field.

- Rerouting of construction vehicles to account for the duelling of the A164 (i.e. no right turn off the A164); and
- Interaction between the project footprints.

In respect of topographical differences between the A1079 and the OnSS access route, this has been factored into the amended access design (the location of which has been moved due to recent consultation), which is included in Volume A6, Annex 7.1: Traffic and Transport Technical Report.

Regarding the use of the layby on the A1079, the Hornsea Four Order Limits allow for the extension of the layby to facilitate the amended access location. Necessary control measures will be agreed with ERYC during the pre-construction period as the access design is undertaken in detail.

See previous response regarding the site selection process.

<ul style="list-style-type: none"> <li>▪ Impact of temporary layby closure – the amenity and safety of road users would need to be assessed further.</li> <li>▪ Maintaining operations/maintenance access – to ensure that layby users do not park/wait in a manner that restricts access.</li> </ul> <p>It is understood that the above matters have not been addressed to date.</p> <p>The LTP work is a key evidence piece that has informed the site selection process for the onshore substation considered above. LTP's conclusion that Option 4 was the most appropriate generated a "mandatory" requirement for access to be via the A1079, and in turn this requirement led to the selection of the substation location.</p>			
<p><u>Access Route: Consideration of Alternatives</u></p> <p>The site selection process for locating the onshore substation is underpinned by the LTP analysis of access options. This conclusions of this analysis have led to a "mandatory" requirement for access to be taken from the A1079 (i.e. Option 4). Therefore, should an alternative access option subsequently be considered to be more appropriate, this has a clear bearing for the site selection process that has taken place.</p> <p>The differences between Options 2 and 4 within the LTP analysis are marginal, at least within the narrow analysis of the RAG and LTP appraisals, with LTP suggesting that Option 4 was preferred as a consequence of potential traffic delays on the A164 at peak periods, and the potential conflict with the proposed improvement works to the A164.</p> <p>The LTP Report (Table 1) recognises that the A1079 is also subject to considerable levels of vehicular movements (18,585 annual average daily traffic [AADT] movements, 2016), albeit below the AADT for the A164 (31,215 movements, 2017). These figures do not, however, reflect changes to the highway network that would arise from the consented highways improvements under 20/01073/STPL, including potential conflict with the proposed alterations to the A1079 layby and its dual use. As a consequence, it is not possible to conclude that access from the A1079 is qualified at the current time.</p>	N/A	N/A	<p>See previous response regarding the site selection process.</p> <p>A review of the submitted Transport Assessment for the Jocks Lodge Highways Improvement Scheme has identified that if implemented, peak hour traffic flows on the A164 would remain significantly higher than flows on the A1079. The basis for the site selection is therefore considered to be validated.</p> <p>At the time of site selection, the preferred design for the Jocks Lodge Highways Improvement Scheme had not been developed and there was no certainty regarding the timing of implementation. The A1079 access was developed in consultation with ERYC and represents a pragmatic solution to allow Hornsea Four to achieve access either independently of the Jocks Lodge Highways Improvement Scheme or concurrently with minimal changes.</p> <p>As noted previously, ERYC have also expressed a clear preference for access to be taken from the A1079 rather than the A164.</p>

<p>It is also demonstrative of an inconsistent approach in the assessment, as potential improvement works to the A164 are considered by LTP in assessing Option 2, whereas improvements to the A1079 are not considered in assessing Option 4.</p> <p>There is no evidence to consider the relationship or cumulative impact of these highway improvements within the consideration of alternative options. This could have a material bearing upon the suitability of Option 4 (and others) as an appropriate access route, as well as my client's ability to access their property. It follows, therefore, that the approach to the substation site selection is underpinned by inadequate analysis, and the "mandatory" requirement to secure access from the A1079 is unfounded at the current time.</p> <p>Within the assessment of alternatives, the evidence does also not explicitly consider whether access from the A164 could be delivered alongside (and in parallel with) the cabling route that will be installed in this location. Ground works will be necessary to delivery this cabling route, and therefore there is merit in delivering an access route in tandem thereby reducing the associate impact to a single area only. This has not been considered to date and there is a prospect that the chosen route is not the most environmentally appropriate option by comparison.</p>			<p>See previous response regarding amendments to the access location.</p> <p>With regards to the use of the cable route access from the A164 to access the A1079 it has been established that access from the A1079 would be a better traffic management solution and is preferred by ERYC.</p>
<p><u>Technical Analysis of Access Options</u></p> <p>The "mandatory" requirement for access from the A1079 is derived from LTP's analysis; however, this adopts a solely highways focus and there are no considerations of the wider environmental or technical merits of each of the five options.</p> <p>Such technical analysis is only applied to the RAG exercise to define a broad zone appropriate for the substation (Zone 2); it has not been subsequently applied to each individual access option thereafter considered by LTP. By way of comparison, in environmental and ecological terms Option 2 could avoid impacts by virtue of proximity</p>	N/A	N/A	<p>Jillywood Lane Local Wildlife Site (LWS) is located within the Hornsea Four Order Limits and comprises an intact ancient species-rich hedgerow and medieval track/boundary. Hornsea Four is unable to directly avoid this non-statutory designated site, however consultation with stakeholders (Natural England, Yorkshire Wildlife Trust) has been undertaken to agree the sensitive crossing measures that will be implemented at this location to avoid adverse impacts to this locally sensitive site.</p>

