



Hornsea Project Four

Applicant's comments on Natural England's Comments received at Deadline 2

Deadline: 3, Date: 21 April 2022

Document Reference: G3.17

Revision: 01

Prepared Kaitlin Eames, Orsted, April 2022
Checked Faye McGinn, Orsted, April 2022
Accepted Hannah Towner-Roethe, Orsted, April 2022
Approved Dr Julian Carolan, Orsted, April 2022

G3.17
Ver. A

Revision Summary

<i>Rev</i>	<i>Date</i>	<i>Prepared by</i>	<i>Checked by</i>	<i>Approved by</i>
01	21/04/2022	Kaitlin Eames, Orsted, April 2022	Faye McGinn, Orsted, April 2022	Dr Julian Carolan, Orsted, April 2022

Revision Change Log

<i>Rev</i>	<i>Page</i>	<i>Section</i>	<i>Description</i>
01	-	-	Submitted at Deadline 3

Table of Contents

1 Introduction 4

Appendices

Appendix	Heading
A	Pup/Juvenile Grey Seal Telemetry Tracks Connectivity with SACs

List of Tables

Table 1: Applicant's Comments to Natural England 5

1 Introduction

- 1.1.1.1 In line with the Rule 8 Letter ([PD-007](#)) and Examination Timetable outlined in Annex A of [PD-007](#), stakeholders are invited to submit comments in relation to the submitted application documents and proposed project. At Deadline 2 there were submissions from 19 stakeholders, other than the Applicant, received by the Examining Authority.
- 1.1.1.2 The Applicant has reviewed and noted the content of all submissions and with this document provides comments on specific topics raised by Natural England in [AS-028](#), [REP2-083](#), [REP2-084](#). Specific comments on Natural England review of G1.47 Auk Displacement and Mortality Evidence Review ([REP2-085](#)) is provided in Deadline 3 submission [G3.7 Applicant's response to Natural England's comments on Auk Displacement and Mortality](#).
- 1.1.1.3 Please see Deadline 3 submissions of [G1.1 Overarching Acronyms List](#) and [G1.45 Overarching Glossary](#) for overarching acronym and glossary lists.

Reference	Stakeholder's Written Representation	Applicant's Response
<i>Deadline 2 Submission – Natural England Responses to Examining Authority's First Written Questions (ExQ1) (AS-028)</i>		
BGC Broad, General and Cross-Topic Questions		
	Comments on DCO by Natural England	In general the comments on the draft DCO by Natural England have been accepted by the Applicant. Where these have not been accepted, or clarification is required, this has been provided in the below comments. For a detailed list of updates please see C1.1.1 Draft DCO and DML Schedule of Changes submitted at Deadline 3.
DCO.1.17 Article 36(2)(a)	Natural England feel this issue warrants further scrutiny, and we were unable to go into the detail for this deadline, however from our perspective, the focus of discussions within the technical panels was on the removal of the hedgerows specified within Schedule 10, rather than the removal of any hedgerows within the order limits. We are concerned about the whole sale removal of any hedgerows that the applicant wishes to removed, without first understanding the importance of them for bats (and or course biodiversity and other species that use them). We would welcome ERYCs views on this matter.	Please see the Applicant's response to DCO.1.17.
ES Environmental Impact Assessment (EIA) and Environmental Statement		
ES.1.3 Breadth of magnitude categories	<p><u>Benthic</u></p> <p>Natural England raised issues with the definition of minor and moderate magnitude within the benthic and intertidal ecology chapter. The terms used are too broad and without a suitable incremental step between minor and moderate. For example, an impact of permanent nature but over a minority of the site/ receptor doesn't fit into either category well. In these cases, the true impact potentially gets lost because the step between the minor and moderate magnitude definitions is too large and the lower magnitude is always chosen. This had led to numerous examples where impacts are likely to be underestimated. This concern is most related to the following Benthic impacts</p> <ul style="list-style-type: none"> • Temporary habitat disturbance (in the Hornsea Four array area and offshore ECC) from construction activities (BIEC-1) • Long-term habitat loss/ change from the presence of foundations, scour protection and cable protection (BIE-O-8). • Colonisation of the WTGs and scour/ cable protection may affect benthic ecology and biodiversity (BIE-O-9). 	<p>Please see the Applicant's response in G1.9: Applicants comments on Relevant Representations (REP1-038) comments RR-029-6.9 and RR-029-APDX:F-8A.</p> <p>The EIA Methodology as set out in A1.5 Environmental Impact Assessment Methodology (AS-007) is the widely used and accepted DMRB (2019) methodology (Highways Agency, 2019; see DMRB LA104 Environmental Assessment and Monitoring (Highways England, 2019) and PD 6900:2015 Environmental impact assessment for offshore renewable energy projects – Guide (British Standards Institute (BSI), 2015)). The significance matrix used within many of the receptor assessment chapters of the ES is taken from DMRB (2019). Topic specific methodologies that varied from the DMRB approach are included in the respective ES chapter with assessments carried out by suitably qualified technical experts (see section 5.10 and Appendix A of A1.5 Environmental Impact Assessment Methodology (AS-007)). The DMRB, or variants thereof, have been used in all Orsted EIAs for NSIP projects</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>• Temporary habitat disturbance from decommissioning of foundations, cables and rock protection (BIE-D-15).</p> <p>Furthermore, all of these impacts are given a conclusion of slight (not significant) effect within the matrix to assess the significance, even when the matrix itself gave a range of slight or moderate, further diluting the impact.</p> <p><u>Fish and Shellfish</u></p> <p>A similar concern is apparent in the Fish and Shellfish chapter where there is no suitable incremental description between 'minor' or 'moderate' magnitude, resulting in likely underestimation of impacts. Examples where this is of most concern include;</p> <ul style="list-style-type: none"> • Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish species arising from construction activities (FSE-C-1) • Long term loss of habitat due to the presence of turbine foundations, scour protection and cable protection (FSEO-6) • Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection (FSE-O-7) • Temporary localised increases in SSC and smothering (FSE-C-2) • Mortality, injury, behavioural changes and auditory masking arising from noise and vibration (FSE-C-4) <p><u>Marine mammals</u></p> <p>Upon review of the definitions of magnitude in the marine mammal environmental statement chapter (APP-016), we consider that the definitions of moderate and minor magnitude are very similar with minimal material change between them (the reverse scenario to Benthic and fish). We advise that they are reviewed and amended to make clearer the differences between the definitions, to provide a clear incremental step between them.</p> <p>The impact assessments should then be reviewed to identify if the changes to the definitions of magnitude would have a material change on the outcome of the assessments.</p>	<p>(Burbo Bank Extension, Walney Extension, Hornsea Project One, Two and Three). In all instances, the EIA methodology presented five magnitude categories (no change, negligible, low, medium and high). In the interest of presenting a proportionate EIA Hornsea Four excluded the "no change" category as irrespective of the receptor sensitivity the impact could not be significant, thereby resulting in four magnitude categories. This breadth of magnitude categories (four) is consistent with the recently consented Norfolk Vanguard, Norfolk Boreas, East Anglia ONE North and East Anglia TWO projects.</p> <p>The Applicant has reviewed the EIA Methodology and the examples provided by Natural England and confirms that all magnitude, sensitivity and significance variations are clearly set out and the justification for the assessment outcomes clearly defined. The Applicant does not agree that the definitions of magnitude are very broad with no suitable incremental step between 'minor' and 'moderate' and that this may result in the underestimation of impacts. The Applicant confirms that the ExA can take confidence in the consistent approach applied between the Hornsea Four EIA and the last five consented Development Consent Order (DCO) Applications for offshore wind farms which utilise the same breadth of magnitude categories.</p> <p>In relation to Natural England's topic specific points, the Applicant provides the following responses:</p> <p><u>Benthic and Intertidal Ecology</u></p> <p>The Applicant disagrees that the magnitude categories are too broad. It is important to note that the magnitude categories and definitions used in the Hornsea Four assessment are identical to those used in the benthic ecology assessments within the recently consented East Anglia ONE North and East Anglia TWO projects. The East Anglia ONE North and East Anglia TWO assessment methodologies for benthic ecology were agreed with Natural England, as set out in Statement of Common Ground between Natural England and East Anglia TWO Limited, East Anglia ONE North Limited that</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>was submitted at Deadline 8 (REP8-109 from the East Anglia ONE North and East Anglia TWO Examination). As such, the Applicant does not understand Natural England's basis for this identical methodology being challenged for Hornsea Four.</p> <p>In relation to instances where specific magnitude and sensitivities which result in a choice between two significance categories (i.e. slight or moderate). DMRB guidance states that where the significance matrix includes two significance categories, the approach to assigning significance of effect relies on the professional judgement of competent experts (Appendix A of A1.5 Environmental Impact Assessment Methodology (AS-007)).</p> <p><u>Fish and Shellfish Ecology</u></p> <p>As above, the Applicant disagrees that the magnitude categories are too broad. It is important to note that the magnitude categories and definitions used in the Hornsea Four assessment are identical to those set out in the DMRB guidance and in the fish and shellfish ecology assessment for the recently consented Hornsea Three project. The Hornsea Three assessment methodology for fish and shellfish ecology was agreed with Natural England through the Hornsea Three SoCG process (REP1-218 from the Hornsea Three Examination). As such, the Applicant does not understand Natural England's basis for this identical methodology being challenged for Hornsea Four.</p> <p><u>Marine Mammals</u></p> <p>Similarly for marine mammals, the Applicant disagrees with Natural England's comments, noting that the magnitude definitions used in the Hornsea Four assessment are identical to those set out in the DMRB guidance and in the marine mammals assessment for the recently consented Hornsea Three project, and agreed with Natural England through the Hornsea Three SoCG process ((REP1-218 from the Hornsea Three Examination). As such, the Applicant does not understand Natural England's basis for this identical methodology being challenged for Hornsea Four.</p>

HRA Habitats Regulations Assessment (HRA)

Reference	Stakeholder's Written Representation	Applicant's Response
HRA.1.1 European site citations	<p>Citation documents are fixed at the time of classification/designation of the site and the high-level conservation objectives for the site remain constant. These can be considered "fixed" at any time. Natural England's Conservation Advice Packages (including Supplementary Advice on Conservation Objectives and Advice on Operations) are updated on a more regular basis, with publication windows in March and September. We therefore recommend that this information is taken as fixed from April 2022.</p>	<p>The Applicant has consulted with Natural England with regards to whether any relevant European Site citations are likely to be reviewed/ amended before the end of the Hornsea Four Examination. Natural England, in response, has provided confirmation that there will be no changes to relevant European Site citations within the Examination period. Natural England confirmed in their Response to Examining Authority's written questions and requests for information (ExQ1) (issued 28 February 2022) at response HRA.1.1 that citation documents are fixed at the time of classification/designation of the site and the high-level conservation objectives for the site remain constant. Natural England further state that Conservation Advice Packages (including Supplementary Advice on Conservation Objectives and Advice on Operations) should be taken as fixed from April 2022.</p>
HRA.1.2 Research findings	<p><u>Marine processes</u></p> <p>Carpenter, J. R., Merckelbach, L., Callies, U., Clark, S., Gaslikova, L., and Baschek, B. (2016). Potential impacts of offshore wind farms on North Sea stratification. PLoS one 11, e0160830 In addition to this Natural England have provided 2 additional references in answering ExQ MC.1.12 in relation to the Flamborough Front.</p> <p><u>Ornithology</u></p> <p>Buckingham, L., Bogdanova, M.I., Green, J.A., Dunn, R.E. et al. (2022). Interspecific variation in non-breeding aggregation: a multi-colony tracking study of two sympatric seabirds. Marine Ecology Progress Series, 684: 181- 197.</p> <p>This recent paper investigates non-breeding distributions, and the extent of population aggregations, in guillemot and razorbill from 11 colonies around the northern UK. These are two of the focal species of the Hornsea 4 EIA and HRA. This research provides insights into the mixing of birds from different breeding colonies outside of the breeding season. This is particularly relevant considering the large numbers of guillemot and razorbill found in the Hornsea 4 project area in August and September, and concerns surrounding apportioning of impacts to FFC SPA at this time.</p>	<p><u>Marine Processes</u></p> <p>The Applicant notes the Carpenter <i>et al.</i> (2016) reference in addition to the two additional references in relation to the Flamborough Front. The Applicant confirms that these references will be incorporated into the workstream that is currently underway (related to G1.46: Marine Processes Supplementary Works Scope of Works (REP1-068)). An update on this workstream has been submitted into Examination at Deadline 3 (see G3.9 Clarification Note on Marine Processes Supplementary Work).</p> <p><u>Ornithology</u></p> <p>The Applicant notes the recent paper and is considering its content.</p> <p><u>Marine Mammals</u></p> <p>The Applicant welcomes Natural England's confirmation that there are no new relevant marine mammal references that have been published since the Hornsea Four DCO Application submission that would materially change the outcome.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>The tracking included is largely limited to Scottish colonies, with no birds tracked from FFC SPA during the non-breeding season. However, the core colony distributions for both species over two years did not overlap with the Hornsea 4 area during mid-August to mid-September, or even later in the year. This suggests that it is unlikely that birds from the more northerly SPAs reach and use the Hornsea 4 area in August and September. The birds present in the Hornsea 4 area at this time are therefore likely to be dominated by those from the relatively nearby FFC SPA. This reinforces Natural England's concerns relating to the weighted apportioning approach used by the Applicant for guillemot during the non-breeding season, as the assessment removes the emphasis from the impacts on birds that are likely to be from FFC SPA at a vulnerable lifecycle stage. We consider that the potential impacts are presently being underestimated.</p> <p><u>Marine mammals</u></p> <p>We consider that there are no new relevant references that have been published since the RiAA that would materially change the outcome.</p>	
HRA.1.4 Grey seal interest of the Noordzeekustzone SAC	The Applicant has submitted revised RIAA integrity matrices at Deadline 1 [REP1-013]. The revised RIAA integrity matrices now include Noordzeekustzone SAC (in integrity matrix 9). We consider that the inclusion of this site in the matrix and the accompanying assessment text is sufficient to address the concerns raised (although we defer to the Dutch authorities on this site).	The Applicant has provided an update to the relevant HRA Screening Matrix to include the Noordzeekustzone SAC at Deadline 1. The Applicant welcomes Natural England's confirmation in its Deadline 2 response that inclusion of this site in the matrix and accompanying assessment text is sufficient to address the concerns raised by Natural England.
HRA.1.5 Screening	Natural England has not yet seen any additional information, therefore our advice remains unchanged. However, we note that the applicant is intending to submit a supplementary report at Deadline 3. We note that there will be insufficient time ahead of the Issue Specific Hearings for us to review this submission, so we will aim to provide written feedback at Deadline 4. However, we note that this will only leave approximately two weeks to review and therefore Deadline 5 may be more realistic. Although we welcome this supplementary information, we also note that these areas of concern are particularly data poor, and that consequently this additional information may not be sufficiently conclusive to allow impacts to these designated sites to be screened out.	<p>The Applicant confirms the scope of works presented in G1.46: Marine Processes Supplementary Works Scope of Works (REP1-068) were submitted into Examination at Deadline 1 and comments received from the MMO and Natural England will be addressed within this workstream as appropriate. Further meetings should they be required will be held between the Applicant, the MMO and Natural England on the outputs from this workstream.</p> <p>Furthermore, the Applicant has secured the services of external independent expert Prof Mike Elliot, Director of International Estuarine & Coastal Specialists Ltd. An update on this workstream has been submitted into</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>Examination at Deadline 3 (see G3.9 Clarification Note on Marine Processes Supplementary Work).</p> <p>We will continue to engage with Natural England following the update on this workstream submitted into Examination at Deadline 3.</p>
<p>HRA.1.6 Assessment of effects in relation to marine mammal qualifying features</p>	<p>Natural England requests information on:</p> <ul style="list-style-type: none"> • Location of ports for construction, and operation and maintenance; • Anticipated vessel transit routes; • Baseline vessel density along these routes; • Vessel density taking into account the addition of project vessels; • Seal densities along the routes and an estimate of number of individuals that may be impacted <p>to inform the assessment of LSE on harbour seal in The Wash and North Norfolk Coast SAC from vessel collision risk.</p> <p>If the final locations of the ports and routes have not been determined, then the likely options should be detailed. Each option should be presented with a high-level assessment of the impact of each option relative to the others.</p>	<p>The Applicant has committed to the implementation of a Vessel Management Plan (Co108 - A4.5.2: Commitments Register (APP-050)) which will determine vessel routing to and from construction areas and ports to minimise, as far as reasonably practicable, encounters with marine mammals. It is highly likely that a proportion of the vessels will be stationary or slow moving throughout construction activities for significant periods of time, and thus the risk of collision is low. Harbour seals are relatively small and highly mobile, and given observed responses to noise, are expected to detect vessels in close proximity and largely avoid collision.</p> <p>However, in response to Natural England's request and to support the RIAA conclusion of no AEoI, the Applicant will provide further 'illustrative' assessment of vessel collision risk at Deadline 5. This will present information on:</p> <ul style="list-style-type: none"> • the worst-case port options for marine mammals (particularly seals) • current vessel density along the potential transit route, • marine mammal density along the potential transit route, • expected vessel types, numbers and frequency of trips, and • how many marine mammals are potentially at risk.
<p>HRA.1.10 Offshore ornithology modelling</p>	<p>Offshore ornithology modelling</p> <p>Natural England's Relevant Representation [RR029] raises fundamental concerns about possible errors in the application of the model used to analyse the baseline offshore ornithological characterisation data to produce the density and abundance estimates that underpin the HRA.</p> <p>Has the Applicant engaged with Natural England subsequently, has progress been made towards a resolution, and will further assessment be submitted into the Examination? If so, when, given the fundamental importance of this issue to the HRA? If not, why not?</p>	<p>The Applicant has responded in full to the points raised at Deadline 1 (please see RR-029 summary for an overview and RR-029-5.1 , RR-029-5.9D, RR-029-APDX:B-C, for detailed consideration) and submitted G2.10 MRSea Baseline Sensitivity Report (Gannet) [REP2-046] which details the consultation and engagement with Natural England and CREEM to date on the matters raised in respect of MRsea to address Natural England's fundamental concerns and address all possible errors.</p> <p>The Applicant can confirm:</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>In the absence of further assessment based on an agreed methodology, what would be the implications for decision-making in terms of quantification and understanding of the likely effects on the offshore ornithology interests of European sites of the Proposed Development? (If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations) (Crossreference may be made to relevant responses to ExQ1 Marine Ecology, provided any specific HRA implications are detailed in this response.)</p>	<p>A. The density and abundance estimates produced by all models (MRSea_v1, MRSea_v2) and the design-based abundances are comparable (~10% variation).</p> <p>B. Irrespective of the density and abundance input data (MRSea_v1, MRSea_v2 or Design-Based abundances there would be no material change to the conclusions of EIA or HRA (to be confirmed in Ornithology Assessment Sensitivity Report to be at Deadline 4).</p> <p>C. The Deadline 3 submitted MRSea Baseline Report Gannet provides a clear path to resolution on the matters outlined by Natural England and the Applicant awaits confirmation of its acceptability from Natural England.</p> <p>The updated MRSea (MRSea_v2) results show clear similarities in the density distributional patterns observed in the raw observation datasets and the MRSea results presented in the DCO Application (MRSea_v1). It is clear from the MRSea_v2 results that the remodelling has improved the spatial fit of these data, especially in months with distinct raw observation hotspots which appear to not affect the overall spatial distribution in the DCO MRSea_v1 datasets.</p>
<p>HRA.1.22 Mitigation for effects on marine mammal qualifying features and monitoring</p>	<p>In our Relevant Representation Natural England proposed the following post-consent monitoring:</p> <ul style="list-style-type: none"> • Source level noise of wind turbine generators (WTG) with a direct-drive gearbox for turbines with a 305m rotor diameter. • Monitoring of the distribution of bottlenose dolphin along the northeast English coast. <p><u>Operational WTG noise monitoring</u></p> <p>The operational WTG noise monitoring's primary purpose would be to verify the assumptions made in the assessment. The current evidence base for underwater noise levels from operational WTG is very limited. The Applicant presented 4 datasets of measurements of operational noise from WTG; for these data, the largest WTG was 120m in diameter, and the maximum water depth was 15m. This is significantly smaller than the 305m diameter WTGs proposed for HOW04, and also in notably shallower waters. As a result, and as acknowledged by the Applicant, "the extrapolation that must be made is</p>	<p><u>Operational WTG noise monitoring</u></p> <p>Please see the Applicant's response to Natural England's Relevant Representation (RR-029-APDX:D-V) in G1.9: Applicant's comments on Relevant Representations (REP1-038).</p> <p><u>Monitoring bottlenose dolphin</u></p> <p>Please see the Applicant's response to Natural England's Relevant Representation (RR-029-APDX:D-W) in G1.9: Applicant's comments on Relevant Representations (REP1-038).</p> <p><u>In-combination effects</u></p> <p>Please see the Applicant's response to Natural England's Relevant Representation (RR-029-APDX:D-52) in G1.9: Applicant's comments on Relevant Representations (REP1-038).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>significant" in order to determine the likely operational noise from WTGs at HOW04.</p> <p>Operational WTG noise is classified as continuous noise rather than impulsive. As such, it would not be included in the assessment of cumulative noise disturbance across the Southern North Sea (SNS) SAC in the Site Integrity Plan (SIP).</p> <p><u>Monitoring bottlenose dolphin</u></p> <p>The bottlenose dolphin monitoring's primary purpose would be to verify the assumptions made in the assessment. As acknowledged by the Applicant, "knowledge of bottlenose dolphin movement along the east coast of Scotland beyond the Moray Firth SAC (which was considered to be their core area of distribution), further south and northeast England is currently developing". Specifically, the following information on this population is missing:</p> <ul style="list-style-type: none"> • A reliable density estimate; • Understanding of the coastal (or otherwise) distribution of this bottlenose dolphin population along the east of England; • The appropriate reference population to use depending on the location of the impact (which links directly to the distribution of the coastal population). <p>The Applicant has had to make assumptions about these parameters in order to inform their RiAA (specifically APP-178). Monitoring should be undertaken to verify these assumptions. As the SIP process is only applicable to harbour porpoise SACs, it would not be informed by this monitoring.</p> <p><u>In-combination effects</u></p> <p>Natural England has not made any specific recommendations on monitoring requirements to control in-combination effects.</p> <p>We consider that monitoring to demonstrate in-combination effects on the harbour porpoise qualifying feature of the SNS SAC is best achieved at the strategic level i.e. beyond the project specific level. There is currently no mechanism to co-ordinate strategic monitoring beyond the project-specific</p>	

