



Hornsea Project Four

Applicant's comments on other submissions
received at Deadline 6

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Revision Summary

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Revision Change Log

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1 Introduction

1.1.1.1 At Deadline 5a the following 8 submissions were received from 6 stakeholders:

- BP Exploration Operating Company Limited – Written submissions following Issue Specific Hearing (ISH) 7 and ISH8, further submissions in response to the Sewell Report [\(REP6-046\)](#)
- East Riding of Yorkshire Council – Further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules [\(REP6-047\)](#)
- East Riding of Yorkshire Council – Late Deadline 6 Submission [\(REP6-070\)](#)
- Harbour Energy – Further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules [\(REP6-048\)](#)
- Harbour Energy – Post-hearing submissions including written summaries of oral case put at Issue Specific Hearings (ISH) during the week commencing 18 July 2022 [\(REP6-049\)](#)
- Marine Management Organisation – Post hearing submissions including written summaries of oral case put at hearings during week commencing 18 July 2022, comments on any other submissions received at Deadline 5a, progressed Statement of Common Ground (SoCG) and any further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules [\(REP6-050\)](#)
- Maritime and Coastguard Agency – Further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules [\(REP6051-\)](#)
- Ministry of Defence – Further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules and the ExA's Further Written Questions (ExQ2) [\(REP6-052\)](#)
- Mr PS Goatley – Deadline 6 Submission [\(REP6-053\)](#)
- Bryan Cave Leighton Paisner LLP on behalf of National Grid Electricity Transmission Plc (NGET) and National Grid Gas Plc (NGG) – Deadline 6 submission [\(REP6-054\)](#)
- Natural England – Natural England's response to G5.34 Applicant's response to Natural England's additional guidance on apportioning of seabirds to Flamborough and Filey Coast (FFC) Special Protection Area (SPA) for Hornsea Project Four [REP5a-018] [\(REP6-056\)](#)
- Natural England – Risk and issues log [\(REP6-0057\)](#)
- Natural England – Action log [\(REP6-058\)](#)
- Natural England – Cover letter [\(REP6-055\)](#)
- Natural England – Natural England's comments on G4.7 Ornithological Assessment Sensitivity Report – Revision 2 [\(REP6-065\)](#)
- Natural England – Natural England's response to G5.6 Indirect Effects of Forage Fish and Ornithology – Revision 1 [\(REP6-060\)](#)
- NEO Energy (SNS) Limited – Further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules [\(REP6-061\)](#)
- Network Rail Infrastructure Limited – Hearing Action Points arising from Issue Specific Hearing 7 (ISH7) [\(REP6-062\)](#)
- Weightmans on behalf of Northern Powergrid (Yorkshire) PLC – Withdrawal of Relevant Representation [RR-042] [\(REP6-064\)](#)
- Perenco UK Limited – Further information requested by the Examining Authority (ExA) under Rule 17 of the Examination Procedure Rules [\(REP6-065\)](#)

- Royal Society for the Protection of Birds (RSPB) – Comments on any other submissions received at Deadline 5 and Deadline 5a – Annex B Compensation Proposals ([REP6-067](#))
- Royal Society of the Protection of Birds (RSPB) – Comments on any other submissions received at Deadline 5 and 5a ([REP6-068](#))
- Royal Society for the Protection of Birds (RSPB) – Comments on any other submissions received at Deadline 5 and 5a – Annex A Offshore Ornithology ([REP6-069](#))
- The Crown Estate – Comments on any other submissions received at Deadline 5a ([REP6-066](#)).

1.1.1.2 The Applicant has reviewed all Deadline 6 submissions and responded on individual stakeholders' submissions in Tables 2 – 4.

1.1.1.3 The following stakeholders are dealt with in separate responses documents, due to their length and/or complexity:

- G7.8 bp Closing Remarks
- G7.10 Applicant's comments on DCO submissions received at Deadline 6
- G7.11 Applicant's comment on Harbour Energy's Deadline 6 submissions

1.1.1.4 Due to the volume and complexity of comments received from Natural England and RSPB in relation to matters pertaining to ornithology, the limited time available between Deadline 6 and 7 and the volume of ongoing works, the Applicant will respond in detail to these submission at Deadline 8.

1.1.1.5 Please see the Deadline 5 submission of [G1.1 Overarching Acronyms List](#) and [G1.45 Overarching Glossary](#) for overarching acronym and glossary lists.