to the designated 'Candidate and Designated Local Wildlife Sites' at Birkhill Wood and Jillywood Lane.

Whilst LTP suggest that Option 4 is the most appropriate in highways terms (notwithstanding Quod's comments above), it has not been proven that this is the most appropriate option in all other technical and environmental aspects.

Furthermore, despite moving the access road 15m east of Birkhill Wood to "reduce potential impacts from traffic emissions on the designated ecological receptor", this is not supported by any evidence or analysis that is publicly available as part of the consultation. Given the number of vehicular movements that would arise, it is feasible that a 15m separation distance may potentially generate adverse ecological and environmental impacts on these designations.

No available technical analysis of the environmental amenity impacts of Option 4 on *redacted* (amongst other sensitive receptors) has been undertaken. This is despite the PEIR considering that the elected substation site ("Site B") has a "high potential to constrain development" due to proximity to residential properties including through noise and vibration, compared to a lesser impact at Site A9. Other technical matters associated with *redacted* and Option 4 also prevail but have not been fully explored compared to alternatives, including:

- *redacted* is partly within Flood Zone 3 with a watercourse that runs adjacent to the residential buildings in a broad east-west direction. The proposed access route would cross this flood designation and it is essential that this watercourse is not inhibited in any way to avoid flooding of the property; however, it is unclear what site-specific evidence has been undertaken to ensure that there is no risk to this watercourse or my client's property.
- The access route must cross beneath existing power lines that run to the north-east of *redacted*. This is contrary to one of the "preferred" site selection objectives adopted by the PEIR to avoid siting underneath the 400kV overhead power lines.

Birkhill Wood Local Wildlife Site (LWS) is located approximately 15 m at the closest point from the Hornsea Four OnSS access road. This LWS comprises a mixed plantation woodland with one area being wholly broadleaved. It is designated as an ancient woodland.

Hornsea Four has avoided this sensitive and protected site through the route planning and site selection process and this is secured through the project's Commitment No.2.

The 15 m separation distance between Birkhill Wood LWS and the OnSS access track has been identified in accordance with Natural England guidance to avoid direct impact on Birkhill Wood as well as avoiding the tree root protection zones. This distance has been consulted and agreed with stakeholders (Natural England) through the onshore evidence plan meeting process.

Regarding the 15 m separation distance, The Natural England road traffic assessment advice note (June 2018) refers to the Design Manual for Roads and Bridges (DMRB) criteria of 1,000 AADT and 200 HGVs as the screening thresholds for being roughly equivalent to 1% of the Critical Load or Level. On that basis, impacts from average daily traffic movements can be screened out.

In terms of the constraint on development from residential property, the fundamental consideration during the site selection process was 1. Proximity to residential settlements, and 2. Proximity to the nearest properties. It is noted that Site A is located closer to this property when compared to Site B. The Applicant has