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>level. In principle we would support any project's consideration or suggestion of strategic monitoring to demonstrate the effectiveness of controls on in-combination effects on the SNS SAC.</p> <p>We note that, in the OMMP [APP-242], the Applicant has stated that "additional monitoring may be required for marine mammals within the Southern North Sea SAC, depending on the further assessments provided during the development of the SIP for the Southern North Sea SAC". We are supportive of the Applicant's consideration of monitoring in relation to the Southern North Sea SAC and the SIP.</p> <p>We have recently been made aware that the MMO have begun to introduce a condition on Marine Licences to further manage in-combination noise in the SNS SAC. Specifically, that the undertakers of noisy activities in the SNS SAC must co-ordinate with other undertakers of noisy activities to ensure that the disturbance thresholds are not exceeded. Evidence of the agreement with the other undertakers must be submitted to the MMO prior to the start of works, and the works cannot begin without written approval from the MMO. We are supportive of this condition in principle, noting that the outcomes of this new condition should be reviewed periodically to ensure it is working as intended to meet the goal of no AEol of the SNS SAC. We consider that this condition should provide additional control over in-combination effects on the SNS SAC.</p> <p>As one of the licence conditions, the developer will be required to submit data to the JNCC's Marine Noise Registry (MNR) on their noisy activities (piling and UXO). The MNR and data stored therein allows for a retrospective look at whether thresholds have been exceeded. The MNR is currently in development to add a forward-looking aspect. We are hopeful that these developments of the MNR will improve the current mechanism to monitor and control in-combination effects.</p> <p>Though these initiatives are welcome, Natural England has outstanding concerns regarding the implementation of SIPs and continue to advise the applicant to commit to mitigation measures at the consenting stage that can</p>	

Reference	Stakeholder's Written Representation	Applicant's Response
<p>HRA.1.26 Norfolk Boreas and Norfolk Vanguard DCO decisions</p>	<p>be removed later, if subsequent assessment identifies that these are not necessary.</p> <p>Natural England fully supports artificial nest structures being in place for four years in advance of operation, as consented in the Norfolk Boreas and Norfolk Vanguard decision.</p>	<p>As provided within the Applicants response at Deadline 1 within Response RR-029-APDX:C-N, the Applicant has considered the timescale for the construction of an artificial nesting structure and the indicative timescale for delivery and implementation illustrated in B2.7.2: Compensation measures for FFC SPA: Kittiwake Offshore Artificial Nesting Roadmap (REP2-007) and B2.7.4: Compensation measures for FFC SPA: Kittiwake Onshore Artificial Nesting Roadmap (REP1-009) allows for four breeding seasons prior to operation.</p> <p>The Applicant has carefully considered the ecological evidence, technical delivery and held discussions with Natural England in recognition of Natural England's concerns regarding the commitment to allow for one breeding season prior to operation if there is an existing colony or two years if there is no existing colony. The Applicant has considered Natural England's comment regarding lead-in timescales for artificial nesting and as set out in Response RR-029-APDX:A-22 the Applicant now makes a commitment to implement the nesting structure three breeding seasons ahead of operation of the windfarm. Three breeding seasons is supported by Coulson's (2011) observations of the recruitment age of English breeding kittiwake where a significant proportion (26.5%) of kittiwakes were aged three when they bred for the first time.</p> <p>The Policy paper 'British Energy Security Strategy' published by BEIS in April 2022 recognises the even greater need for rapid development of offshore wind farms committing to 'cut the process time by over half' and 'helping to speed up delivery timelines' (BEIS, 2022a).</p> <p>The Applicant recognises how vital it is that the compensation delivered is not only successful for Hornsea Four, but for the industry and that the progress will be watched closely. The Applicant has committed to implementing nesting structures three breeding seasons ahead of operation of the windfarm, as arguably this balances the need to demonstrate the</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>compensation measure will be effective with the pressing and urgent need to deliver 50GW of offshore wind energy by 2030, as set out in the British Energy Security Strategy. The Applicant does however believe that there is a case to be made not to include a specific timescale in the DCO ahead of operation but rather to simply state that the measures should be in place prior to operation. This approach would remove this issue as an impediment to the faster deployment of offshore wind energy.</p> <p>The Applicant will continue to seek opportunities to accelerate the construction of the artificial nesting structure. It is noted that in February 2022, the UK Department of Business, Energy & Industrial Strategy (BEIS) committed to annual CfD auctions from March 2023 and Auction Round 5. Previously, CfD auctions 1 to 4 had been held on an approximate 2-year cycle. Coupled with the new 50GW target, this demonstrates the clear priority to deliver significant capacity of offshore wind by 2030.</p> <p>This commitment to implement the nesting structure three breeding seasons ahead of operation of the windfarm is provided within Revision 3 of B2.7.2: Compensation measures for FFC SPA: Kittiwake Offshore Artificial Nesting Roadmap (REP2-007) and Revision 3 of B2.7.4: Compensation measures for FFC SPA: Kittiwake Onshore Artificial Nesting Roadmap (REP2-009).</p> <p>The relevant documents (including the DCO for kittiwake) have been updated accordingly to reflect this. Please see C1.1.1 Draft DCO including Draft DML Schedule of Changes (REP1-026), which was submitted at Deadline 1.</p>
<p>HRA.1.36 Seabird colony dynamics and population limiting factors</p>	<p>Natural England assumes that the first two questions are directed at the Applicant. We provide an answer to the third question below.</p> <p>To Natural England's knowledge there is no further evidence demonstrating/quantifying the extent of nest limitation for kittiwake since the time of application.</p> <p>Regarding offshore structures, as noted in our Relevant Representation [RR-029], determining the reasons for existing offshore structures being colonised</p>	<p>The Applicant refers to their response RR-029- APDX:C-30 which explains how the Applicant has sought to ascertain further platform information from operators (i.e. historical deterrent use), to demonstrate why some existing platforms are unsuitable for nesting and has had varying levels of response (noting this is a sensitive topic for platform operators) and aims to submit further information on this to the Examination as soon as possible. Furthermore, the Applicant is committing to further offshore survey work on nesting seabirds on oil and gas platforms in the Summer of 2022 following</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>versus not colonised may be key to ensuring the success or failure of the measure, and also improving our understanding of the extent to which offshore nest site availability is currently a limiting factor to kittiwake.</p> <p>Please see response to HRA.1.42 for further comment regarding onshore and offshore nest structures.</p>	<p>the same methods which Natural England have praised in their Relevant Representation.</p>
<p>HRA.1.38 Level of detail and confidence in compensation measures</p>	<p>Natural England recognises that further information will be submitted during the Examination to further refine the proposals. At present the proposals are not sufficiently well-defined, which limits the reliability of the shadow HRA. As noted in our response to ES.1.18, Natural England included a checklist in Appendix C of our Relevant Representation submission [RR-029] of the aspects of compensatory measures that we consider need to be described in detail where impacts on MPAs are anticipated. In order for a shadow HRA to be reliable we would particularly need:</p> <ul style="list-style-type: none"> • Locations for delivery of measures • Implementation mechanism for measures • Scale/extent of measures 	<p>The Applicant's shadow HRA of compensation measures has been prepared to provide the Examining Authority with assurance that the proposed compensation measures are acceptable from an HRA perspective.</p> <p>The Applicant has made a Commitment to avoiding statutory and non-statutory designations (CoC-ON-30) and priority habitat (CoC-ON-45). Whilst it is acknowledged that the potential remains for an impact outside of designated sites (functionally linked habitat) it is important to note that the nature of proposed compensatory measures are such that AEoI would not occur.</p> <p>The Applicant provided further information at Deadline 2, in their updated roadmap document's (Revision 3) which includes further refined locations for compensation measures and their scale/ extent. Further location and proposed implementation details will be provided to the Examination as soon as possible (anticipated to be no later than Deadline 5).</p>
<p>HE Historic Environment including Marine Archaeology</p>		
<p>LV.1.14 Assessment of the Yorkshire Wolds as an Area of Outstanding Natural Beauty</p>	<p>A change in designation would alter the significance of effects and additional mitigation would likely be necessary. However, until the special qualities of the area have been identified and the designation order limits defined and approved, Natural England is not able to provide specific advice as to what these mitigation measures should comprise. However, provision of a high standard of mitigation regarding views from the Wolds now would minimise the risk of additional measures being found to be required in the post-consent phase.</p> <p>Unfortunately we have been unable to liaise with the team leading the work on the AONB to confirm the assessment process and likely timescales ahead of this deadline. We will provide an update on this at Deadline 3.</p>	<p>Effects of the OnSS on views from the Wolds are assessed in A3.4 Landscape and Visual (APP-028). Two representative viewpoints were selected within the Important Landscape Area: Viewpoint 6 Fishpond Wood, Risby Hall; and Viewpoint 7 Little Weighton Road. Whilst it cannot be known whether either location would be located within the potential future AONB, they both represent elevated views looking over the Creyke Beck area from the eastern foothills of the Wolds. Indicative visualisations are presented from these viewpoints in Figures 14 and 15 of A6.4.1 Landscape and Visual Resources: Wireframes and Photomontages (APP-115). These show that visibility of the OnSS from the Wolds will be very limited. The LVIA finds no significant effects from either viewpoint (A3.4 Landscape and Visual (APP-028) Table 4.26).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>As noted in the Applicant's response to ExQ1 LV.1.14, the presence of a national designation such as an AONB indicates a high level of value placed on the receptor, which may influence the significance of effects by increasing the sensitivity of the receptor. The magnitude of change arising from the OnSS would not be altered. The magnitude of change experienced by receptors at Viewpoints 6 and 7 is assessed as negligible. Even if the sensitivity of these receptors were increased to high or very high, it is unlikely that a significant effect would be recorded given the negligible magnitude.</p> <p>The Indicative Landscape Plan (A3.4 Landscape and Visual (APP-028), Figure 4.8) shows substantive mitigation planting around the western boundary of the OnSS site. Whilst this is primarily designed to mitigate effects on more local receptors, it will also provide mitigation in longer views from the Wolds. It is considered therefore that a high standard of mitigation is already included in the Indicative Landscape Plan, regarding views from the Wolds, particularly given the low level of effects that are anticipated.</p>
MC Marine and Coastal Geology, Oceanography and Physical Processes		
MC.1.2 Further geophysical surveys	<p>Natural England has not seen these 2021 geophysical survey data. However, we note that the Applicant is undertaking a review of their Maximum Design Scenario (MDS) against the 2021 geophysical survey data and will be providing a Clarification Note on this at Deadline 3. We will aim to respond to this in our deadline 4 submissions (noting that there will be insufficient time for us to review Deadline 3 submissions ahead of Issue Specific Hearings).</p>	<p>Please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to MC.1.2.</p> <p>The Applicant has produced a note to provide clarification and justification of several offshore MDS, as presented in the offshore chapters of the Hornsea Four ES (Volume A2: APP-013 – APP-023). This clarification note was submitted into Examination at Deadline 3 (G3.6 Clarification Note: Justification of Offshore Maximum Design Scenarios).</p>
MC.1.3 Impacts of any further geophysical surveys	<p>The Applicant has responded to MMO's question stating: "At the time of assessment, the timing, scope and scale of geophysical surveys associated with Hornsea Four were not known" [REP1-038] RR-020-4.5.17. Natural England's initial query would be whether these geophysical surveys are likely to include sub-bottom profilers, as these are the main geophysical equipment of concern in terms of noise generated.</p>	<p>Please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to MC.1.3.</p> <p>The type of geophysical survey carried out for offshore wind farms is not typically considered likely to result in Permanent Threshold Shift (PTS) in</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>A high-level assessment should be presented, with as much detail as is available at this time. However, we note that the precise detail and timings of surveys may not be known at this stage, which will present a challenge in assessing the potential in-combination effects. This should therefore be addressed the Site Integrity Plan.</p>	<p>marine mammals, as such a risk is mainly derived from surveys in water >200 m and/or using airguns. As such, the Applicant can confirm that airguns will not be used in Hornsea Four surveys. The Applicant notes that Natural England have raised concerns specifically about the use of SBP in surveys. The SBPs used in offshore wind surveys are typically a parametric SBP. Being a parametric sound source ensures that the beam width of the sound is extremely spatially limited (the angle of the beam spread is typically approximately 3 degrees) and this combined with the high frequency of the generated sound (typically focused at 100kHz) ensures that any propagation of the sound source is extremely limited. Additionally, it should be noted that the generated sound from the parametric SBPs is a non-impulsive sound source which reduces the risk of any potential injury to marine mammals and the potential for injury impacts is considered unlikely.</p> <p>Whilst it is recognised that there is a paucity of data regarding the actual sound levels and the propagation of the sound through the water column from SBPs from studies in the UK, there is a wealth of data available from studies and assessments undertaken within the USA from surveys using the same equipment.</p> <p>Studies in the US used to inform Incidental Take Allowance applications apply a modelling methodology developed by NOAA which is based on monitoring data and considers the narrow beam of the sound emitted from the SBP. The modelling outputs reported state that emitted sound levels from the SBP will attenuate to 120dB SPLrms within 4 m from the source. This is the level used to assess behavioural disturbance (termed level B harassment in the US). It is not possible to directly convert this to SPL(peak) values (without knowing the time period over which the rms was calculated), however, it is unlikely that peak values would be much greater than the rms value. Even using a conservative estimate of a 3 – 7dB difference between the rms and peak values (CSA 2020), this would result in worst case SPLpeak values of 127 dB at 4 m.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>Even allowing for a level of uncertainty and conservatism, with the extremely rapid attenuation of the sound source horizontally through the water column and the primary energy of the sound source being at 100kHz, it is expected that any disturbance to the marine mammal species within the area from the use of the SBP would be fully within any disturbance effect from the presence of the vessel(s) themselves. As such, it is considered that any disturbance from the use of the SBP would be no greater than that from the vessel and consequently is predicted to be not significant for harbour porpoise, enabling a confident conclusion of no likely significant effect on the harbour porpoise feature of the SAC from the project alone.</p> <p>Due to the limited spatial range of potential effects arising from the potential pre-construction geophysical surveys that may be required at Hornsea Four, coupled with the direct nature of the sound sources used and the relatively short duration of the surveys, it is considered unlikely that any non-trivial in-combination effects on marine mammals will arise from the surveys sufficient enough to result in a measurable change to the in-combination total. As such, the Applicant does not consider it necessary or appropriate to undertake an assessment of these surveys, nor for these surveys to be included within the SIP.</p>
<p>MC.1.7 Rock backfill</p>	<p>No, the use of rock or any material from elsewhere is not acceptable to Natural England (please see RR - Appendix E Marine Geology, Oceanography and Physical Processes - point 24 [RR-029]).</p> <p>Backfilling with rock (or any material brought in) would not meet the same characteristics as the sediment removed and would fundamentally change the habitat type and marine processes of the area. Over time the rock used to backfill could become exposed and create an artificial berm which will have further implications for marine processes and sediment movement in the area.</p> <p>It is standard practice for developments along this coastline to use material extracted from the pits to backfill these to allow the sediment structure to be maintained. Depending on available land and completion of impact assessment, Natural England would recommend removing the extracted material to a suitable holding location on land to ensure it is available for re-instatement (As per Natural England RR -029).</p>	<p>As detailed in RR-029-APDX:E-24 of G1.9: Applicant's comments on Relevant Representations (REP1-038), the Applicant notes that the details requested by Natural England in relation to the restoration of profile of the excavated HDD exit pits, and these will be provided with the Cable Specification and Installation Plan which is conditioned in the DML (Condition 1.3(1)(k) - C1.1: Draft DCO including Draft DML (REP2-061)) which will be submitted to and approved in writing by the MMO. Therefore, appropriate storage of materials will be secured through the DCO/ DMLs via the Cable Specification and Installation Plan.</p> <p>As confirmed in Table 1.13 of A2.1: Marine Geology, Oceanography and Physical Processes (APP-013), the backfilling of exit pits will recover a similar amount of material from the surrounding seabed, as required. This is further supported by paragraph 1.11.1.10 of A2.1: Marine Geology, Oceanography</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>Natural England would also refer the Examiners to our Relevant Representation comment 25 in Appendix E Marine Geology, Oceanography and Physical Processes, where we highlight 'there is no mention of the reinstatement of the seabed profile following backfilling of the exit pits' which is also an important factor to consider when backfilling. Natural England, therefore, cannot agree with the assessment of significance of the impact pathway relating to Seabed preparation activities in landfall area (MP-C-1)</p>	<p>and Physical Processes (APP-013), which states <i>"The preferred option is to side-cast the excavated material onto the adjacent seabed as a temporary spoil mound for later backfilling. Alternatives include removing the material elsewhere to a temporary storage area prior to use for backfilling"</i>. Whilst it is not the preferred option, the use of additional materials, including rock, may be required to ensure that the original seabed profile is reinstated.</p>
<p>MC.1.13 Assessment of the Flamborough Front</p>	<p>The Applicant has provided Natural England with a Scope of Works which details a marine process analysis to investigate/validate the position of the Flamborough Front, and the potential impacts of the Hornsea Four array on the Front, both alone and in-combination with other projects/plans. This is expected at Deadline 3. Natural England will aim to review and respond to this supplementary report at Deadline 4, noting that there will be insufficient time for us to review Deadline 3 submissions ahead of the Issue Specific Hearings. Recent relevant research which may help inform the Applicant's assessment of the impact of the Hornsea Four array on the Flamborough Front include the following: Christiansen N, Daewel U, Djath B and Schrum C (2022) Emergence of Large-Scale Hydrodynamic Structures Due to Atmospheric Offshore Wind Farm Wakes. <i>Front. Mar. Sci.</i> 9:818501. doi: 10.3389/fmars.2022.818501 Dorrell et al. (2022) Anthropogenic Mixing of Seasonally Stratified Shelf Seas by Offshore Wind Farm Infrastructure 2112.12571.pdf (arxiv.org)</p>	<p>Please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to MC.1.13 and MC1.14.</p> <p>The Applicant confirms the scope of works presented in G1.46: Marine Processes Supplementary Works Scope of Works (REP1-068) were submitted into Examination at Deadline 1 and comments received from the MMO and Natural England will be addressed within this workstream as appropriate. Further meetings should they be required will be held between the Applicant, the MMO and Natural England on the outputs from this workstream. Furthermore, the Applicant has secured the services of external independent expert Prof Mike Elliot, Director of International Estuarine & Coastal Specialists Ltd. An update on this workstream has been submitted into Examination at Deadline 3 (see G3.9 Clarification Note on Marine Processes Supplementary Work).</p>
<p>MC.1.14 Location of the Flamborough Front</p>	<p>NE believe Flamborough Front and HOW4 array could potentially overlap, based on the data presented within the ES and associated annexes. However, the data presented is currently insufficient to inform the baseline characterisation of the Flamborough Front. Recent research suggests that clusters of offshore wind farms could lead to structural changes to the water column which extend far beyond the associated wind farms. Given the importance of the Flamborough Front to nutrient availability, it is vital that the potential impact of the Hornsea Four array in respect of tidal flows, the related turbulent wakes and resultant mixing of the water column, be adequately assessed for all design options being considered (gravity bases, pin piles, monopiles). We would want to see this assessment irrespective of whether there is a direct overlap between Flamborough Front</p>	