2 Applicant's comments to Marine Management Organisation (REP6- 050)

Reference	Stakeholder's Written Representation	Applicant's Response
<i>Post-hearing submissions including written summaries of oral case put at hearings during w/c 18 July 2022</i>		
1.4.3	Regarding Smithic Bank monitoring the MMO advise a high-resolution pre-construction survey is undertaken followed by a post-cable installation survey every 6 months for 2 years (including two winters periods and one summer) and further surveys every 5-years for the duration of the project. Comparison reports should be produced, incorporating a comparison with existing bathymetric survey data.	The Applicant confirms F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 to include provision for monitoring the Smithic Bank. This includes a pre-construction high-resolution multi-beam bathymetry survey followed by six monthly surveys for the first three years (asset crossing), with the requirement for further surveys reviewed thereafter. The pre-construction survey will be reviewed to validate the baseline Smithic Bank and Dogger Bank Offshore Wind Farm export cable crossing) and the post-construction surveys will be reviewed against the pre-construction survey to determine any change with reviews reported annually to MMO. The Applicant would like to highlight that any notable changes will need to consider natural variability (such as seabed response to metocean events) and potential influences due to installed structures.
1.4.4	The MMO consider that tighter control measures should be implemented to ensure that the least amount of rock protection is deployed within Smithic Bank, in line with the proposed maximum 5% of cables getting rock protection in the Smithic Bank area. We believe the Applicant should be conditioned to submit the detailed pre-construction surveys and the cable burial risk assessment for the Smithic Bank area showing the % of cables that will be buried, and what the method of construction will be. This would then be reviewed and approved by the MMO.	The Applicant considers that the provision of the information requested by the MMO is already conditioned in the DCO, specifically within the following pre-construction plans and documentation: <ul style="list-style-type: none"> • construction method statement (Condition 13(1)(c) of Schedule 12 of the DCO); • cable specification and installation plan (Condition 13(1)(h) of Schedule 12 of the DCO); and • provision of pre-construction baseline report (Condition 17 of Schedule 12 of the DCO). As such, the Applicant considers that no additional conditions are required.
1.4.5	Regarding the Flamborough Front, the MMO confirms that we believe the Applicant is making progression regarding satellite monitoring, we confirm that the level of detail, and resolution of the satellite monitoring proposed is good. However, the MMO believes that this monitoring needs to expand to an array scale in the first instance, and not wait to see if monitoring of 3 distinct locations triggers the need for a wider scale monitoring. We believe this monitoring should look at productivity, by looking at chlorophyll, and sediment plumes which will help illustrate and monitor turbine wake interactions. Regarding the timing of monitoring the MMO believe we would need to see the stratification and as such, covering periods of spring, summer	The Applicant confirms F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 to include provision for monitoring the Flamborough Front. This includes the addition of a reconnaissance analysis of satellite data prior to a near-field survey in order to ensure that the near-field survey only takes place when alignment of the Flamborough Front is either across or south of the Hornsea Four array area. The near-field survey will be put on hold if the front remains to the north of the Hornsea Four array area as this will indicate no stratification will occur. This reconnaissance step has been added to F2.7: Outline Marine Monitoring Plan as a result of discussions with Cefas at Issue Specific Hearing 10 (as summarised within G6.10 Written Summary of the Applicant's Oral Case at Issue Specific Hearing 10 (REP6-037)).