<ul style="list-style-type: none"> <li>It is unclear whether the proposed access route is deliverable given it will cross a high-pressure gas pipeline that runs. Zone 3 was dismissed for locating the substation for this very reason.</li> </ul>			<p>undertaken impact assessments to ensure that effects from both construction and operation and maintenance activities are considered and necessary mitigation measures are identified.</p> <p>It is acknowledged that the OnSS access road sits partly within Flood Zone 3. This is mitigated by commitment 184, which states “Where the permanent access track to the OnSS is within areas of flood risk (as shown on the Environment Agency Flood Map for Planning) it will be appropriately designed to maintain existing ground elevations to ensure continued floodplain capacity and/or flow conveyance, where reasonably practicable.”</p> <p>In respect of the location below power lines and above high-pressure gas pipelines, it is noted that constraints relevant to permanent above ground buildings associated with the electrical transmission infrastructure are not comparable to those identified for access roads.</p>
<p><u>Impact on Amenity</u></p> <p>The number of vehicle trips forecast to be generated during the construction phase are significant. The evidence suggests that 287 peak daily HGV two-way movements are predicted to use the new access route alongside additional access by 49 employees (i.e. a further 98 two-way LCV movements) during the construction period. This would equate to an average of 38.5 one-way vehicle movements per hour, or 1.3 one-way movements every two minutes, assuming a construction period of 8am to 6pm.</p> <p>Whilst the number of post-construction vehicular movements will be less than the construction phase, there will be everlasting impacts upon the environment that will not be reversed. It is therefore</p>	N/A	N/A	<p>The current forecast for peak construction traffic would comprise of up to 287 two-way HGV movements per day and 299 employees per day. The numbers presented however represent the peak period in construction.</p> <p>Average HGV movements would be significantly lower, typically, there would be an average of approximately 137 two-way HGV movements per day, equivalent to seven inbound and seven outbound HGV movements per hour.</p> <p>Employee numbers equate to a worst case in terms of peak numbers and do not include for any reductions to account for travel planning measures, such as car-sharing. Employee movements would typically occur at</p>



essential that the selection of an access route is founded on sound and robust environmental evidence.

The number and proximity of these vehicular movements will adversely impact upon the amenity of my client in terms of noise and disturbance. The proposed access route will be c. 100m from his property boundary at its nearest points<sup>10</sup>, and closer than the 150m that is being suggested within the consultation material.

There is no evidence to consider the impact directly upon my client's amenity in terms of noise, vibration and visual impact that would occur. In addition, without consideration of the consented highways improvements under 20/01073/STPL and the reconfigured access arrangements to *redacted*, there is no assessment of the potential conflicts that could arise and how the significant number of construction phase traffic could impact upon my client's ability to access their residence safely and without obstruction.

The creation and utilisation of a second point of access to *redacted* could also create an additional security risk to the property through the creation of an additional means of access.

the start and the end of the day and would be managed through the Construction Traffic Management Plan (CTMP). The CTMP will implement measures to minimise overall employee vehicle movements.

ERYC have agreed that should there be an overlap in construction activities, that measures and controls can be developed within the respective Construction Traffic Management Plans (CTMPs) to manage the potential for significant cumulative adverse impacts. This would include consideration of the potential for temporary access arrangements.

The distance of the access road from residential properties has been measured to the nearest habitable building, not the property line, which is standard practice. It is important to note however that the distance from the permanent access road to the property line is greater than 100m, with the distance to the nearest habitable building greater than 150m. The placement of the access road considered both this property and other residential properties.

The baseline noise measurement survey undertaken in April 2019 included a measurement location near to this property (namely location SMP6) with the daytime noise levels measured as 53dB(A) Leq / 55dBA L10 during the daytime period.

Using the traffic figures for Hornsea Four, predictive calculations of the noise level associated with the OnSS access road have been undertaken. Details of this assessment is provided in Volume A3, Chapter 7: Noise and Vibration.

		<p>In terms of construction noise effects, comparing the predicted noise levels against the “Daytime Construction Noise Impact Magnitude Criteria” (PEIR Vol 3 Chapter 8 Table 8.24) and the Evening and Weekend Construction Noise Impact Criteria (PEIR Vol 3, Chapter 8, Table 8.25), these noise levels are below the threshold of negligible impact.</p> <p>Cumulatively, the change in noise level when the road traffic noise level is included gives an increase of 1.4dB(A). It is accepted that a change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.</p> <p>With regard to external amenity, the predicted Leq is also below the upper guideline value of 55dB LAeq,T as set out in Section 7.7.3.2 in British Standard 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings.</p> <p>Considering the above review and predicted noise levels, it is concluded that the use of the access road at this location is unlikely to significantly impact or affect amenity at this location.</p> <p>Construction of the OnSS is acknowledged as resulting in disturbance to receptors across the area within the Hornsea Four Order Limits, including the works associated with the temporary access track across the arable fields. Receptors near the OnSS and temporary works area include residential receptors at this property amongst others. Consideration of these impacts in relation to these residential receptors has been made</p>
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			<p>within the Landscape and Visual Impact Assessment, noting that receptors will have clear views of the construction works, although these will only be from one direction and for a limited period of time. Landscape mitigation planting is proposed and aimed to be established as early as possible in the construction phase, which in turn is considered to reduce of the visibility of the works in close range views.</p> <p>See above comment response regarding consideration of interaction between the A164/Jocks Lodge Highways Improvement Scheme and Hornsea Four.</p> <p>The Applicant has amended the access location off the A1079 to avoid an overlap with the new access to this property. We can confirm that security risk will be an important consideration through the development of the access design off the A1079. It is not in the interest of the Applicant for non-project related traffic to be using the access road and as such will be mitigated.</p>
<p><u>Summary of Objections</u></p> <p>These objections respond to the proposed access route from the A1079 to the onshore substation and its relationship to my client's residence at <i>redacted</i>. Despite being an interested party, my client has not been formally consulted on the proposals to date and they have not had an opportunity to comment on any aspect of the proposed access arrangements.</p> <p>Alongside the current amendments to make this access route permanent and adjust its position slightly away from Birkhill Wood (but only by 15m), these objections respond to the wider principles underpinning the access route in addition. In summary, it is demonstrated that:</p>	<p>N/A</p>	<p>N/A</p>	<p>The Applicant notes these comments and responses are given to each point individually above.</p>