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>and Hornsea 4 array area. The applicant should also consider the cumulative impacts of the other impacts within the Hornsea Zone.</p> <p>Currently, potential adverse effects to designated sites such as the Flamborough Head SAC, Flamborough and Filey Coast SPA, and Southern North Sea SAC, cannot be discounted due to the lack of robust scientific evidence to the contrary. Yet, we know that the Flamborough Front has a significant influence over primary production, the marine ecosystem and, in turn, the function of nearby marine protected areas.</p> <p>As raised above Natural England is concerned with the timeframes presented in examination and the addition of new material to consider. The additional submission expected by the Applicant at Deadline 3 could have significant implications for the assessment of impacts within the Marine Processes Environmental Statement.</p>	
<p>MC1.19 Intertidal access ramp</p>	<p>Natural England is reassured that the temporary intertidal access ramp only partially encroaches on the very upper intertidal zone and is unlikely to interfere with beach processes ([REP1-038] RR-029-5.36). However, we are still concerned that the ramp will be installed at a low point of a rapidly eroding cliff. Any works that result in the lowering of the cliff will need to consider the impact on flood risk from wave action and spray. The impact of the intertidal access ramp on cliff stability and cliff erosion has not been fully considered. In addition, the potential impact of accelerated cliff erosion needs to be considered.</p> <p>Furthermore, no details have been provided regarding cliff slope re-grading, cutting into the existing cliff face, and/or surfacing of the cliff face. Similarly, there are no details regarding the storage of any removed cliff material and whether it will be reinstated on completion of the works. Given the very high rates of erosion along this coastline, the Applicant needs to consider cliff retreat and down-wearing of the upper beach at the ramp location, during the lifespan of the access ramp.</p>	<p>Please see the Applicant's response to RR-029-5.36 at Deadline 1 (G1.9: Applicant's comments on Relevant Representations (REP1-038)).</p> <p>The Applicant's position is that the construction of a temporary access to the foreshore will not impact the existing cliff profile. It is not proposed to excavate, lower or regrade the cliff or foreshore for the installation of the temporary ramp. It is important to note that vehicular access onto the foreshore is for emergency access only.</p>
<p>MC.1.20 Identification of marine process receptors</p>	<p>Natural England has held further discussions with the Hornsea Four Project Team to explain our concerns. We note that the Applicant will be providing their Marine Processes Supplementary Reports at Deadline 3 and we would anticipate further discussion on this topic following this submission.</p> <p>Natural England is concerned that there are significant marine process issues to work through within the examination. Although we are pleased that the</p>	<p>Please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to MC.1.20.</p> <p>The Applicant confirms the scope of works presented in G1.46: Marine Processes Supplementary Works Scope of Works (REP1-068) were</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>applicant is seeking to draw upon all available information, we are conscious that overall the empirical evidence available is likely to be limited, and that this will make drawing definitive conclusions difficult. We therefore encourage the applicant to focus on identifying workable solutions that reduce the potential for impacts to acceptable levels, rather than seeking to definitively rule out impacts. Natural England would welcome the opportunity to help identify mutually acceptable solutions in the face of this uncertainty.</p>	<p>submitted into Examination at Deadline 1 and comments received from the MMO and Natural England will be addressed within this workstream as appropriate. Further meetings should they be required will be held between the Applicant, the MMO and Natural England on the outputs from this workstream. Furthermore, the Applicant has secured the services of external independent expert Prof Mike Elliot, Director of International Estuarine & Coastal Specialists Ltd. An update on this workstream has been submitted into Examination at Deadline 3 (see G3.9 Clarification Note on Marine Processes Supplementary Work).</p>
ME Marine Ecology		
ME.1.1 European and national sites	<p>Natural England do not consider this assumption to be valid. We advise that it should be checked that where this assumption has been made, all affected features under both designations have been considered.</p>	<p>Please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to ME.1.1.</p> <p>The Applicant notes that in relation to benthic and intertidal ecology, the only SSSI that could be deemed to have features associated with benthic ecology within the Hornsea Four benthic and intertidal ecology study area (Figure 2.1 of A2.2: Benthic and Intertidal Ecology (APP-014)) or with SSSI Impact Risk Zones (IRZ) that overlap the study area, is the Flamborough Head SSSI. The IRZs are a tool developed by Natural England in order to assist in identifying potential risks on designated sites. The IRZs define zones around each SSSI which reflect the sensitivities of the features for which it is notified and indicates the types of development proposal which could potentially have adverse impacts (Natural England, 2021). The benthic features of Flamborough Head SSSI are 'Hard maritime cliff and slope Vegetated sea cliffs of the Atlantic and Baltic coasts'. Paragraph 2.7.2.3 of A2.2: Benthic and Intertidal Ecology (APP-014) notes that through the Evidence Plan process, it was agreed that 'Vegetated sea cliffs of the Atlantic and Baltic Coasts' of the Flamborough Head SAC and 'Sea Cliffs' that form the feature of the Flamborough Head SSSI could be screened out of the assessment as these are regarded as terrestrial features of interest (OFF-ME&P-5.2 – B1.1.1: Evidence Plan (APP-130)). As such, no further consideration of SSSIs is merited within A2.2 Benthic and Intertidal Ecology (APP-014), irrespective of the assumptions associated with the approach.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>In relation to fish and shellfish ecology, there are no SSSIs with fish or shellfish features within the Hornsea Four fish and shellfish ecology study area (Figure 33 of A5.3.1: Fish and Shellfish Ecology Technical Report (APP-071)) or with SSSI IRZs that overlap the fish and shellfish ecology study area. As such, no further consideration of SSSIs is merited within A2.3: Fish and Shellfish Ecology (APP-015), irrespective of the assumptions associated with the approach.</p>
<p>NAR Navigation and Radar (Marine and Air)</p>		
<p>NVL.1.6 At-source mitigation of underwater noise for cetaceans</p>	<p>The Applicant has stated, in their EIA assessment, that the measures in the Outline MMMP will reduce the impact from PTS to negligible levels. At present, the only mitigation measure proposed in the Outline MMMP [APP-240] to mitigate the full PTS zone (based on SELcum) is the use of at-source noise mitigation. Indeed, the Applicant states in the Outline MMMP that "Hornsea Four will commit to providing at-source noise reduction measures in order to reduce the potential for cumulative PTS risk to negligible levels." We therefore consider that, in order to agree with the PTS impact assessment conclusion, at-source noise mitigation must be secured.</p> <p>This is of further importance given the Applicant's response to our Relevant Reps [REP1-038], specifically the response to comment 2. In this response the Applicant presents an assessment of animals in the PTS-onset zone (based on SELcum) during concurrent piling. When compared to single piling, there is a ~5- to 6-fold increase in the number of harbour porpoises that may experience PTS (up to 1792 individuals), and the number of minke whales increases too (<1 to 9). This significant increase in number of individuals potentially exposed to PTS places even greater importance on committing to mitigation of the full PTS zone.</p> <p>We acknowledge that the Applicant is proposing to undertake further underwater noise modelling. We will consider the additional modelling once it has been submitted for examination.</p> <p>If the Applicant does not commit to at-source noise mitigation, then an assessment of the number of harbour porpoise that could experience PTS based on SELcum after the mitigation committed to in the Outline MMMP has been applied must be presented. This should not include at-source underwater noise</p>	<p>Please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to NVL.1.6.</p> <p>The Applicant has undertaken additional noise modelling for the sequential installation of two monopiles within 24 hours in the same area of the Hornsea Four array (northwest corner). This clarification note has been submitted into Examination at Deadline 3 (G3.5 Clarification Note on the Installation of Two Monopile Foundations Sequentially).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>mitigation. The Applicant should also ensure this is based on the MDS ranges and not the most likely scenario.</p> <p>Only after this assessment is presented can an assessment of the residual impact significance be undertaken. This will determine the implications for harbour porpoise at an EIA level.</p> <p>Similarly, only after this assessment is presented can an assessment against the SNS SAC harbour porpoise feature in view of the site's Conservation Objectives be undertaken.</p>	
<p>NVL.1.7 Concurrent piling</p>	<p>At Deadline 1 the Applicant has provided a revised draft DCO [REP1-003]. In this, it is specified that "It is possible for installation of the two piled foundations to occur concurrently i.e. within a 24-hour period at up to two locations within the HVAC search area or up to two locations within the array".</p> <p>We are satisfied that this addresses our concern, in that concurrent piling between the HVAC booster stations and the array area is not permitted under the DCO. We agree with MMO that this should also be made clear in the Commitment Register.</p>	<p>The Applicant has undertaken additional noise modelling for the sequential installation of two monopiles within 24 hours in the same area of the Hornsea Four array (northwest corner). This clarification note has been submitted into Examination at Deadline 3 (G3.5 Clarification Note on the Installation of Two Monopile Foundations Sequentially).</p> <p>Further, the Applicant will update the wording associated with Co85 of the Commitment Register [APP-050] at a future deadline.</p>
<p>OE Onshore Ecology</p>		
<p>OE.1.3 (1) Mitigation measures for bat species - hedgerows</p>	<p>The mitigation measures summarised in Table 3.23 of ES Vol. A3 Chapter 3 [APP-027] are provided in full in the Commitments Register [APP-050] and the Outline Ecological Management Plan [OEMP; APP-238]. Natural England considers the mitigation proposals contained therein, with respect to removal of hedgerows and employment of movable features in active construction areas, to be largely satisfactory with regards to ensuring that there is continuity of commuting activity for bats. However, there is some disparity in the text between commitments in APP-050 and APP-238 which we consider needs to be addressed to ensure effects on bats are fully mitigated.</p> <p>For example, Co26 of [APP-050] states: "Where hedgerows and/or trees require removal, this will be undertaken prior to topsoil removal. Sections of hedgerows and trees will be replaced using like for like hedgerow species. DCO Requirement 17 (CoCP); and; DCO Requirement 10 (EMP)".</p>	<p>As presented in A4.1.1 How to read this Environmental Statement (APP-035), the Hornsea Four commitments are classified as Primary, Secondary or Tertiary. In addition, the Applicant has also developed a number of enhancement commitments. Co26 is a primary commitment that is secured through DCO Requirement 10 (F2.3: Outline Ecological Management Plan (APP-238)) whereas Co194 is an enhancement commitment that is secured through DCO Requirement 22 (F2.14: Outline Enhancement Strategy (APP-249)). It should also be noted that the documents are not secured through the commitments, the commitments are secured through the documents.</p> <p>The Applicant confirms that through Co26, and Requirement 10 (F2.3: Outline Ecological Management Plan (APP-238)), sections of hedgerows and trees which are removed will be replaced using like for like hedgerow species. However, where landowner permission is obtained, the Applicant will seek to enhance these replaced hedgerows through Co194. In respect of the age of hedgerow replacement it is noted that this is only relevant to hedgerows utilised by bats as commuting corridors. This will be subject to plant stock</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>Co194 [APP-050] states: "Where agreed with landowners, removed hedgerows and trees will be replaced with hedgerows of a more diverse and locally native species composition than that which was removed."</p> <p>The OEMP [APP-238] states: "Where a hedgerow has been removed within an area that bats are using as a foraging/commuting route, the replacement hedgerow will be of a comparable age to minimise the impact of connectivity for foraging/commuting bats."</p> <p>Table 5 of the Outline Enhancement Strategy [APP-249] also states that: "Hedgerows removed for onshore export cable installation may be replanted to an improved ecological standard, one that aligns with local guidance of hedgerow planting i.e. the East Riding of Yorkshire hedgerow Biodiversity Action Plan (BAP) strategy." Natural England do not have concerns with these approaches, but we consider that the conditions in the commitment register should be amended to reflect that some hedgerows may be enhanced. Further, we consider that the proposals for planting hedgerows of a comparable age to those lost should be made a commitment.</p>	<p>availability at the time and cannot be committed to at this time for specific instances; however, it is included in the Outline Ecological Management Plan for consideration, where feasible, as part of the detailed version to discharge Requirement 10.</p>
<p>OE.1.3 (2) Mitigation measures for bat species - hedgerows</p>	<p>We also note that the current commitments (Co26, Co168 and Co194) do not specifically mention what will happen during and post development to minimise/negate connectivity for foraging and commuting. We consider this should be addressed in the commitments.</p>	<p>As presented in Section 7 of F2.14: Outline Enhancement Strategy (APP-249), the appointed ECoW will be responsible for monitoring adherence during the construction and post-construction phases. Furthermore, post-construction monitoring of protected species as required under any potential Natural England licences will be undertaken by the ECoW or appropriately experienced and if necessary, licenced ecologist(s), who will be pre-approved by the ECoW. Whilst the Applicant acknowledges that foraging/commuting bats do not require a mitigation licence, the requirement for monitoring these will be within the remit of the appointed ECoW and therefore they will be responsible for monitoring the adherence to the requirements set out in F2.14: Outline Enhancement Strategy (APP-249) for foraging/commuting bats, as well as all other onshore ecology and nature conservation requirements.</p> <p>Post consent, an EMP will be developed in accordance with F2.14: Outline Enhancement Strategy (APP-249), as secured through Co168 and DCO Requirement 10, which will include details of any long-term mitigation and</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		management measures relevant to onshore ecology and nature conservation. The EMP will be developed in consultation with the relevant responsible authorities (including Natural England).

Deadline 2 Submission – Natural England Risk and Issues Log (REP2-083) (Natural England responses in plain text represent RR comments. Italicised text represents 'Consultation, actions, progression' from Natural England at Deadline 2).