- The onshore substation location is informed by (i) a RAG appraisal of four broad areas, and (ii) a subsequent transport appraisal of five access options within the preferred area undertaken by LTP.
- The analysis of the five potential access options is flawed and does not account for committed highways improvements to the A1079/A164 and the potential conflicts that could arise with the DCO proposals. This includes, amongst others, the creation of an additional (new) access to *redacted* in the same layby as is being proposed for the substation.
- The LTP analysis has informed the substation location, and it therefore follows that this location is not founded on sound and appropriate evidence.
- The consideration of the alternative access options is undertaken from a highways perspective only. There is no consideration of the technical or environmental appropriateness of each specific option to directly understand their appropriateness.
- No assessment appears to have been carried to determine if the proposed access could be delivered from the A164 alongside the construction of the cabling route, to limit the impact to a single area. It is unclear as to whether the chosen route is the most environmentally appropriate option.
- The assumption that access from the A1079 is “mandatory” is therefore unfounded and must be substantiated further with regard to reasonable alternatives.
- The number of vehicle movements during the construction phase could equate to 1.3 one-way movements every two minutes within c. 100m of my client’s property demise. This is closer than the 150m being suggested within the consultation material and will have adverse impacts on my client’s amenity, particularly through the noise, vibration and visual impact that will occur.

I trust that these objections will be given due regard and consideration. We would welcome a response on the matters outlined above, and without further evidence to address the lack of foundation to the case we maintain our objections to the proposals.

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<p>Should you have any queries regarding the information included, please do not hesitate to contact me.</p>			
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**Table 5: Applicant regard to Targeted Consultation [3] Section 42 Consultation Responses (30 June - 30 July 2021).**

Comment	Project change? (Y/N/I or N/A) <sup>8</sup>	Project commitment? <sup>9</sup> (1o/New/N/A)	Applicant response
<p>Lazaat Hotel requested a more detailed map and further information on the access change prior to confirming no objections to the proposals.</p>	N/A	N/A	<p>The Applicant provided an additional map and Andy Acum, Community Liaison Officer, met to answer any questions.</p>
<p>The move south for construction traffic access, under the circumstances of Jocks Lodge Scheme, seems sensible.</p> <p>My only concern, as part of the Beverley Ramblers Team involved in prior consultations with you at Cottingham, is continued access for walkers travelling north, from the south using the non-motorised/agricultural 'old road'. This is important for access to the Jillywoods Lane Public Right of Way (Skidby Footpath 12) thereby allowing walkers access to other routes to the east of Jillywoods Lane running north/south. Jillywoods Lane footpath is an important link route allowing excellent, popular circular walks from the Beverley and Cottingham areas.</p> <p>It is noted in your cover letter under 'Proposed Change' that, "construction traffic volume is anticipated to be low in this location". Could you please confirm access to the above PRow will still be available whilst also used for construction access?</p>	N/A	N/A	<p>Comments regarding the validity of the access change and general support of efforts to encourage the cooperation and interaction between the two projects is noted.</p> <p>The Applicant can confirm that appropriate management measures will be developed, through consultation with East Riding Yorkshire Council, to minimise disruption to the Non-motorised User Route (NMUR). General detail is provided in the Outline Public Right of Way Management Plan, which forms Appendix C of <a href="#">Volume F2, Chapter 2: Outline Code of Construction Practice</a>, which will provide the basis</p>