Summary Tab

<p>Marine Mammals: EIA Methodology</p>	<p><i>"The Applicant has provided clarity on the potential for concurrent and simultaneous piling to occur in a 24 hour period. The DCO condition has been revised to reflect that no more than 2 piles will be installed in a 24 hour period. This is sufficient to address our concerns on this point.</i></p> <p><i>The Applicant has not provided any further assessment of bottlenose dolphin at the coast. We request this information in order to address our concerns. We have provided more detail on the information we would like to see in response to Comment 1 on Appendix D - Marine Mammal."</i></p>	<p>The Applicant has undertaken additional noise modelling for the sequential installation of two monopiles within 24 hours in the same area of the Hornsea Four array (northwest corner). This clarification note has been submitted into Examination at Deadline 3 (G3.5 Clarification Note on the Installation of Two Monopile Foundations Sequentially).</p> <p>In relation to the assessment of bottlenose dolphin at the coast, please see the Applicant response to D1 from the Marine Mammals tab of the Natural England Risk and Issues Log below. At the current time there is simply no suitable density estimate for this area, and this data gap will remain until systematic line transect surveys are conducted along the east coast of England to estimate bottlenose dolphin density.</p>
<p>Marine Mammals: EIA CEA</p>	<p>The Applicant has not provided sufficient justification to scope out vessel collision risk and vessel disturbance for specific marine mammals.</p> <p><i>Please see our response to Examiner Questions on the subject of further information needed from the Applicant in order to give us confidence in the assessment of LSE to harbour seal in The Wash and North Norfolk Coast SAC from collision risk.</i></p> <p><i>The Applicant has provided further justification that all projects that could act in combination on collision risk will undertake mitigation measures to minimise collision risk. We agree with their response and consider that it is sufficient to address our concerns on this point.</i></p> <p><i>With regards to vessel disturbance, please see our response to comment 5 in Appendix D - Marine Mammal on our concerns that vessel disturbance in combination has not been sufficiently considered.</i></p>	<p>The Applicant welcomes Natural England's confirmation of the resolution of the vessel collision risk issue.</p> <p>The Applicant can confirm that vessel disturbance has been included in the marine mammal cumulative assessment (see paragraph 4.12.1.11 and Section 4.12.6 in A2.4: Marine Mammals (APP-016)). Please see the Applicant response to D5 from the Marine Mammals tab of the Natural England Risk and Issues Log below.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
<p>Marine Mammals: HRA screening</p>	<p>Insufficient information has been provided to demonstrate no LSE to harbour seal in The Wash and North Norfolk Coast SAC from vessel collision risk.</p> <p><i>The Applicant has not provided any new information in their response. Please see our response to Examiner Questions on the subject of further information needed from the Applicant in order to give us confidence in the LSE assessment.</i></p>	<p>Please see the Applicant's comments on Natural England's response to ExA's First Written Questions within this document, specifically the comments on HRA.1.6.</p>
<p>Marine Mammals: HRA in- combination</p>	<p>Different tiers have been used between RIAA and CEA in the ES. Seismic surveys have not been included.</p> <p><i>The Applicant has provided a side by side comparison of the tiers in the RIAA and CEA, which we welcome. However, we have comments and clarifications required on the information provided, as outlined in our response to Comment 11 in Appendix D - Marine Mammal, before we can consider whether our concerns have been addressed.</i></p> <p><i>The Applicant is also seeking clarification from NE about the inclusion of seismic surveys.</i></p>	<p>The Applicant notes that the confusion is a result of a typographic error within Section 8.2.1.9 of the RIAA. Therefore, the previous side-by-side comparison of tiers provided by the Applicant at Deadline 1 is incorrect.</p> <p>For clarity - paragraph 11.3.2.10 of the RIAA states:</p> <p>'It is noted that the projects assigned into Tier 1 within the RIAA include projects assigned into Tiers 1, 2, 3, 4 and 5 within the marine mammal chapter for ES – the marine mammal tiering differentiating between the certainty of projects (tier 1 including operational/in construction, having consent and CfD, tier 2 having consent but no CfD, tier 3 application submitted but not determined, tier 4 application not yet submitted and tier 5 all relevant projects expected to be submitted). That tiering is differentiated here from the tiering used in the marine mammal chapter for ES by the suffix Tier 1a (analogous to ES Tier 1), Tier 1b (ES Tier 2), Tier 1c (ES Tier 3), Tier 1d (ES Tier 4) and Tier 1e (ES Tier 5) for clarity.'</p> <p>Therefore the (more detailed) RIAA tiering structure for marine mammals is intended to ensure that there is a clear understanding of the level of confidence in the in-combination assessment within the RIAA. Therefore, all projects considered in the ES cumulative effects assessment for marine mammals are included within the RIAA in-combination assessment, however the RIAA in-combination assessment goes further in that it considers more projects within its 'tier 1' assessment and includes more tiers therefore considering a wider scope of projects within the in-combination assessment.</p> <p>An amended (to that provided at Deadline 1) 'side by side comparison of tiers' is provided below for illustrative purposes.</p>

Reference	Stakeholder's Written Representation	Applicant's Response															
		<p>It is important to note that the exclusion of seismic surveys from the RIAA in combination assessment is not because of the differing tier systems used, but rather because of the difficulty in undertaking an illustrative in-combination assessment in the absence of detailed information. The Applicant is involved in discussions with Natural England regarding this matter.</p> <p>Comparison between RIAA and ES Tiers</p> <table border="1" data-bbox="1256 480 2036 1398"> <thead> <tr> <th data-bbox="1256 480 1406 592">RIAA MM Assessment Tiers</th> <th data-bbox="1406 480 1563 592">ES MM Assessment Tiers</th> <th data-bbox="1563 480 2036 592">Description of stage of development of project</th> </tr> </thead> <tbody> <tr> <td data-bbox="1256 592 1406 810">Tier 1a</td> <td data-bbox="1406 592 1563 810">Tier 1</td> <td data-bbox="1563 592 2036 810">Operational and under construction projects which were not in place when baseline data was collected. Projects with a legally secure consent that have been awarded a CfD but have not yet been implemented.</td> </tr> <tr> <td data-bbox="1256 810 1406 959">Tier 1b</td> <td data-bbox="1406 810 1563 959">Tier 2</td> <td data-bbox="1563 810 2036 959">Includes all projects/plans that have a legally secure consent, but have no CfD; therefore, there is uncertainty about the timeline for construction of these projects.</td> </tr> <tr> <td data-bbox="1256 959 1406 1214">Tier 1c</td> <td data-bbox="1406 959 1563 1214">Tier 3</td> <td data-bbox="1563 959 2036 1214">Projects for which an application has been submitted, but not yet determined. There is therefore information on which to base a quantitative assessment of cumulative impact but there is a degree of uncertainty as to the final approved design of the project and the timeline for construction.</td> </tr> <tr> <td data-bbox="1256 1214 1406 1398">Tier 1d</td> <td data-bbox="1406 1214 1563 1398">Tier 4</td> <td data-bbox="1563 1214 2036 1398">Relevant marine infrastructure projects that the regulatory body are expecting to be submitted for determination and projects for which PEIR has been submitted, but not yet a full ES. There is therefore</td> </tr> </tbody> </table>	RIAA MM Assessment Tiers	ES MM Assessment Tiers	Description of stage of development of project	Tier 1a	Tier 1	Operational and under construction projects which were not in place when baseline data was collected. Projects with a legally secure consent that have been awarded a CfD but have not yet been implemented.	Tier 1b	Tier 2	Includes all projects/plans that have a legally secure consent, but have no CfD; therefore, there is uncertainty about the timeline for construction of these projects.	Tier 1c	Tier 3	Projects for which an application has been submitted, but not yet determined. There is therefore information on which to base a quantitative assessment of cumulative impact but there is a degree of uncertainty as to the final approved design of the project and the timeline for construction.	Tier 1d	Tier 4	Relevant marine infrastructure projects that the regulatory body are expecting to be submitted for determination and projects for which PEIR has been submitted, but not yet a full ES. There is therefore
RIAA MM Assessment Tiers	ES MM Assessment Tiers	Description of stage of development of project															
Tier 1a	Tier 1	Operational and under construction projects which were not in place when baseline data was collected. Projects with a legally secure consent that have been awarded a CfD but have not yet been implemented.															
Tier 1b	Tier 2	Includes all projects/plans that have a legally secure consent, but have no CfD; therefore, there is uncertainty about the timeline for construction of these projects.															
Tier 1c	Tier 3	Projects for which an application has been submitted, but not yet determined. There is therefore information on which to base a quantitative assessment of cumulative impact but there is a degree of uncertainty as to the final approved design of the project and the timeline for construction.															
Tier 1d	Tier 4	Relevant marine infrastructure projects that the regulatory body are expecting to be submitted for determination and projects for which PEIR has been submitted, but not yet a full ES. There is therefore															

Reference	Stakeholder's Written Representation	Applicant's Response	
			<p>some information on which to base a quantitative assessment of cumulative impact but there is a large degree of uncertainty as to the final design of the project and the timeline for construction.</p>
		Tier 1e	<p>Tier 5</p> <p>Relevant marine infrastructure projects that the regulatory body are expecting to be submitted for determination.</p>
		Tier 2	<p>N/A</p> <p>Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.</p>
		Tier 3	<p>N/A</p> <p>Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted.</p> <p>Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.</p> <p>Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
<p>Marine Processes: EIA - CEA</p>	<p><i>The Applicant has not considered the Viking Link Interconnector Cable, SEGL2 (Eastern Green Link), Northern Endurance Partnership and Dogger Bank South in the CEA. We would advise that this should be reviewed when further details are available.</i></p>	<p>The Applicant has not considered the Viking Link interconnector cable in the marine processes cumulative assessment as there will be no spatial or temporal overlap with construction activities.</p> <p>The Applicant highlights that no Marine Licence application has been submitted in relation to the Scotland to England Green Link – SEGL2 (formerly Eastern Green Link) and as such, this project should remain in Tier 3 of cumulative assessments and no updates to the assessments are required. The Applicant will maintain a watching brief on the submission of an offshore SEGL2 application, with consideration given to this if made available during Examination.</p> <p>The Applicant is reviewing details from the Northern Endurance Partnership project offshore EIA Scoping Report and consideration is being given to whether this requires an update of cumulative assessments.</p>
<p>Benthic & Intertidal Ecology: Baseline characteristics</p>	<p>Natural England are generally satisfied with the baseline data. However it is unclear how benthic environment is characterised beyond the Order limits in the study area.</p> <p>We wish to see additional raw data for classification of Stony reef.</p> <p><i>Natural England still seek further clarification on the significands of the environment beyond the order limits.</i></p> <p><i>We have been given access to the raw data for stony reef and will review in due cause.</i></p>	<p>As detailed within A5.2.1: Benthic and Intertidal Ecology Technical Report (APP-068), the biotope model collated a wealth of available physical and biological point data across the area of interest to help understand the occurrence of potential biotopes over the wider study area (outside the Order Limits) to support the application and the assessment of impacts on the subtidal benthic ecology. The predictive habitat model enables the Applicant to develop an understanding of the benthic subtidal ecology baseline where ground-truth data was not collected, based on the suitability of likely biotopes that were modelled through a well-developed three-tiered process: creation of a seabed sediment model, a EUNIS Level 4 model and a biotope model.</p>
<p>Benthic & Intertidal Ecology: EIA – Identified Impacts</p>	<p>Further consideration needs to be given to the impact of drill arising material being deposited on the seabed.</p> <p>Impact of contaminated sediments</p> <p><i>The impact of drill arising is still an outstanding concern of Natural England REP-066 has gone some way to clarifying the level of contaminants within sediments however the document doesn't provide sufficient confidence on the impact these might have to the benthos.</i></p>	<p>The Applicant can confirm that further consideration is being given to the impact of drill arisings with a clarification note due to be submitted into Examination at Deadline 5.</p> <p>An update will be made to G1.44 Clarification Note on Marine Sediment Contaminants following Natural England's contaminants comments and this will be submitted at Deadline 4.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
Benthic & Intertidal Ecology: EIA – Methodology	<p>We do not agree with the assessments of magnitude for permanent and temporary habitat loss.</p> <p>This discussion is still ongoing with the applicant.</p>	<p>Please see the Applicant's comments on Natural England's response to ExA's First Written Questions within this document, specifically the comments on ES.1.3.</p> <p>It is important to note that operational habitat loss was considered for Norfolk Boreas, Norfolk Vanguard, East Anglia ONE North, and East Anglia TWO and deemed to be of low magnitude for East Anglia ONE North and East Anglia TWO, with identical definitions of magnitude used for those projects when compared to the definitions used for the Hornsea Four benthic ecology assessment. Similarly, Norfolk Vanguard and Norfolk Boreas deemed the impact to be of low or negligible magnitude. Although project details across projects differ, the scale of projects are comparable and provide valuable context to how these assessments are approached. It is also important to highlight that the benthic assessments were agreed between the developers and Natural England through the SoCG process for these other four projects. As such, the Applicant considers that the Hornsea Four assessment presented is appropriate and robust.</p>
Benthic & Intertidal Ecology: EIA – CEA	<p>Viking Link should be screened into the CEA.</p> <p>It should be noted that Eastern Green Link and the Northern Endurance Partnership should now be considered in Tier 2.</p> <p>Certain impacts assessed for the project alone are not considered in the cumulative assessment, as they are assessed as 'not significant' on a project alone basis.</p> <p><i>Natural England welcomes the applicants commitment to update the cumulative assessment if and when new information comes forward on this project to the planning inspector.</i></p> <p><i>We do still wish to have further discussion on the issues not taken forward to CEA due to 'negligible' impacts.</i></p>	<p>In relation to certain 'not significant' project alone impacts not being taken forward into the cumulative assessment, the Applicant notes that this is the standard approach to cumulative assessments for offshore wind farms, with Hornsea Three, Norfolk Vanguard and Boreas, and East Anglia ONE North and TWO adopting similar methodology, with these methodologies agreed with Natural England through their respective SoCG processes. This approach is adopted because many of the potential impacts identified and assessed for projects alone are relatively localised and temporary in nature and therefore have limited or no potential to interact with similar changes associated with other projects (e.g. accidental release of pollutants, temporary habitat disturbance associated with maintenance activities).</p> <p>As such, the Applicant does not understand Natural England's basis for this identical methodology being challenged for Hornsea Four.</p>
Benthic & Intertidal Ecology:	<p>Natural England notes that there is no information provided in relation to the likely disposal locations of sandwave material removed during site preparation</p>	<p>The Applicant can confirm that the entire Hornsea Four Order Limits are proposed to be designated as a disposal site (with the exception of the section</p>