<sup>8</sup> N/A = Comment is not requesting a project change to be made; Y = Amendments made to the project design as a result of feedback from consultation; N = The applicant has had regard to the comment but determined that a change is not appropriate / justified in the circumstances; I = The applicant has had regard to the comment and incorporated into or considered when producing the assessment

<sup>9</sup> 1o = primary Commitment relevant to this response; Change = any change to the existing Commitment as a consequence of the feedback; New = any new commitment resulting from the comment

			<p>of the detailed Code of Construction Practice.</p> <p>The Applicant will work with ERYC pre-construction and during construction to ensure the NMUR remains open when possible. This will involve the use of management measures to facilitate construction traffic and users of the NMUR itself. It is acknowledged that during the construction of the construction access road, and peak times of construction, the NMUR may need to be temporarily stopped up.</p>
<p>Beverley Ramblers raised two further queries.</p> <p><b>First query:</b> concerns the Non-Motorised User agricultural track running north from Lazaats Hotel. Your application states "construction traffic volume is anticipated to be low in this location." It appears from your Map 1 that this track will be significantly widened to accommodate your machinery. Please would you confirm that (1) use of this track by your machinery will not affect the hedges/trees lining the track, and (2) that you have placed in the public domain an appropriate vegetation survey, eg as required by the Hedgerow Regs 1997.</p>	<p>N/A</p>	<p>N/A</p>	<p>The amount of vegetation clearance required to facilitate construction traffic is dependent on the amount of overhanging vegetation within the Order Limits as shown on Map 1 of the consultation materials. Any vegetation that impedes construction traffic within the Order Limits may be removed or cut back. Additionally, it is dependent on the timing of the A164/Jocks Lodge Highway Improvement Scheme construction works, which is anticipated to undertake works to nearby vegetation.</p> <p>The Applicant has commissioned ecology surveys for Hornsea Four, in line with relevant regulations and</p>

			requirements. An additional survey effort was undertaken at the location of the amended construction access, as presented in Appendix A of <a href="#">Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report</a> and <a href="#">Volume A6, Annex 3.2: Phase One Target Notes</a> .
<p><b>Second query:</b> relates to your application for a Development Consent Order (DCO) under Section 15(3) of the Planning Act 2008 (as amended.) We understand your DCO application is to be submitted in Q4 2021. At both the western junction of Rowley FP No. 12 with the NMU agricultural track and at the section of your "blue corridor" on Map 1 where it crosses Jillywood Lane, there is the potential for damage to the lane, which is believed to be an ancient sunken lane with protected hedges on both sides. Are you planning to drill under the lane to take the cable? As you will know, the Hedgerow Regs 1997 require that your company surveys these hedges and ensure that steps are taken to mitigate the damage to vegetation during the construction work.</p> <p>If your surveys are not yet completed, perhaps you could make them available to the public and HMI after you have submitted the DCO application.</p> <p>We note that the Jock's Lodge development and the Hornsea 4 project are going ahead in close proximity, and we appreciate that you are attempting to avoid disruption to public access as far as possible.</p>	N/A	N/A	The Hornsea Four crossing over Jillywood Lane and Rowley Footpath No. 12 is to be undertaken by either Horizontal Directional Drill (HDD) or open cut, dependant on the pre-construction design phase and detailed design requirements. A full suite of environmental surveys are presented in <a href="#">Volume A6</a> of the Environmental Statement, including <a href="#">Volume A6, Annex 3.14: Hedgerow and Arboricultural Survey Report</a> .
Skidby Parish Council raised no objections to the proposals	N/A	N/A	The Applicant notes this comment.
From the information detailed on the plan KCOM has apparatus the area of your works and could be affected by it. KCOM attached a plan showing details of the areas which may be affected by your potential works. If the works go ahead and more detail is given to the construction of the entrance and access road leading to the site we can forward a C3 budget estimate for any diversionary works we need to carry out	N/A	N/A	The Applicant and KCOM have worked together to agree Protective Provisions in respect of the Hornsea Project Four works. Once detailed designs are completed the Applicant will provide KCOM with drawings to



			ascertain whether diversionary works are required. Upon determination, the Applicant will continue work with KCOM to ensure that a mutually satisfactory solution is put in place
The Environment Agency has no formal comment on the proposed change.	N/A	N/A	The Applicant notes this comment.
Natural England has no formal comment on the proposed change.	N/A	N/A	The Applicant notes this comment.