Reference	Stakeholder's Written Representation	Applicant's Response
HRA Assessment & MCZ conclusions	<p>works and would welcome clarification on this point to support the assumptions made within the assessment.</p> <p><i>This request has not yet been fulfilled.</i></p>	<p>of the ECC that overlaps with the Dogger Bank A & B ECC). As such, this assumption has been carried forward into all assessments of disposal activity.</p>
Fish & Shellfish Ecology: Data Gaps	<p>It was not possible to fully assess the behavioural responses in herring in relation to piling noise. Additional information is required to establish a more accurate peak herring spawning timeframe.</p> <p><i>Natural England welcomes the additional information provided in 'Clarification note on peak herring spawning period' (G1.10). We note that the MMO (as advised by Cefas) have commented on this report (G1.10) at Deadline 1. Natural England would like to see the Applicant's Response to this submission before making further comment in relation to peak herring spawning timeframes.</i></p>	<p>At Deadline 2, the Applicant responded to MMO comments on G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction within G2.6 Applicant's comments on other submissions received at Deadline 1 (REP2-042), with an updated note also submitted at Deadline 2 (G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction (REP2-033)).</p>
Fish & Shellfish Ecology: Identified Impacts	<p>Impacts related to habitat loss as a result of drill arisings have not been assessed.</p> <p>There is also new evidence to consider in relation to the effect of EMF on shellfish.</p> <p><i>Natural England still request that impact from drill arisings are assessed. We are awaiting data from the Applicant on EMF levels within the project to comment on this impact being scoped out.</i></p>	<p>The Applicant can confirm that further consideration is being given to the impact of drill arisings with a clarification note due to be submitted into Examination at Deadline 5.</p> <p>The Applicant has supplied Natural England with information on potential EMF levels from Hornsea Four offshore cables through the statement of common ground process, and welcomes further discussion with Natural England on this issue.</p>
Fish & Shellfish Ecology: EIA – CEA	<p>It should be noted that Eastern Green Link and the Northern Endurance Partnership should now be considered in Tier 2 as both have submitted scoping documentation.</p> <p>Certain impacts assessed for the project alone are not considered in the cumulative assessment as they are assessed as negligible on a project alone basis. Natural England believe these should be carried forward to the CEA.</p> <p><i>Natural England welcomes the applicants commitment to update the cumulative assessment if and when new information comes forward on nearby projects to the planning inspector. It is unclear if the information from the Endurance scoping document has been included in the assessment.</i></p>	<p>Please see the Applicant response to 'Benthic & Intertidal Ecology: EIA – CEA' from the Summary tab of the Natural England Risk and Issues Log above.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
Fish & Shellfish Ecology: EIA conclusions	<p>We are not convinced with the conclusion that there are no significant effects on herring spawning grounds due to the highly variable spawning density data year on year.</p> <p><i>Natural England consider 'minor' magnitude is an appropriate assessment of effect on herring spawning ground (FSC-C-1 & FSC-C-2) due to the small proportion of the spawning area which overlaps with the ECC in certain years. However we are waiting for comments from MMO on the Peak herring spawning period document (G1.10) to be addressed by the Applicant before commenting on if the peak spawning period has been sufficiently covered by the commitment Co190.</i></p>	<p>At Deadline 2, the Applicant responded to MMO comments on G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction within G2.6 Applicant's comments on other submissions received at Deadline 1 (REP2-042), with an updated note also submitted at Deadline 2 (G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction (REP2-033)).</p>
C – Compensation Tab		
C1 - 1,12,38,43	<p>"Natural England welcome the increase lead in time to three breeding seasons prior to operation, however as kittiwake do not breed until they are 4+ years old breeding recruits will not enter the biogeographic population until that point.</p> <p>Justification is needed on the deviation from 4 breeding seasons consented for Hornsea Project Three, Norfolk Boreas and Norfolk Vanguard, demonstrating that the required colony size/growth is achievable prior to wind farm operation for the reduced lead in time. (OffN7; RR-029-APDX:C-1; RR-029-APDX:C-12)"</p>	<p>The Applicant has provided a response within their Comments on Relevant Representations provided at Deadline 1 within response RR-029-APDX:C-WWW and RR-029-APDX:C-12. Please see response to HRA 1.26, three breeding seasons is supported Coulson's (2011) observations of the recruitment age of English breeding kittiwake where a significant proportion (26.5%) of kittiwakes were aged three. The Applicant's response to HRA 1.26 also refers to the Policy paper 'British Energy Security Strategy' published by BEIS in April 2022 which recognises the even greater need for rapid development of offshore wind farms committing to help speed up delivery timelines.</p>
C21 - 85	<p>We note the Applicants response that monitoring for reinfestation will be ongoing during the operational phase of the Project, but remain concerned that biosecurity measures will involve predator control rather than re-eradication (RR-029-APDX:C-85).</p>	<p>The Applicant has provided a response within their Comments on Relevant Representations provided at Deadline 1 within response RR-029-APDX:C-EEE. The Applicant would utilise biosecurity measures to prevent the re-invasion of invasive species. If a re-invasion was to occur, the Applicant would undertake a further eradication programme to remove the target invasive species from the location. To be clear, the Applicant does not intend to control invasive predators, rather eradicate them and maintain the successful eradication status.</p>
C27 – 46 C29 - 61,81	<p>Natural England are concerned that averaging bycatch rates across fishermen could result in important context being lost from the data, which could result in inaccurate bycatch rates being applied (RR-029-APDX:C-46). We highlight that RR-029-APDX:C-73 indicates that bycatch rates differ between fishers/vessels.</p>	<p>The Applicant has provided a response in the Relevant Representations provided at Deadline 1 within response RR-029-APDX:C-49.</p> <p>Averaging of bycatch rates across fishers was supported by the fishing industry. While bycatch rates may differ between fishers, the focus of the</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>questionnaires during the bycatch technology selection phase has been to identify fishers willing to take part in the selection phase who have also reported seabird bycatch in certain locations. Differences in bycatch rates will be important during the delivery stage of compensation where context in rates can inform location. This will be informed by monitoring using cameras and GPS, during the bycatch technology selection phase.</p> <p>During the analysis of data collected during the bycatch reduction technology selection phase, spatial and temporal differences in bycatch will be examined and considered with the questionnaire results that have been used for the bycatch rate used to determine the number of vessels required during implementation. The process provides an additional level of confidence to the bycatch estimates and allows compensation delivery to be focused on regional specific data.</p> <p>Further information on recent advancements made by the Applicant are provided within Revision 3 of the Bycatch Reduction Roadmap (B2.8.2 Volume B2, Annex 8.2: Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA): Guillemot and Razorbill Bycatch Reduction: Roadmap (REP2-011)).</p>
C36 - 71	<p>The Applicant considers the measure flexible as vessels the LEB are deployed on can change from year to year. Adaptive management will be discussed within the OOEG (RR-029-APDX:C-71). Natural England agree that a suite of measures gives increased resilience, however, we note that the compensation ratio would be reduced by half if one measure was not delivering. This would need to be accounted for by adaptive management. If bycatch reduction proves a viable method over the short term it may prove prudent to over-deliver to buffer against any future issues.</p>	<p>The Applicant has provided a response within the Relevant Representations provided at Deadline 1 within response RR-029-APDX:C-80 & RR-029-APDX:C-46.</p> <p>In order to provide a clear and transparent representation of how the level of compensation has been calculated for Hornsea Four, the following document G1.41 Calculation Methods of Hornsea Four's Proposed Compensation Measures for Features of the FFC SPA (REP1-063) has been produced and shared with SNCBs. This report provides the calculation method and evidence behind the input parameters used and was discussed with Natural England during the workshop held on 3rd February.</p> <p>The estimate of 7 vessels is based on information collected during the questionnaire phase of the project and literature (i.e., Rouxel et al., 2021</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>suggested a reduction in birds within proximity to net). This number can be scaled up to meet the required number determined by the impact scale for each species.</p> <p>Both bycatch reduction and predator eradication measures are scalable and flexible in terms of implementation both in their own right, and in synergy within the proposed package of measures for these species. The Applicant is therefore confident that the proposed compensation package can be delivered at the scale required.</p>
D - Marine Mammals Tab		
D1: Chapter	<p><i>The Applicant has requested clarification on what we mean by "present the density of the CES MU population based on uniform distribution." Essentially, we would like the applicant to present any available density estimates that could be representative of the Coastal East Scotland (CES) MU. The Applicant has considered both the CES MU and the Greater North Sea (GNS) MU as their reference population. At present, they have only presented a density estimate that is relevant to the GNS MU. Density estimates that are relevant to the CES MU should be presented for context, and to give us assurance that impacts are not being underestimated (through the use of a lower density estimate). The uniform density estimate is one type of approach to generating a density estimate for the CES MU, but if there are other approaches and/or figures in the literature these should be included.</i></p>	<p>The Applicant notes that density estimates for bottlenose dolphins are not reported from the standard monitoring conducted within the SAC and for the Firth of Tay and St Andrews Bay surveys. These surveys focus on photo-ID to obtain population size estimates instead of obtaining density estimates.</p> <p>The density estimate presented in the ES was 0.003 dolphins/km² (assuming a uniform density with the GNS MU). Assuming uniform distribution within the CES MU, the resulting density estimate would be 0.0104 dolphins/km² (224 dolphins in 21,578.6 km²). Paxton et al (2016) estimated density in the Firth of Forth in 2010 to be between 0.013 and 0.032 dolphins/km² (depending on the season).</p> <p>However, the Applicant re-iterates the fact that there is no evidence to suggest that density estimates along the east coast of England are comparable to those in the CES MU or the Firth of Forth. At the current time, there is simply no suitable density estimate for this area, and this data gap will remain until systematic line transect surveys are conducted along the east coast of England to estimate bottlenose dolphin density.</p>
D2: Chapter	<p><i>As requested, the Applicant has provided a table showing the number of animals that may experience PTS-onset based on concurrent piling. In this respect they have sufficiently addressed our original comment.</i></p> <p><i>However, from the new data we note that for harbour porpoise the number of individuals that may experience PTS from concurrent piling (of pin piles) is 1661-1792 (dependent on density estimate used). This represents a ~5-6-fold increase</i></p>	<p>The Applicant would like to re-iterate that the MMMP does consider the use of noise abatement systems as an option to be used in the final MMMP. However, the Applicant cannot commit to NAS at the current stage. It is considered to be more appropriate to agree mitigation methods closer to the time of construction when final piling parameters, equipment etc are known.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>in the numbers, and so percentage of the MU (~0.5% compared to ~0.1%), exposed to PTS (when compared to single event piling). For minke whales, the number of animals potentially exposed to PTS has increased from <1 (single piling) to 9 (concurrent piling).</i></p> <p><i>n the MMMP the Applicant is proposing to only mitigate the instantaneous PTS zone (based on SPLpeak), which is <1000m. The Applicant has not committed to mitigation for the PTS zone based on SELcum, which is much larger than the one based on SPLpeak. The distances presented for this cumulative piling scenario is based on SELcum. Although the impact distances are not presented, it can be inferred from the area of impact (~1000 km2) that the mitigation proposed by the Applicant will not mitigate the full PTS zone. Therefore we do not agree that the risk from PTS will be minimised to negligible levels. We have provided more information on this point in our response the Examiner's Questions.</i></p> <p><i>Consideration should be given to implementing a maximum separation distance between two concurrent piling events, which limits how far apart the concurrent piling locations can be. A maximum separation distance would help to maximise the overlap of impact zones from piling, and therefore minimise the number of individuals potentially impacted.</i></p>	<p>There is ongoing work to investigate how marine mammal hearing can recover between pulses. for example, see Kastelein et al. (2014) - Effect of level, duration, and inter-pulse interval of 1–2kHz sonar signal exposures on harbor porpoise hearing. The following statements are quotes from this paper:</p> <p><i>"Results show that the inter-pulse interval of the fatiguing noise is an important parameter in determining the magnitude of noise-induced TTS"</i></p> <p><i>"Exposures with equal SEL_{cum} but with different inter-pulse intervals do not result in the same induced TTS."</i></p> <p>This highlights that the current modelling, which does not account for duty cycle and recovery between pulses, is highly conservative. Further research into this is currently ongoing by Kastelein and his team and it is expected that results should be published soon. Therefore, the Applicant maintains at that at the current time, the modelling for cumulative PTS is over-precautionary.</p>
D5: Chapter	<p>We note that the Applicant has not considered all offshore wind farm projects where the operation and maintenance (O&M) phase overlaps with the construction of Hornsea 4. To illustrate, there are many projects which are constructing/due to complete construction between 2021 and 2024 that have not been included in the CEA. We also note that no cable and pipeline projects have been screened into the CEA. The Applicant should consider whether all project types mentioned in 4.12.6.2 have been adequately included.</p> <p><i>The Applicant's response has not addressed our concerns. In the response they have provided a different definition for the projects that have been considered in the CIA - stating that it's only projects with a construction window that overlaps or is +/- 1 year from the HOW04 construction window. This differs to the definition in 4.12.6.2 of the ES: "Offshore wind farms where construction and operational and maintenance phases overlap with the construction phase of Hornsea Four." By not including operational and maintenance phases, the Applicant is not fully assessing one of the impact pathways in the CIA "The potential for disturbance</i></p>	<p>The Applicant notes that predicted impacts to marine mammals during the O&M stage is expected to be negligible. The primary impact pathway during O&M activities will be disturbance and collision risk from vessels. It is assumed that all offshore developments will implement either a Vessel Management Plan or will follow best practice/codes of conduct in order to minimise the risk to marine mammals.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>from vessel activity during construction, operation and maintenance and decommissioning of developments" (Paragraph 4.12.1.11, ES). The Applicant should explain why these changes have been made and address the inconsistencies.</i></p>	
<p>D10:Report to Inform Appropriate Assessment</p>	<p>Further information is required to demonstrate no likely significant effect (LSE) on the harbour seal feature of The Wash and North Norfolk Coast SAC as a result of vessel collision risk. We acknowledge that the area of construction itself has low numbers of harbour seals (although it is within the foraging range of the SAC). However, collision risk can also arise whilst vessels are in transit to/from ports, where densities may be higher. Information on vessel transit routes, ports for construction and operation and maintenance and anticipated densities (baseline and project addition) along these routes should be provided to support the conclusion of low risk to harbour seals.</p> <p><i>The Applicant has not provided any new information in their response. In our response to Examiner Questions on the subject of further information needed from the Applicant in order to give us confidence in the assessment, we have requested the following:</i></p> <ul style="list-style-type: none"> <i>-Location of ports for construction, and operation and maintenance;</i> <i>-Anticipated vessel transit routes;</i> <i>-Baseline vessel density along these routes;</i> <i>-Vessel density taking into account the addition of project vessels;</i> <i>-Seal densities along the routes and an estimate of number of individuals that may be impacted</i> 	<p>Please see the Applicant's comments on Natural England's response to ExA's First Written Questions within this document, specifically the comments on HRA.1.6</p>
<p>D11:Report to Inform Appropriate Assessment</p>	<p>We note that the tiers used for the RiAA differ from those used in the cumulative environmental assessment (CEA) in the marine mammal environmental statement (MM ES) chapter. Justification should be provided as to why two different tier systems have been used, as well as a clear comparison of the two systems and any implications for the assessments.</p> <p><i>As referenced in their comment, the Applicant has provided a Revision 02 of the RiAA where they provide more information on the tiering structure. The information provided partially addresses our concerns.</i></p>	<p>Please see the Applicant response to 'Marine Mammals: HRA in-combination' from the Summary tab of the Natural England Risk and Issues Log above.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>We note that, under Tier 5 in the CEA, the applicant has included projects such as decommissioning projects, CCS projects, and "seismic surveys across various oil and gas development blocks in the North Sea." Given that such seismic surveys have not been included in Tier 3a in the RIAA, we do not consider these tiers equivalent. The tiering structure should therefore be amended to reflect this. We also still consider that further justification on why different tiers have been used is needed.</i></p>	
<p>D12:Report to Inform Appropriate Assessment</p>	<p>We further note that the different definitions of tiers and/or approaches between the MM ES chapter and the RiAA has led to different types of projects being scoped in/out between these two chapters. The most notable change is with respect to seismic surveys, which have been omitted from the RiAA but included in the CEA in the MM ES chapter. We highlight that this is a deviation from the approach taken by previous offshore wind projects including Hornsea 3, which is acknowledged in the text. Whilst we understand the rationale, we cannot consider that the incombination assessment presented in this RiAA is the worst-case scenario.</p> <p>We understand that the Applicant is proposing to capture any future seismic surveys in the SIP; however, Natural England has concerns about the current implementation of SIPs (see Relevant Representations, Paragraphs 5.30- 5.32). Because of the short lead-in times for seismic surveys, it is paramount that the SIP is not undertaken/finalised too far in advance of construction as this could mean that potentially concurrent seismic activities are not captured; this should be secured in a DCO condition.</p> <p>The approach taken by the Applicant relies heavily on the SIP for mitigation of adverse effect as, at this stage, the project has not committed to undertaking any mitigation measures. That the in-combination assessment does not present the worst-case scenario, yet the thresholds for significant disturbance are already exceeded, further highlights that noise abatement at source should be being considered strategically across the offshore wind industry at earlier stages than the SIP. Therefore, we cannot currently rule out an adverse effect on integrity for the SNS SAC in combination.</p> <p>We strongly recommend that the Applicant commit to mitigation measures at this stage, rather than at the SIP, to reduce potential impacts from the project alone. We consider the mitigation should be included to minimise impacts as far</p>	<p>The Applicant has submitted a detailed note to Natural England explaining why it would be impossible to do such an assessment meaningfully without the relevant data – as worst case scenarios would provide a significantly skewed and flawed conclusion.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>as possible on principle, with the later SIP consultation determining if they can be removed.</p> <p>Section 8.2 does not fully address our concerns in this comment. We have provided clarification to the Applicant on the inclusion of seismic surveys in the RIAA and anticipate further information at Deadline 2 on this. We do not expect the Applicant to address our overarching concerns regarding the use of SIPs as this is a matter for the Decision Makers, however we do consider that the Applicant should address our concern regarding mitigation being committed to at this stage. We have also provided various comments about at-source mitigation in this response, that we await a response on.</p>	
<p>D13:Report to Inform Appropriate Assessment</p>	<p><i>The applicant has confirmed that they will not be undertaking geophysical surveys as part of the activities under the Hornsea Four DCO. Natural England would defer to the MMO as to whether or not this is appropriate noting their representations on this matter. However, as they are a known activity directly connected to the construction (and in some cases, operation) of wind farm development they should be fully considered and assessed within the ES and RIAA.</i></p>	<p>The Applicant would like to confirm that while geophysical surveys will be conducted pre-construction, these will not be seismic airgun surveys. The equipment used in these geophysical surveys are expected to have minimal disturbance impact to marine mammals. The JNCC <i>et al.</i> (2020) guidance states that a 5 km EDR should be used to assess disturbance from non-airgun seismic surveys, as per the methodology in the Hornsea Four Report to Inform Appropriate Assessment.</p>
<p>D15:Report to Inform Appropriate Assessment</p>	<p><i>The applicant has confirmed that they will not be undertaking geophysical surveys as part of the activities under the Hornsea Four DCO. However, we do not consider that removes the need for these activities to be fully considered within the ES and RIAA. (See Point 13).</i></p>	
<p>D16:Report to Inform Appropriate Assessment</p>	<p><i>The Applicant has confirmed that seismic surveys may be required. The Applicant's response on the JNCC (2020) guidelines is incorrect. The JNCC (2020) guidelines only propose a single EDR for seismic surveys, which is 12 km; all seismic surveys using airguns need to use this EDR. The 5 km EDR is applicable only to non-airgun geophysical sources e.g. sub-bottom profilers. Therefore, a 12 km must be used in the assessment of disturbance impacts to harbour porpoise. We therefore request that the assessment is updated using the 12 km EDR.</i></p>	
<p>D18:Report to Inform Appropriate Assessment</p>	<p>We advise that a figure should be presented to accompany Table 32, showing how overlap between projects can be taken into account in the in-combination assessment and offer a reduction in spatial area by 15-25% (as stated in Section 11.3.2.23). This is important as the Applicant considers this approach provides certainty that primary mitigation will be sufficient.</p>	<p>The Applicant will review the figure and table and provide updated information at Deadline 5.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>The Applicant has provided a figure to accompany Table 32, as requested.</p> <p>We understand that the figure presents all projects in Tiers 1-2 in Table 32 that could contribute to in-combination disturbance on the SNS SAC. There are parts of this figure which could be clearer (e.g. the caption, and which year each panel in the figure is relating to).</p> <p>There are two inconsistencies between the Figure 23 and the numbers presented in Table 32:</p> <ul style="list-style-type: none"> •In the winter min/max figures there is no contribution from Hornsea 4 presented. Whereas, in Table 32, the min/max overlap between Hornsea 4 and the winter area is 352 and 277 km² respectively. The figure must be updated to show the contribution of Hornsea 4 to in-combination disturbance in the winter area of the SNS SAC. •Based on Table 32, Dogger Bank C does contribute to the in-combination disturbance in the summer max scenario. This should be reflected in Figure 23. <p>These clarifications and inconsistencies should be addressed before we can consider whether our concern has been addressed.</p>	
<p>D19:Report to Inform Appropriate Assessment</p>	<p>We have provided clarification to the Applicant on the inclusion of geophysical surveys in the RIAA and anticipate further information at Deadline 2 on this.</p>	<p>Please see the Applicant's comments on Natural England's response to ExA's First Written Questions within this document, specifically the comments on MC.1.3.</p>
<p>D20:Report to Inform Appropriate Assessment</p>	<p>The Applicant has not provided any new information or confirmed that they will be using at-source noise mitigation; they continue to rely on the SIP process to secure mitigation. However, we note that a Clarification note on underwater noise abatement systems will be provided at Deadline 2.</p> <p>As it is mentioned by the Applicant in their response, we request that the Applicant provide justification as to why committing to mitigation is "not possible" at this stage.</p>	<p>A note on the feasibility of using noise abatement methods at the Hornsea Four site has been submitted at Deadline 2 (G2.14 Clarification Note on Underwater Noise Abatement Systems (REP2-050)).</p> <p>The Applicant would like to re-iterate that the MMMP does consider the use of noise abatement systems as an option to be used in the final MMMP. However, the Applicant cannot commit to NAS at the current stage. It is considered to be more appropriate to agree mitigation methods closer to the time of construction when final piling parameters, equipment etc are known.</p>
<p>D21:Report to Inform Appropriate Assessment</p>	<p>Natural England cannot agree with the conclusion of no AEOI for in-combination disturbance impacts to the SNS SAC due to lack of confidence in the SIP process (see Relevant Representations, Paragraphs 5.30-5.32). We consider that mitigation should be committed to at this stage for future review under the SIP process.</p>	

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>Natural England maintains that mitigation should be committed to at this stage. This concern has not been resolved.</p>	
<p>D22: Report to Inform Appropriate Assessment</p>	<p>"We have provided clarification to the Applicant on the inclusion of geophysical surveys in the RIAA and anticipate further information at Deadline 2 on this. Please also see Points 13 and 15 regarding the inclusion of geophysical surveys in assessments.</p> <p>We have provided clarification to the Applicant on the inclusion of geophysical surveys in the RIAA and anticipate further information at Deadline 2 on this. Please also see Points 13 and 15 regarding the inclusion of geophysical surveys in assessments."</p>	<p>Please see the Applicant response to D12 from the Marine Mammals tab of the Natural England Risk and Issues Log above.</p>
<p>D23: RIAA (Appendix G)</p>	<p>A figure of the movements of the 9 tagged pups and juveniles should be presented, in order to better understand the movements of these life stages and the difference in movements compared to adult seals. Pups and juveniles are part of the protected feature of the site as well as adults.</p>	<p>There were 9 pup/juvenile grey seals that had telemetry data within the Hornsea Four area. Of these, seven showed connectivity with the Berwickshire and North Northumberland SAC, two showed connectivity with the Humber SAC and one showed connectivity with the Isle of May SAC. A figure is presented in Appendix A of this document.</p>
<p>D25: Outline Site Integrity Plan</p>	<p>We consider that both primary and secondary mitigation need to be considered by the Applicant when determining how to provide certainty of no AEol.</p>	<p>The Applicant notes that both primary and secondary mitigation options are presented within F2.11: Outline Southern North Sea Special Area of Conservation Site Integrity Plan (APP-246).</p>
<p>D26: Outline Site Integrity Plan</p>	<p>We request that the Applicant provide more information on the likelihood of NAS being suitable for the Hornsea 4 project. Several factors are listed as affecting the suitability of NAS, however these are factors that we would anticipate to be mostly already understood about the site, or possible to make generalisations on based on existing data. We wish to understand the likelihood of NAS being feasible as early as possible, given the Applicant's inclusion of this measure in both the OMMMP and the Outline SIP.</p>	<p>Please see the Applicant response to D20-21 from the Marine Mammals tab of the Natural England Risk and Issues Log above.</p>
<p>D27: Outline Site Integrity Plan</p>	<p><i>The Applicant maintains that they do not need PAM. We disagree with this and do not consider that they have addressed our concerns.</i></p> <p><i>They state that the full mitigation zone (based on instantaneous PTS) is 2.9 km for harbour porpoise and that PAM does not cover that distance; we would advise that this issue is not only applicable to PAM as MMOs would also be unlikely to detect harbour porpoise over the this 2.9 km mitigation zone.</i></p>	<p>The Applicant maintains that the use of PAM is insufficient to provide any additional benefit to the pre-piling searches. The Applicant maintains that the combined use of an MMO and an ADD is sufficient. PAM is generally limited to a 500 m detection zone for harbour porpoise at most. Based on recent studies, it is expected that animals will have left the immediate vicinity of the pile due to the presence of construction related vessels even before piling activity starts (e.g. Benhemma Le-Gall et al. 2021, Brandt et al. 2016).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>As per the SNCB statement on ADDs (2016), we note that the Lofitech ADD can elicit behavioural response from harbour porpoise and harbour seal, and potentially for grey seals. We note that since the 2017 statement there has been evidence to demonstrate that the Lofitech ADD is also effective at deterring minke whales (McGarry et al., 2017). However, there is limited evidence that Lofitech ADDs are effective at deterring dolphin species, including bottlenose dolphin which may be present in impact zones. We therefore advise that a combination of methods including MMOs, PAM and ADDs would provide a level of protection to all marine mammal species likely to occur.</i></p>	
<p>D28: Outline Site Integrity Plan</p>	<p>Based on the information provided in the OMMMP, further discussion is needed during Examination between Natural England and the Applicant as to the most appropriate duration of ADD activation.</p> <p><i>The Applicant agrees that further discussion is needed. It can be inferred from their response that they would intend to have this discussion post-consent. The exact timings of the ADD duration could be finalised post-consent (after further modelling is undertaken). However, the principles which determine ADD duration should be discussed at this stage (i.e. whether ADD duration corresponds to the instantaneous PTS zone or the cumulative PTS zone). Agreement is needed on this point. Note that this discussion is related to our concerns over no commitment to mitigate the full cumulative PTS zone as per our previous comments.</i></p>	<p>The Applicant is willing to discuss the principles which determine ADD duration at a future statement of common ground meeting.</p> <p>Please see the Applicant response to D2 from the Marine Mammals tab of the Natural England Risk and Issues Log above in relation to ongoing work in this area (Kastelein et al. 2014).</p>
<p>D29: Outline Site Integrity Plan</p>	<p>The Applicant notes that previously bubble curtains have been used in waters up to 45m in depth. Further information is needed on whether it is feasible to use bubble curtains in the deeper waters of the site that are >45m, possibly even >60m. We request that more information is provided on the likelihood of bubble curtains and NAS being suitable for the Hornsea 4 project (specifically in regard to deeper waters).</p>	<p>Please see the Applicant response to D20-21 from the Marine Mammals tab of the Natural England Risk and Issues Log above.</p>

E - Marine Processes Tab

Many of Natural England's comments in the 'Marine Processes' tab are related to topics contained within the scope of works presented in [G1.46: Marine Processes Supplementary Works Scope of Works \(REP1-068\)](#) which was submitted into Examination at Deadline 1. Comments have been received from the MMO and Natural England and these will be addressed within this workstream as appropriate and further meetings should they be required will be held between the Applicant, the MMO and Natural England on the outputs from this workstream. Furthermore, the Applicant has secured the services of external independent expert Prof Mike Elliot, Director of International Estuarine & Coastal Specialists Ltd. An update on this workstream has been submitted into Examination at Deadline 3 (see [G3.9 Clarification Note on Marine Processes Supplementary Work](#)). As this workstream is ongoing, the Applicant has not responded to any comments related to their points, pending the outputs of this work.

Reference	Stakeholder's Written Representation	Applicant's Response
E2 & E3: Chapter	<p>Although we acknowledge that there have been efforts made to refine the Maximum Design Scenarios (MDS) in some cases, Natural England remains concerned that a number of maximum design scenarios are unnecessarily precautionary. Of particular concern to Natural England are the volumes of sandwave levelling and boulder clearance outlined in the draft DCO/dML, which are based on clearance across the full length of the cable corridor, particularly given that there are geophysical data available from a 2021 campaign that should allow these figures to be refined. An additional concern is the proposal to defer a large proportion of the detailed assessment to the post consent phase, notably the Cable Burial Risk Assessment and Scour Assessment. Consequently, the volumes of rock protection outlined in the draft DCO/dML are conservative and estimated based on experience at other projects rather than being informed by the ground conditions within the developable area. From a marine processes perspective, this makes WCS for each receptor difficult to define as a wide range of potential scenarios are possible.</p> <p>On light of Paragraph 2.6.196 of NPS EN-3, which states that " Methods of construction, including use of materials should be such as to reasonably minimise the potential for impact on the physical environment", further justification should be provided to support the following maximum design parameters and provide an understand how these figures has been calculated:</p> <ul style="list-style-type: none"> • The requirement for up to 8 HDD exit pits for a maximum of 6 cables. • An MDS for sand wave clearance based on clearance along the full length of each of the 6 cables, despite geophysical data being available. • Cable protection based on a percentage of the total cable route rather than available geophysical data (10% of route). • Drilling will only be required for up to 10% of all pile installations (or up to 10% of the depth across all installations) 	<p>The Applicant has produced a note to provide clarification and justification of several offshore MDS, as presented in the offshore chapters of the Hornsea Four ES (Volume A2: APP-013 – APP-023). This clarification note was submitted into Examination at Deadline 3 (G3.6 Clarification Note: Justification of Offshore Maximum Design Scenarios).</p>
E4: Chapter	<p>"Whilst we note that the Applicant has limited the number of GBS to 110, the introduction of GBSs in the MDS has substantially increased the significance of impacts and, thus, the risk associated with this project.</p> <p>However, our original comment to the ExA was intended to highlight that these changes to the MDS at a relatively late stage in the evidence plan process, and</p>	<p>The Applicant notes that the re-introduction of GBS foundations was first discussed with the Marine Ecology & Processes Evidence Plan Technical Panel in November 2019. The GBS option was originally removed from the project design envelope following Scoping, but the subsequent collection and analysis of project-specific survey data highlighted the requirement for the re-introduction of this option. As such, the Applicant does not consider that this</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>the lack of resolution prior to application have left us with substantial issues to resolve during this examination."</p>	<p>change was introduced at a 'relatively late stage in the Evidence Plan process'. It is important to note that since this re-introduction of GBS, the Applicant has endeavoured to take stakeholder concerns into account, resulting in the imposed limitation in the number of these foundations that will be used.</p>
<p>E9: Chapter</p>	<p>Data/Evidence</p> <p>The presentation of wave, tide and plume modelling in the Marine Processes chapter does not include the schematics of model output in the Technical Report which makes it difficult to gauge the magnitude of impacts.</p> <p><i>The Applicant has not addressed the issue of model output schematics being presented in the Technical Report but not in the Marine Processes Chapter. This makes it difficult to fully assess and understand the magnitude of impacts.</i></p>	<p>The Applicant does not consider it appropriate or proportionate to replicate the significant detail across both the ES technical report and chapter documents. Highly technical detail is set out in the ES technical reports, to ensure main ES chapters are not disproportionately long and unwieldy and so they remain accessible to non-specialists as well as specialists. The Applicant does not consider it appropriate or proportionate to replicate the significant detail across both the ES technical report and chapter documents. The location of where information is presented does not preclude Natural England from considering it.</p>
<p>E12: Chapter</p>	<p><i>Natural England notes the Applicant's explanation that the waves passing through the array do not interfere with sediment transport due to the water depth. However, our concern remains the modelling shows a 10% reduction in wave height on the leeward side of the array. Although the Applicant states that this dissipates with distance from the array and has no discernible effect at the coast, there is no assessment as to whether this 10% wave height reduction would have an impact over the lifetime of the project. We'd therefore welcome further discussion with the Applicant on this matter.</i></p>	<p>The Applicant welcomes Natural England's acknowledgement that water depth restricts the waves orbital velocities reaching the seabed. As such, the wave regime does not influence sediment suspension and associated sediment transport within, and adjacent to, the array. The numerical modelling presented in Appendix C of A5.1.1: Marine Processes Technical Report (APP-067) illustrates that the wave heights recover rapidly with distance from the array such that there are no measurable effects identified at any of the adjacent coastlines. This is in line with results presented in Environmental Statements for other Offshore Wind Farms. The Applicant considers that if there is no (zero) measurable effect at the coastline, then cumulatively over time there can be no (zero) measurable effect at the coastline.</p>
<p>E13: Chapter</p>	<p>Although the use of a Controlled Flow Excavator has become standard within offshore windfarm applications, and assessments are made on the assumption that the seabed and associated habitats will recover in the short-term (up to 2 years), we highlight that there is very little evidence available to support this assumption.</p> <p>Natural England recommend that all available evidence is considered, and that there is a commitment to post-consent monitoring to test the assumptions made within this application.</p>	<p>The Applicant considers that whilst the evidence base for the potential impacts from the use of a CFE is smaller than for that of a MFE, the engineering design of the two tools are very similar such that sediment is mobilised in a similar manner, albeit to a lesser extent with the use of a CFE. The Applicant therefore considers that the comparable design of the two tools is therefore sufficiently similar that the wealth of knowledge available for the MFE is applicable to understanding the potential impacts of the CFE.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>Natural England does not consider that this point has been addressed and would welcome a commitment to post construction monitoring in order to verify the assumptions being made in relation to recovery.</i></p>	
E14: Chapter	<p>Natural England does not consider that this point has been addressed. Our understanding is that the Trailing Suction Hopper Dredging would mean that once removed, the sediment would be retained with the hopper and once full, transported to a disposal location. The two dredge disposal locations are currently identified "the array" and "the ECC". Our concern is that this is not specific enough to allow an assessment.</p>	<p>The Applicant disagrees with Natural England and would like to draw attention to standard practice for disposal locations associated with OWF developments. It is standard practice to identify disposal area, i.e. within the array and within the ECC. It is not however standard practise at this stage to identify specific locations within these 'broader' sites.</p>
E16: Chapter	<p>Whilst the Applicant has considered long-term average cliff recession rates in the planning of the HDD TJB locations inland, they have not included estimates of changes to the intertidal area due to climate change/sea level rise, or through the project lifetime. Similarly, there is no consideration of changes to the Holderness Cliff due to the coastal access ramp, changes to the coastline linked to lowering of Smithic Bank due to the proposed development and climate change/sea level rise. We would also wish to seek clarification of the anticipated need for remedial works for landfall infrastructure beyond the lifetime of the project, as we note it is the Applicant's position that there is no requirement for remediation plans. Therefore, we would advise that annual monitoring of cliff retreat and beach lowering rates over the lifetime of the project should be carried out in order to assess cliff/beach stability and cable exposure.</p>	<p>A description of the future baseline, in the absence of Hornsea Four, is presented in Section 1.7.11 of Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes (APP-013). This section includes consideration of climate change (sea level rise, storm surge and waves).</p> <p>The Applicant considers that the presence of the temporary coastal access ramp, located above the intertidal, provides a considerably smaller impact upon coastal processes than the artificial headlands in front of Barmston Beach Holiday Park and Barmston Drain (and the protruding outfall structure which acts like a groyne) which act as permanent features with a far greater influence for this section of coastline.</p>
E18: Landfall	<p>Whilst we are reassured that the temporary access ramp only partially encroaches on the very upper intertidal zone, and is unlikely to interfere with beach processes (RR-029-5.36; RR-029-5.37), there still remains the concern that the ramp will be installed at a low point of a rapidly eroding cliff. Any works that result in the lowering of the cliff will need to consider the impact on flood risk from wave action and spray. The impact of the beach access ramp on cliff stability and cliff erosion has not been fully considered. Similarly the potential impact of accelerated cliff erosion needs to be considered. Natural England would welcome further discussion with the applicant on this issue.</p>	<p>The Applicant has provided detailed justification stating that no measurable impacts would be observed at the designated sites such as Flamborough Head SAC, Humber Estuary SAC, SPA, Ramsar and SSSI, Holderness Inshore MCZ and Dimlington Cliffs SSSI as a result of the temporary access ramp. As such, the Applicant does not intend to carry out further assessment or monitoring as this would be disproportionate to the potential arising impacts.</p> <p>However, it's important to note that East Riding of Yorkshire Council (ERYC) already undertake routine land-based monitoring of the Holderness Coast in spring and autumn each year (from 2003) which includes beach profiles from the top of the sea cliffs to low water (see Section 1.7.3.2 of A2.1: Marine Geology, Oceanography and Physical Processes (APP-013)).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>The Applicant notes that the decommissioning plan and programme will be updated during Hornsea Four's lifespan to take account of changing best practice and new technologies. The approach and methodologies employed at decommissioning will be compliant with the legislation and policy requirements at the time of decommissioning.</p>
E19: Landfall	<p>HDD exit pits</p> <p>It is vital that the seabed profile is restored following the excavation of exit pits (particularly given the sensitivities of this area). Material from elsewhere should not be brought in for reinstatement. There should be an element of sorting of sediment to enable the sediment structure to be reinstated. The appropriate storage of material should be secured in the DCO/dML as mitigation.</p> <p>Furthermore, there is no mention of the reinstatement of the seabed profile following backfilling of the exit pits. It would be useful to provide an assessment of the potential range of change in intertidal/subtidal elevation and coastal retreat over the lifetime of the project following reinstatement.</p> <p>Natural England, therefore, cannot agree with the assessment of significance of this impact pathway.</p> <p><i>We welcome the Applicant's commitment to include these details in the Cable Specification and Installation Plan. If this can be conditioned in the dML or outlined in a certified document then we would be content to close this matter.</i></p>	<p>As detailed in RR-029-APDX:E-24 of G1.9: Applicant's comments on Relevant Representations (REP1-038), the Applicant notes that the details requested by Natural England in relation to the restoration of profile of the excavated HDD exit pits, and these will be provided with the Cable Specification and Installation Plan which is conditioned in the DML (Condition 1.3(1)(k) - C1.1: Draft DCO including Draft DML (REP2-061)) which will be submitted to and approved in writing by the MMO. Therefore, appropriate storage of materials will be secured through the DCO/ DMLs via the Cable Specification and Installation Plan.</p> <p>As confirmed in Table 1.13 of A2.1: Marine Geology, Oceanography and Physical Processes (APP-013), the backfilling of exit pits will recover a similar amount of material from the surrounding seabed, as required. This is further supported by paragraph 1.11.1.10 of A2.1: Marine Geology, Oceanography and Physical Processes (APP-013), states "The preferred option is to side-cast the excavated material onto the adjacent seabed as a temporary spoil mound for later backfilling. Alternatives include removing the material elsewhere to a temporary storage area prior to use for backfilling". Whilst it is not the preferred option, the use of additional materials, including rock, may be required to ensure that the original seabed profile is reinstated.</p>
E21: Landfall	<p><i>We welcome clarification of the duration for cofferdam placement in the nearshore. The Applicant has suggested that as the DML will be limited to what has been assessed, a condition securing these parameters ins not required as it is inherently secured. The However, Section 1.11.1.118 of the ES is misleading as its states that the cofferdams will be in place for a three-month period, yet the Applicant has now clarified that cofferdams could be in place for three periods of three months to account for up to eight HDD exit pits. We advise that the MDS for</i></p>	<p>The Applicant does not agree it necessary to include the MDS for cofferdams within the dMLs. The text in A2.1 Environmental Statement Volume A2 Chapter 1 Marine Geology Oceanography and Physical Processes (APP-013) Table 1.13 and at Section 1.11.1.114 makes it clear that the installation of up to three cofferdams in place at any time for up to three months is required.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>cofferdam placement duration should be secured within the dMLs to ensure clarity on this issue post consent.</p>	
<p>E26: Export Cable Corridor</p>	<p>The Applicant states that the figures presented in Volume A2, Chapter 1 and Volume A5, Annex 1.1, provide a representation only of the Hornsea Four/Dogger Bank A&B Cable Crossing footprint area (approx.1000m by 2000m), rather than the specific location of the much smaller crossing. The cable crossing footprint area adopted in the hydrodynamic modelling in Volume A5, Annex 1.1 measured 500m by 770m. In order to understand the scale and magnitude of the impacts of the Dogger Bank Cable Crossing on nearshore sediment transport pathways and long-term erosion/accretion, it is important that a realistic worst-case cable crossing footprint area be presented. Furthermore, the hydrodynamic modelling was not extended to include sediment transport and long-term erosion/accretion. Therefore, we advise that adverse effects on nearshore sediment transport cannot be ruled out at this stage. Whilst the Applicant has modelled changes to the hydrodynamic regime due to the Dogger Bank Cable Crossing, there is no assessment of changes to the nearshore sediment transport regime, or long-term erosion or accretion trends. Therefore, we cannot rule out adverse environmental impacts, until this has been assessed.</p>	<p>The Applicant has submitted the updated chart G3.8 Chart depicting the Dogger Bank A and B export cable crossing rock protection into Examination at Deadline 3, at the request of the Examining Authority (see MC.1.8 of G2.2 Applicant's Responses to the ExA's First Written Questions (ExQ1) (REP2-038)).</p>
<p>E27: Export Cable Corridor</p>	<p>The Applicant states that the figures presented in Volume A2, Chapter 1 and Volume A5, Annex 1.1, provide a representation only of the Hornsea Four/Dogger Bank A&B Cable Crossing footprint area (approx.1000m by 2000m), rather than the specific location of the much smaller crossing. The cable crossing footprint area adopted in the hydrodynamic modelling in Volume A5, Annex 1.1 measured 500m by 770m. Our concern remains that there is sufficient uncertainty regarding the anticipated Dogger Bank cable crossing footprint area and thus, the scale and magnitude of its impacts on nearshore sediment transport pathways and long-term erosion/accretion. We advise that a realistic worst-case cable crossing footprint area needs to be presented.</p>	
<p>E29: Export Cable Corridor</p>	<p>It has been shown that moderate elevation changes to sandbanks like Smithic Bank could translate to an alteration in wave power at the shoreline and, in turn, a modification of the shoreline response to storms. Whilst we note that the Applicant considers that 'cable installation is unlikely to lead to lowering of the bank profile', there is insufficient evidence to rule out the adverse impacts described above. We also remain concerned that the cumulative impacts of a</p>	<p>The Applicant has produced a note to provide clarification and justification of several offshore MDS, as presented in the offshore chapters of the Hornsea Four ES (Volume A2: APP-013 – APP-023). This clarification note was submitted into Examination at Deadline 3 (G3.6 Clarification Note: Justification of Offshore Maximum Design Scenarios).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>number of cable installations (i.e. HP4, Dogger Bank A&B, SEGL2) and any cable protection across Smithic Bank may affect the form and function of the sandbank. Moreover, we advise that the impacts of the HP4/Dogger Bank A&B cable crossing (with up to 3m of cable protection) within 20m water depth offshore of Smithic Bank have not been adequately assessed since the wave and tidal modelling was based on a significantly smaller cable crossing footprint area than the one identified in the Environmental Statement. We advise that an additional review is required for the Hornsea Four/Dogger Bank A&B cable crossing, based on the anticipated cable crossing footprint area, to assess changes to nearshore sediment transport processes and morphology over the lifetime of the project (and beyond).. We would also wish to see more robust evidence presented on the adverse effects on Smithic Bank, nearshore sediment transport processes, the Holderness coast, and nearby designated sites. We note that the Applicant is carrying out a Technical Review of the MDS in relation to cable protection across Smithic Bank, and we look forward to the Clarification Note regarding MDS justification.</p>	<p>The Applicant confirms the scope of works presented in G1.46: Marine Processes Supplementary Works Scope of Works (REP1-068) were submitted into Examination at Deadline 1 and comments received from the MMO and Natural England will be addressed within this workstream as appropriate. Further meetings should they be required will be held between the Applicant, the MMO and Natural England on the outputs from this workstream.</p> <p>Furthermore, the Applicant has secured the services of external independent expert Prof Mike Elliot, Director of International Estuarine & Coastal Specialists Ltd. An update on this workstream has been submitted into Examination at Deadline 3. See G3.9 Clarification Note on Marine Processes Supplementary Work.</p>
E33: Export Cable Corridor	<p>Natural England notes the applicants response, but would like to see evidence of the plume extent, concentration and persistence for the HVAC drilling before this issue can be closed out. We'd welcome further discussion with the Applicant on this point.</p>	<p>The Applicant notes that, as presented in Appendix C of A51.1: Marine Processes Technical Report (APP-067), three MDS sediment release scenarios were considered. As stated in section 4.4.5.1 of A5.1.1: Marine Processes Technical Report (APP-067), the provision of drilling three piles at the HVAC Booster Substation assumes for up to 4,618m³ of drill arising. This potential sediment release is comparable to seabed levelling and the potential release of fines from the same location as overspill, which has a higher estimated total volume (5% of 171,735m³). As such, the Applicant considers that the assessments presented within both A2.1: Marine Geology, Oceanography and Physical Processes (APP-013) and A5.1.1: Marine Processes Technical Report (APP-067) are fit-for-purpose.</p>
E46: Array	<p>"Wake to Wake Interactions Section 1.11.2.27: It is stated that "The inclusion of 10 GBS box-type foundations in the array with greater widths (75m and 150m), and also non-cylindrical shapes, increases the potential for wake-to-wake interactions across parts of the array which are in the leeward path of the larger foundations.</p>	<p>The Applicant would like to draw attention to Section 4.7 of A5.1.1: Marine Processes Technical Report (APP-067) which addresses turbulent wakes, presenting the evidence base and project-specific assessment undertaken on this subject.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>Whilst it is suggested that the area affected by these wake-to-wake interactions will be limited, this has not been demonstrated or qualified. Evidence should be provided to show the spatial extent of these wake-to-wake interactions.</p> <p><i>Further evidence should be provided by the Applicant to support their conclusion here.</i></p>	
E49: Array	<p>"Within paragraph 1.7.8.3, it is noted that there is a sand ridge in the north western part of the array which is associated with a larger area of sand ridges and sandbanks known as 'The Hills'. These are sufficiently close to the array as to be impacted by changes to hydrodynamics and sediment transport. The impact of scouring around foundations should be considered for marine processes receptors such as 'The Hills' over the medium to long term.</p> <p>Natural England is concerned with the potential impact of the MDS foundation type, GBS structures, on the physical environment in particular the adjacent sandbank systems (i.e. The Hills). Given the uncertainties stated here regarding large box-type GBS foundations, we would suggest the WCS should be adapted in terms of their potential effect on scour development and, thus, scour protection requirements.</p> <p>Additionally, within paragraph 1.7.8.2 the Outer Silver pit geological feature (which lies directly adjacent to the array) is referenced, and yet it hasn't been considered a potential receptor. Further justification should be provided to support its exclusion from further consideration.</p> <p><i>Further evidence should be provided by the Applicant to support their conclusion here.</i></p>	The Applicant would like to seek clarity from Natural England on what evidence is sought.
E50: Array	<p>Seabed levelling in the offshore array area has not been assessed for its impact on marine process receptors. Consequently, the Applicant has not considered potential adverse impacts due to the modification or removal of sandwaves on nearby or adjacent prominent sand ridge and sandbank systems (e.g. The Hills). This is particularly relevant to the northern part of the offshore array area and should be assessed.</p>	The Applicant considers that there are no marine receptors identified in the offshore array area which are sensitive to seabed levelling. The effects on the seabed are expected to remain within the array area and would not extend to The Hills. The Hills is also not expected to be a deposition area for silts that may disperse more widely.

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>Further evidence should be provided by the Applicant to support their conclusion here.</i></p>	
E51: Array	<p>It is stated that "All foundations are considered sufficiently separated to mitigate the chance of group scour." Group scour is known to extend beyond the influence of the foundation with large diameter structures such as GBS or jacket structures and, therefore, has a large cumulative environmental effect when taking into the whole Hornsea 4 array. Therefore, further information should be provided to support this assertion and the separation distance should be stated.</p> <p><i>We advise that evidence should be provided by the Applicant to support this conclusion.</i></p>	<p>The Applicant would like to seek clarity from Natural England on what evidence is sought.</p>
E52: Array	<p><i>Whilst we welcome clarification from the Applicant on anticipated maximum scour footprints around WTGs and OSSs, it is unclear if the applicant has carried out any monitoring of secondary scour.</i></p> <p><i>Our position remains that post construction monitoring should test the assumptions made within the ES.</i></p>	<p>The Applicant notes that standard engineering and design surveys which will be carried out pre- and post-construction and as summarised in Table 2 of F2.7: Outline Marine Monitoring Plan (APP-242), will provide data on changes in seabed topography and scour around foundations. Where these surveys are being undertaken as part of the standard pre- and post-construction geophysical survey campaign, the specification of the surveys will be agreed with the MMO and its advisors during consultation in the post-consent phase.</p>
E54: Decommissioning and Post Operational Impacts	<p><i>It remains unclear how the ongoing need for remedial works (i.e. removal of exposed infrastructure) will be addressed beyond the decommissioning phase.</i></p>	<p>As stated in Volume A1, Chapter 4: Project Description (APP-010), the Applicant confirms that at the end of the operational lifetime of Hornsea Four, it is anticipated that all structures above the seabed (excluding scour protection and cable rock protection) or ground level will be completely removed. The Crown Estate agreement for lease (AfL) for Hornsea Four requires that the project is decommissioned at the end of its lifetime.</p> <p>The Applicant notes that the decommissioning plan and programme will be updated during Hornsea Four's lifespan to take account of changing best practice and new technologies. The approach and methodologies employed at decommissioning will be compliant with the legislation and policy requirements at the time of decommissioning.</p>
E57: Cumulative Impacts	<p><i>Natural England requires the Applicant to acknowledge that cumulative assessments may need to be updated if further details on the Endurance CCS are submitted to the planning authorities. This will also require the assessment of</i></p>	<p>The Applicant is reviewing details from the Northern Endurance Partnership project offshore EIA Scoping Report and consideration is being given to the update of cumulative assessments within a future Examination submission.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>impacts in combination with the Endurance Carbon Capture project to be reviewed at a later date when more information is available.</i></p>	
<p>F – Benthic & Intertidal Tab</p>		
<p>F1: Chapter & Technical Report</p>	<p><i>Natural England welcome the additional document provided by the Applicant (G1.44 Clarification note on marine sediment contaminants revision 1 [REP1-066] which helps clarify all contaminant levels and highlight where thresholds (CEFAS Action Levels and Canadian Marine Sediment Quality Guidelines) have been exceeded. It removes any concerns around inconsistencies in interpretation of the data tables and between the benthic ES chapter [APP-014] and the technical Annex [APP-068].</i></p> <p><i>One example of exceedance which we were concerned about (PAH) appears to have been a typographic error.</i></p> <p><i>We welcome the additional information around source of Arsenic within the sediments and note that the levels are considered normal within the region.</i></p> <p><i>We do wish to seek clarification from the Applicant or Cefas on why the CAL1 thresholds haven't been used for PAH (limit of 0.1mg/kg).</i></p>	<p>The Applicant welcomes the resolution of the concerns around inconsistencies in the interpretation of data tables, particular exceedances, and regional context.</p> <p>In G1.44 Clarification Note on Marine Sediment Contaminants [REP1-066], the PAH results are presented against the Interim Sediment Quality Guidelines which generally consist of a lower thresholds in the order of µg/kg versus mg/kg (100 µg/kg = 0.1 mg/kg). However, the Applicant will update this note for Deadline 4.</p>
<p>F2: Chapter & Technical Report</p>	<p><i>Given the number of samples which exceed the recognised thresholds particularly within the ECC Natural England cannot agree with the generalisation (made in G1.44 Section 4.1.1.2) that the chemical composition of all the material being disturbed are typical of wider regional background.</i></p> <p><i>Natural England advises further review and expansion of data interpretation by the Applicant is needed to provide suitable evidence that despite the threshold exceedances, the chemical constituents within the ECC were not adversely affecting the faunal community at the time of the survey. For example linking the chemical and benthic fauna composition through description and expansion of the statistical analysis described in Paras 5.5.2.22 to 5.5.2.24 of the technical appendix [APP-068] or a check of the species recorded at stations with CEFAS exceedances against published sensitivities such reported as part of the MarsSEA MarLIN - The Marine Life Information Network - Species (A-Z), We note the latter was undertaken within the technical Annex for the Array area [APP-068], but not for the export cable corridor.</i></p>	<p>The Applicant agrees with Natural England's comment, however whilst further statistical analysis would be useful, it should be noted that the survey was not designed for the purposes of exploring the impact of chemical contaminants on benthic faunal abundance and therefore there would be limited statistical power in doing so. It is proposed that the Applicant will undertake a check of the species recorded at stations with CEFAS exceedances against published sensitivities such reported as part of the MarsSEA MarLIN - The Marine Life Information Network - Species (A-Z) and provide further detail in an updated version of G1.44 Clarification Note on Marine Sediment Contaminants at Deadline 4.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>A similar comment was made by the Applicants in response to our Relevant Representations RR-029- APDX:F-31 "Furthermore, the biotopes present within the array area and ECC are considered to be tolerant of chemical pressures, as presented within the MarESA assessment". This may provide some level of reassurance that could be used as part of expert judgement in determining the likelihood that sediment disposal will result in adverse effects as concluded in Section 4.1.2.4 of the contaminant clarification note.</p>	
<p>F4: Chapter & Technical Report</p>	<p>Natural England queries the highlighted CEFAS Action level organotin exceedances (including two stations within the ECC above CEFAS Action Level 2) as these organotin exceedances were not previously reported in the technical annex [APP-068].</p> <p>We recommend this is checked against the raw data by the Applicant as the data within the table suggests the measurement unit is mg/kg (ppm). The array report highlights that all concentrations were $\leq 1 \text{ ng/g}$ (equivalent to $\mu\text{g/kg}$ or ppb) at all stations. In contrast the CEFAS Action levels are reported in units of mg/kg (ppm).</p> <p>If the organotin concentrations reported within this clarification note are correct and CEFAS AL1 and AL2 are exceeded, Natural England would have concerns about environmental impacts during construction. This should be of note by the MMO in determining the suitability of sediments for disposal as this would not have been considered following their review of the benthic ES chapter and technical Annex.</p>	<p>The concentrations presented for tin in G1.44 Clarification Note on Marine Sediment Contaminants (REP1-066) are consistent with those presented in Table D 11 of Appendix D of A5.2.1: Benthic and Intertidal Ecology Technical Report (APP-068) (i.e. presented in mg/ kg). The Applicant will provide a revised version of G1.44 Clarification Note on Marine Sediment Contaminants at Deadline 4 which provides further assurance that these discrete elevated concentrations will not result in significant effects if disturbed or disposed of.</p>
<p>F5: Chapter & Technical Report</p>	<p>Natural England wish to see <i>Sabellaria</i> reef considered for assessment due to <i>Sabellaria spinulosa</i> individuals being the dominant taxon in grab samples at ECC Stations 17 to 21, therefore the suitability of this substrate for the colonisation of <i>Sabellaria</i> reef is good and potential of the habitat high.</p>	<p>The Applicant notes that the characteristic signature that represents <i>Sabellaria spinulosa</i> reef was not identified within the geophysical data analysis, nor was there evidence of reef within the drop-down video (DDV) analysis. Whilst <i>Sabellaria spinulosa</i> individuals were accountable for the similarity of some of the faunal groups within the nearshore stations of the ECC, the densities recorded were not at numbers that would constitute reef (as supported by the geophysical and DDV campaign). Following multivariate analysis and expert review, ECC stations 17 to 21 were characterised by the biotope '<i>Flustra foliacea</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral mixed sediment (SS.SMx.CMx.FluHyd)'. Encrusting fauna such as <i>Sabellaria spinulosa</i> is not unusual of this biotope. Therefore, based on the evidence</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>presented, it is not appropriate to undertake an assessment on <i>Sabellaria spinulosa</i> reef habitat.</p> <p>Furthermore, Condition 17(2)(a) of Schedules 11 and 12 of C1.1: Draft DCO including DMLs (REP2-061) requires the Applicant to determine the location, extent and composition of any potential habitats of principle importance (Section 41 of the NERC Act) including biogenic or geogenic reef features (as defined by Irving (2009) and Gubbay (2007) as part of the preconstruction surveys. Additionally, habitats of principal importance (Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act) will be avoided where possible, informed through the undertaking of survey works pre-construction (as secured by Condition 13(1)(a) of Schedules 11 and 12 of C1.1: Draft DCO including DMLs (Rep2-061).</p>
<p>F6: Chapter & Technical Report</p>	<p><i>We have an outstanding concern relating to how examples of stony reef (outside a designated site) would be categorised in relation to 'habitats of principle importance' and at what 'grade' examples of stony reef would be micro sited around in relation to Co48 & Co84.</i></p> <p><i>We still query why stony reef data points were not cited as a range (low to medium) where datapoints within a polygon found both low and medium reef examples. The applicant has also not answered our query with regards to stony reef being carried forward as a Valued Ecological Receptor (VER).</i></p> <p><i>We would also welcome clarity as to the status of the Commitments Register and if and how commitments may be enforced post consent.</i></p>	<p>It is proposed that stony reef (outside a designated site) is to be categorised using the Irving (2009) guidance, where the importance of medium to high stony reef assemblages are highlighted. Based on the ecological importance of medium to high grade reef, the Applicant will micro-site around such reef features, in accordance with Co48 & Co84 (as set out in A4.5.2: Commitments Register (APP-050) and Condition 13(1)(a) of Schedules 11 and 12 of C1.1: Draft DCO including DMLs (Rep2-061).</p> <p>The four distinct patches of Annex I stony reef habitat recorded during this survey were scored as 'low' resemblance as per the qualifying criteria set out in regulatory guidance on assessing stony reef habitats (Irving, 2009). Additional to setting out the reef qualifying criteria thresholds, this guidance also suggests that "When determining whether an area of the seabed should be considered as Annex I stony reef, if a 'low' is scored in any of the four characteristics (composition, elevation, extent or biota), then a strong justification would be required for this area to be considered as contributing to the Marine Natura site network of qualifying reefs in terms of the EU Habitats Directive". This suggests that the patches identified during this survey would not necessarily be considered to be contributing to the National Site Network unless there is strong justification. Given that none of these reefs are designated features of any protected sites and that 'low' was generally</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p>scored against each of the qualifying criteria for the majority of seabed images in each area, it is unlikely that any impacts associated with the installation of the proposed Hornsea Project Four export cable route will be of any significance in the context of the National Site Network.</p> <p>In relation to the Commitments Register, please see the Applicant's response to the Examiners questions at Deadline 2 (G2.2: Applicant's Response to the ExA's First Written Questions (ExQ1) (REP2-038)), specifically the response to ES.1.21.</p>
<p>F11: Chapter & Technical Report</p>	<p>It is not clear how all the habitats within 14km of the order limits are considered in the assessment of significance of impact, as data and biotope information has not been collected within this area. There may be habitat within 14km that differ from those presented in this report in relation to habitats found in ECC and array area and therefore sensitivities may be different.</p> <p>The developer should make it clear what evidence has been used for assessments of impacts outside the order limits, whether this be modelled habitat maps or expert judgement, in order to help give the reader confidence in any assessments of impacts being made.</p> <p><i>We note the applicant's position that there is adequate information for the purposes of baseline characterisation of benthic ecology, however our question was in relation to the assessment of significance in the area outside the order limits and what this was based on, which we do not feel has been addressed."</i></p>	<p>As detailed within A5.2.1: Benthic and Intertidal Ecology Technical Report (APP-068), the biotope model collated a wealth of available physical and biological point data across the area of interest to help understand the occurrence of potential biotopes over the wider study area (outside the Order Limits) to support the application and the assessment of impacts on the subtidal benthic ecology. The predictive habitat model enables the Applicant to develop an understanding of the benthic subtidal ecology baseline where ground-truth data was not collected, based on the suitability of likely biotopes that were modelled through a well-developed three-tiered process: creation of a seabed sediment model, a EUNIS Level 4 model and a biotope model.</p>
<p>F12: Chapter & Technical Report</p>	<p>Flamborough SAC and Holderness Offshore MCZ are close to the cable route and therefore could be affected by higher levels of SSC and deposition. Natural England recommend referring to the assessment carried out in B2.2: Report to Inform Appropriate Assessment Part 1 (10.2.3.8) and A5.2.3 Marine Conservation Zone Assessment (Section 7) when describing the effect of increased suspended sediment and deposition from the ECC on the nearby protected sites, rather than dismissing the impacts as minor.</p> <p><i>This issue has been noted by the applicant but it is not clear if/how it will be addressed.</i></p>	<p>The Applicant will provide additional information and contextualisation within A2.2 Benthic and Intertidal Ecology (APP-014) referring to the assessment carried out in B2.2: Report to Inform Appropriate Assessment Part 1 (REP1-010) (paragraph 10.2.3.8) and A5.2.3 Marine Conservation Zone Assessment (APP-070) (Section 7) when undertaking the assessment of increased suspended sediment and deposition from the ECC on the nearby protected sites. The update will be submitted during examination.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
<p>F13: Chapter & Technical Report</p>	<p>Here it is stated that 'The communities associated with subtidal chalk reef habitat, which is a protected feature of the Flamborough Head SAC are expected to have some tolerance to increases in SSC (De-Bastos and Hill 2016c; Tillin and Hill 2016), particularly as these habitats are near the coast, where background SSC levels are highest. Sensitivity of many animals associated with soft rock habitats to light sediment deposition would also be expected to be limited, due to the resilience of some characterising species (De-Bastos and Hill 2016c) and the natural sediment mobility in these areas.'</p> <p>Natural England advises that the sensitivity of designated features within MPAs should be taken from the relevant conservation advice package and associated advice on operations, rather than wider references.</p> <p><i>Natural England notes the Applicant's response, however, whilst we welcome the use of supplementary evidence we continue to maintain that assessment of impacts to features within MPAs should refer to the conservation advice and associated advice on operations for that feature.</i></p>	<p>The Applicant will provide additional information and contextualisation within A2.2 Benthic and Intertidal Ecology (APP-014) referring to the conservation advice and associated advice on operations for the feature of the Flamborough Head SAC. The update will be submitted during examination.</p>
<p>F14: Chapter & Technical Report</p>	<p>Natural England have previously commented on a draft version of this ES chapter in November 2020 and did not agree with the assessment of magnitude for 'long-term habitat loss/ change' due to the use of the term 'high reversibility' concluding negligible magnitude.</p> <p>The magnitude has been re-assessed as minor and acknowledgment made that some infrastructure will be permanent. However Natural England still question if this is the most appropriate term given than the definition for minor is 'discernible, temporary change'. We appreciate that the definition 'moderate' magnitude (Considerable, permanent / irreversible changes, over the majority of the receptor) is also not appropriate for this scenario as it is not affecting the majority of the receptor. Therefore, it seems to fit neither category well.</p> <p>Natural England wish to have more discussion with the developer on this issue and request further scientific justification or refinement of the magnitude of impact.</p> <p><i>The Applicant has stated that they will continue to actively engage with Natural England through the SoCG process in relation to the issues raised in the representation. An updated SoCG is due to be submitted at Deadline 3.</i></p>	<p>Please see the Applicant's comments on Natural England's response to ExA's First Written Questions within this document, specifically the comments on ES.1.3.</p> <p>It is important to note that operational habitat loss was considered for Norfolk Boreas, Norfolk Vanguard, East Anglia ONE North, and East Anglia TWO and deemed to be of low magnitude for East Anglia ONE North and East Anglia TWO, with identical definitions of magnitude used for those projects when compared to the definitions used for the Hornsea Four benthic ecology assessment. Similarly, Norfolk Vanguard and Norfolk Boreas deemed the impact to be of low or negligible magnitude. Although project details across projects differ, the scale of projects are comparable and provide valuable context to how these assessments are approached. It is also important to highlight that the benthic assessments were agreed between the developers and Natural England through the SoCG process for these other four projects. As such, the Applicant considers that the Hornsea Four assessment presented is appropriate and robust.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
F15: Chapter & Technical Report	<p><i>We do not agree with the methodology that impacts assessed as negligible alone do not need to be considered in an 'in-combination' assessment. Natural England still believe further justification for excluding these impacts should be provided or they should be carried forward to CEA assessment as it is important that the combined effects are fully explored.</i></p>	<p>In relation to certain 'not significant' project alone impacts not being taken forward into the cumulative assessment, the Applicant notes that this is the standard approach to cumulative assessments for offshore wind farms, with Hornsea Three, Norfolk Vanguard and Boreas, and East Anglia ONE North and TWO adopting similar methodology, with these methodologies agreed with Natural England through their respective SoCG processes. This approach is adopted because many of the potential impacts identified and assessed for projects alone are relatively localised and temporary in nature and therefore have limited or no potential to interact with similar changes associated with other projects (e.g. accidental release of pollutants, temporary habitat disturbance associated with maintenance activities).</p> <p>As such, the Applicant does not understand Natural England's basis for this identical methodology being challenged for Hornsea Four.</p>
F16: Chapter & Technical Report	<p><i>Natural England welcomes the applicants commitment to update the cumulative assessment if and when new information comes forward on this project to the planning inspector.</i></p> <p><i>The Endurance Carbon Capture project has submitted an EIA scoping document to the MMO in September 2021 for the project therefore it should now be considered a Tier 2. It is unclear if the information from the scoping document has been captured in the assessment. "</i></p>	<p>The Applicant is reviewing details from the Northern Endurance Partnership project offshore EIA Scoping Report and consideration is being given to the update of cumulative assessments within a future Examination submission.</p>
F21: Outline Offshore Cable Installation Plan	<p>Within the Sandwave clearance plan, location information should include area of impact and volume of sandwave clearance at clearance and disposal locations. Information should also be clearly provided on habitats impacted and comparison of plans to ES predictions.</p> <p><i>The information highlighted by the Applicant is in relation to things to 'consider within the consultation' of the cable installation plan document rather than stating they will be included in the plan itself.</i></p> <p><i>Natural England does not see where the requested details relating to sandwave clearance extent and location information are included within the DML. If it can be demonstrated that this information is captured within the DML or associated document then Natural England would be content to close out this issue.</i></p>	<p>The Applicant can confirm that the Construction Method Statement (secured by Condition 13(c) of Schedules 11 and 12 of C1.1: Draft DCO including draft DMLs (REP2-061)) must provide details on 'foundation installation methodology, including drilling methods and disposal of drill arisings and material extracted during seabed preparation for foundation and cable installation works'. As such, the Applicant considers that Natural England's request for sandwave clearance information is appropriately captured within the DML.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
F22: Dredging & Disposal	<p><i>The Applicant has suggested that an assessment is provided in Section 7.1.3 of Volume A4.4.4 (APP-042) however this refers to effects of sediment plumes with no references to impacts once sediment settles. Natural England would like to see extent figures estimating the area affected by the settlement of sediment plumes.</i></p>	<p>The Applicant can confirm that further consideration is being given to the impact of drill arisings and settled sediment plumes with a clarification note due to be submitted into Examination at Deadline 5.</p>
F23: Dredging & Disposal	<p><i>The Applicant has provided no additional evidence to provide confidence that the exit pits will not be within the intertidal area. If the applicant is unable to provide accurate locations at this time then the worst case scenario should be considered up front and prior to consent. If the intertidal area is located within the proposed range from the TJB (HDD exit pits will be 400m - 1,500m from TJB) then impacts on the intertidal habitat need to be included as part of the assessment.</i></p> <p><i>Natural England request the applicant confirms where the exit pits will be in relation to the intertidal area.</i></p>	<p>The reference in paragraph 4.9.2.9 of A1.4: Project Description (REP1-004) is not correct. The wording "The HDD exit pit may be located above mean high water (MHW), within the Hornsea Four intertidal area (intertidal punch out) or below mean low water (MLW)" should be replaced with "The exit pits will be below Mean Low Water (MLW)" That is in line with reference in paragraph 4.9.2.5 of A1.4: Project Description (REP1-004) which states that "The HDD exit pits will be located at a minimum of 400 m and a maximum of up to 1,500 m from the TJB" A1.4: Project Description (REP1-004) will be updated to clarify this and submitted at Deadline 6 (to allow for any further updates as a result of ExQ2).</p>
F25: Dredging & Disposal	<p><i>The applicant has noted our comment with regards to re-use of sediment spoil. We would welcome the inclusion of a commitment to give ongoing consideration to this matter within the Commitments Register to prompt further consideration. (N.B. Natural England has changed the RAG status to Amber to reflect that we would like this point addressed).</i></p>	<p>The Applicant is considering the benefits and implications of this request and will return with a response at Deadline 5.</p>
F26: Dredging & Disposal	<p><i>Natural England appreciate it is difficult to predict where drilling may be required and what the material deposited as a result will be like as a number of factors will affect this. However chalk mounds could still form in the environment as a result of disposal of drill material, as they have done in other locations and the impact of this should be assessed. Mitigation, or post construction monitoring to inform the need for mitigation should also be considered to avoid or reduce impacts.</i></p>	<p>The Applicant can confirm that further consideration is being given to the impact of drill arisings with a clarification note due to be submitted into Examination at Deadline 5.</p>
F27: Dredging & Disposal	<p><i>Natural England acknowledged the Applicant's position that micrositing and mitigation will be agreed prior to construction, however we would welcome a commitment to avoid sensitive features including low resemblance stony reef when it comes to the identification of disposal sites in particular. This would avoid pushing this matter to the post consent phase to be resolved.</i></p> <p><i>(N.B. Natural England has changed this RAG status to Amber to highlight that this is something we would ideally like to be addressed).</i></p>	<p>Please see the Applicant response to F6 from the Marine Mammals tab of the Natural England Risk and Issues Log.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
<p>F28: Dredging & Disposal</p>	<p>Natural England welcome the Applicant's plan to deposit spoil material close to the site of production as it is best practice to try and ensure sediment composition is unchanged. This is particularly important in the case of larger particles, which should not be deposited on finer sediments as they are likely to persist and change the habitat composition.</p> <p>However, Natural England would like the Applicant to commit to this best practice either through a formal commitment or within a mitigation agreement.</p> <p><i>We are yet to receive comment from the Applicant as to whether they will commit to best practice through a formal commitment.</i></p>	<p>The Applicant describes in Section 4.6.1.3 of A4.4.4 Environmental Statement Volume A4 Annex 4.4 Dredging and Disposal Site Characterisation (APP-042) the intention to dispose of sediment "close to the point of production" which ensures the spoil will be returned into a broadly similar sedimentary environment (and in the case of drill arisings, ensures that the spread of material away from the point of production is minimised). The Applicant does not see the need to formalise this practice by way of formal commitment.</p>
<p>F29: Dredging & Disposals</p>	<p><i>Natural England are less concerned with the accidental release of pollutants from human sources, rather this point was referring to the high levels of contaminants found in the benthic sediments themselves and what might happen when these are disturbed during dredging and disposal. We welcome the statement about biotopes being tolerant to chemical pressures within the order limits and this will to some extent relieve our concerns.</i></p> <p><i>However we seek guidance from Cefas and the MMO on the suitability of those sediments which exceed contamination thresholds CAL 1 & ISQG TEL (as identified in RREP1-066 Clarification Note on Marine Sediment Contaminants Revision: 1) for dredging and disposal activities associated with construction.</i></p>	<p>The Applicant will provide a revised version of G1.44 Clarification Note on Marine Sediment Contaminants at Deadline 4 which provides further assurance elevated contaminant concentrations will not result in significant effects if disturbed or disposed of.</p>
<p>F32: Offshore Cumulative Effects Screening Matrix</p>	<p>It is not clear how ongoing effects of projects already operational are taken into account when assigned category a (included as part of the topic baseline and hence not considered within the cumulative impact assessment) within the screening matrix. This is the case for many cables, pipelines & oil and gas plans or projects as well as shipping activity.</p> <p>For example all existing oil and gas infrastructure in the vicinity are already changing the habitat and therefore the ability to withstand further pressures and justify the use of non significant or minor judgements in EIA terms. In the long term the issue is that there will be multiple projects affecting the same widespread habitats with low sensitivity. If all of these are assessed as negligible and the baseline doesn't change, then it is hard for the reader to understand if and at what point the level of construction/ infrastructure starts to be an issue.</p>	<p>Please see the Applicant's response to Natural England's Relevant Representation (RR-029-APDX:F-36) in G1.9: Applicant's comments on Relevant Representations (REP1-038).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p><i>Natural England's position on this matter remains unchanged.</i></p>	
<p>G – Fish & Shellfish Tab</p>		
<p>G1: Fish and Shellfish Ecology</p>	<p>A new paper has recently been published which provides new evidence of impacts of EMF on shellfish. Natural England advise that the Applicant reviews Scott et al (2021) and reconsiders the scoping out of EMF impacts on fish and Shellfish.</p> <p><i>Natural England note the Applicant's response to the issue raised. However, they have not provided EMF values for their cables to allow us to compare their project with those considered within the study. We have highlighted this to the Applicant and are awaiting this information from them in order to determine if there assessment of No LSE and keeping the impact scoped out is correct.</i></p>	<p>The Applicant has supplied Natural England with information on potential EMF levels from Hornsea Four offshore cables through the statement of common ground process, and welcomes further discussion with Natural England on this issue.</p>
<p>G4: Fish and Shellfish Ecology</p>	<p>Natural England do not feel the impacts associated with drilling foundations, in particular the mounds formed following disposal of drill material, have been considered in the impact assessment (as raised previously in Nov 2020). This also applies to the benthic chapter. Whilst the impacts from increased suspended sediment are considered, there is no mention of temporary or long-term habitat loss/change in habitat as a result of drill arisings forming persistent mounds or changing surface substrate type. Whilst the area affected might be less than the presence of the infrastructure itself, the area impacted by disposal will be in addition to the infrastructure itself and therefore needs to be considered in the impact assessment.</p> <p><i>Natural England note the applicants comment that any area impacted by drill arising will be within the footprint of seabed preparation works, however the impacts from drill arisings are likely to be different to those arising from the use of GBS.</i></p> <p><i>Therefore it is still Natural England's position that impacts associated will drill arisings should be assessed in the context of Fish and Shellfish as well as other receptors within the ES.</i></p> <p><i>(N.B We have changed the RAG status from yellow to align with similar comments made in relation to benthic ecology and that we would like this issue to be considered further).</i></p>	<p>The Applicant can confirm that further consideration is being given to the impact of drill arisings with a clarification note due to be submitted into Examination at Deadline 5.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
G5: Fish and Shellfish Ecology	<p>Natural England suggests the calculated combined suspended sediment levels is reduced in line with the area of overlap between the Dogger Bank A & B export cables and the fish and shellfish study area. This will allow a more accurate cumulative impact to be assessed.</p> <p>Natural England notes the Applicant's response to this point. We appreciate that taking a precautionary approach to setting MDS has become industry standard, however we also note that presenting a "realistic scenario" alongside the "worst case" is used elsewhere in the Application and that this could have been useful here.</p>	<p>The Applicant notes that based on current known progress of the Dogger Bank projects, there will be no temporal overlap between the export cable installation for the Dogger Bank A and B projects and Hornsea Four. Furthermore, there is no information within the current domain detailing potential maintenance works of the Dogger Bank export cables in the operational phase. Therefore, no meaningful realistic scenario can be presented to inform the assessment. As such, Hornsea Four maintain that presenting the worst case is appropriate.</p>
G6: Fish and Shellfish Ecology	<p><i>Natural England welcomes the applicant's commitment to update the cumulative assessment if and when new information comes forward on this project to the planning inspector.</i></p> <p><i>The Endurance Carbon Capture project has submitted an EIA scoping document to BEIS in September 2021 for the project therefore it should now be considered a Tier 2. It is unclear if the information from this consultation has been included in the assessment.</i></p>	<p>The Applicant is reviewing details from the Northern Endurance Partnership project offshore EIA Scoping Report and consideration is being given to the update of cumulative assessments within a future Examination submission.</p>
<p><i>Deadline 2 Submission – Natural England review of REP1-068 - G1.46 Clarification Note on Marine Processes Supplementary Work Scope of Works Revision: 01 (REP2-084)</i></p>		
<p>Deadline 2 Submission – Natural England review of REP1-068 - G1.46 Clarification Note on Marine Processes Supplementary Work Scope of Works Revision: 01 (REP2-084)</p>		<p>The Applicant confirms the scope of works presented in G1.46: Marine Processes Supplementary Works Scope of Works (REP1-068) were submitted into Examination at Deadline 1 and comments received from the MMO and Natural England will be addressed within this workstream as appropriate. Further meetings should they be required will be held between the Applicant, the MMO and Natural England on the outputs from this workstream. Furthermore, the Applicant has secured the services of external independent expert Prof Mike Elliot, Director of International Estuarine & Coastal Specialists Ltd. An update on this workstream has been submitted into Examination at Deadline 3 (see G3.9 Clarification Note on Marine Processes Supplementary Work).</p>

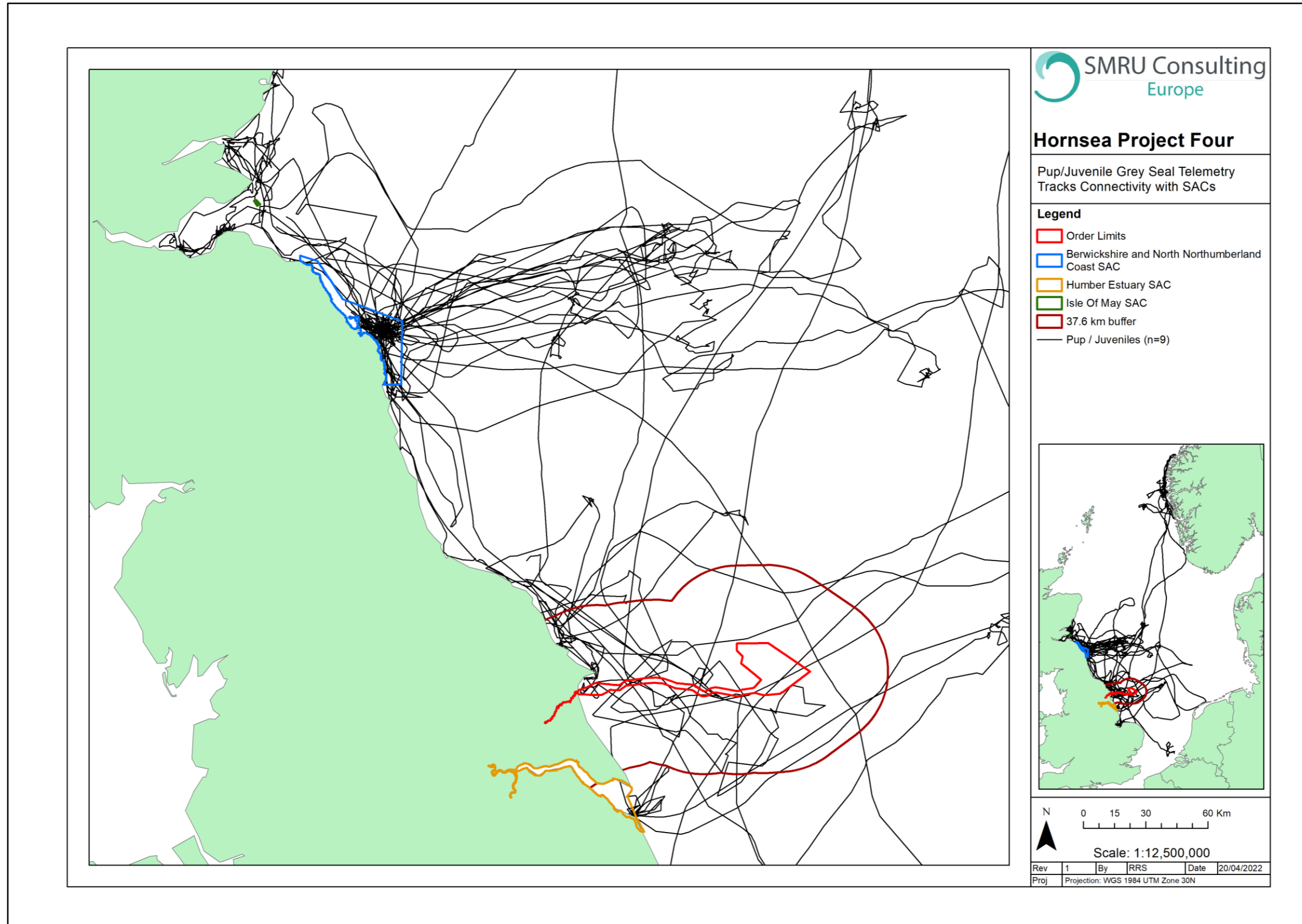


Figure 1: Pup/Juvenile Grey Seal Telemetry Tracks Connectivity with SACs.