Reference	Stakeholder's Written Representation	Applicant's Response
	and autumn. The MMO proposes a first set of monitoring is undertaken to then help with the identification and the wider design of the monitoring to be suitably tailored.	
1.4.6	The MMO confirm that the Doggerbank A and B Export Cable Corridor (ECC) is not an open disposal site, and as such the Hornsea Project Four will be able to have its ECC designated for disposal. The issue of overlapping disposal sites is not applicable. The MMO supports the re-implementation of this area as a disposal site to allow for the retention of sediment within the Flamborough Front System.	The Applicant welcomes the MMO's confirmation that the Dogger Bank A & B Export Cable Corridor (ECC) is not a designated disposal site and the previous issue of potentially overlapping disposal sites is no longer applicable. The Applicant had pre-empted this and reimplemented the reinstatement of the entire Hornsea Four ECC as a single disposal area by way of amendments included in the Deadline 5a draft DCO (REP5a-002).
1.4.7	For the extent, assessment and monitoring of the proposed temporary access ramp, the MMO are content with the monitoring that East Riding of Yorkshire Council undertake, it produces high quality and robust data that should capture any impacts from the temporary access ramp. The MMO have no further comments on this matter.	The Applicant welcomes confirmation from the MMO that project-specific monitoring of the temporary access ramp is not requested.
1.4.8	The MMO has reviewed the Applicant's position regarding the monitoring of sediment samples put forward at Deadline 5a. The MMO confirms that we are referring to the OSPAR Guidelines for the Management of Dredged Material in our comments referencing OSPAR. Furthermore, due to the laboratories used for carrying out the Particle Size Analysis (PSA) not being MMO validated, we are yet to be able to review the analysis and provide advise as to whether the frequency of sampling for sediment will need to be every 3 years or every 5. As such our advice on an explicit condition to address sampling remains. The MMO will consider the Applicant's suggestion regarding the approval of this matter being contained within the construction project environmental management and monitoring plan, however, we caveat if this route is pursued, it would need to be clearly outlined within this plan. The MMO also notes Condition 30 within the East Anglia 2 DML's (Schedule 13 and 14) where sampling requirements have been specifically outlined. Please see section 2.4 of this submission for further comments on sediment contamination.	<p>Further to the post-hearing note item 6.1 in G6.10 Written Summary of the Applicant's Oral Case at Issue Specific Hearing 10 (REP6-037), the Applicant is committed to using reasonable endeavours to accommodate the MMO's late request to retrospectively apply their current approach to accredited laboratories within the timescales of the Examination (noting samples have been frozen for approximately four years so quality could be compromised). The Applicant notes that the MMO have agreed to review the results provided previously with the caveat of the unvalidated PSA laboratory, to allow them to provide some comments on the analysis before the end of the Hornsea Four Examination.</p> <p>In relation to ongoing sampling, the Applicant considers it important to draw the Examining Authority's attention to the standard industry approach that is followed in relation to site characterisation to inform disposal licencing for offshore wind farm projects. It is commonplace for samples to be collected in advance of the EIA, in order to inform the assessments required to support a development consent application. Samples are therefore routinely taken between 5 and 8 years prior to construction (and in some cases in excess of this) with no validity period imposed, nor requirement to re-sample on an ongoing basis. An accepted exception to this is where there are known areas of high potential for excess contaminants, where additional sampling may be required in the event that works are to</p>

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		<p>take place in the vicinity of the contaminated area (on the basis that there is a need to consider further the risk of contaminants being remobilised). With regard to the Hornsea Four Order Limits, there is no evidence to suggest that there is a high potential for sampling results to show high levels of contaminants that would lead to significant concern. As such, the Applicant does not consider ongoing sampling of sediment to be appropriate.</p> <p>As stated in the post-hearing note item 6.1 in G6.10 Written Summary of the Applicant's Oral Case at Issue Specific Hearing 10 (REP6-037), the East Anglia One North and East Anglia TWO comparison the MMO draws is incorrect. The Applicant believes the inclusion of these conditions does not related to ongoing sampling or OSPAR requirements, but specifically to disagreements between the developer and the MMO in relation to the methodology used to collect and analyse the samples to inform the EIA. This disagreement appears to have been resolved by agreement on the need for a survey to be redone pre-construction and is therefore not related to ongoing sampling nor applicable to Hornsea Four.</p> <p>As such, the Applicant maintains that no further sediment sampling should be required and are unaware of any condition having been included in other recent offshore wind farm DCOs related to ongoing sampling or adhering to OSPAR requirements.</p>
<p><i>Comments on any other submissions received at Deadline 5a: Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction Revision: 03 [REP5-048]</i></p>		
2.1.2	<p>The Applicant notes that the ICES 2020 report acknowledges the existence of 2018 IHLS data for the Banks stock. However, the Applicant confirms that this data is not publicly available via the ICES data portal. The Applicant has contacted ICES and the respective authors of the report, requesting that this data is made available and will seek to include it in a future update of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction, if this data becomes available to the Applicant during Examination.</p>	<p>The Applicant welcomes the confirmation that the 2018 IHLS data for the Banks stock can be excluded from the assessment.</p>
2.1.3	<p>We thank the Applicant for their efforts to gain access to the data, and accept that under these circumstances, 2018 IHLS data for the Banks stock can be excluded for the purpose of this assessment.</p>	
2.1.4	<p>The Applicant notes that while temperatures lower than 12°C were identified in the vicinity of the hotspots, the lowest temperature recorded within the</p>	

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	<p>hotspot in any year was 11.9°C, with all other years generally much higher than the 12°C mean temperature (which includes all values from the survey area, not just the hotspot). Notwithstanding this, the Russell et al. (1976) paper does not provide values for yolk absorption and egg development at such a resolution to enable the use of an 11.9°C value, the 12°C temperature remains the most appropriate value to use. Specifically, this value can still be considered a precautionary temperature to determine the durations for egg development and yolk absorption as in all other years the temperature within the hotspot (i.e. the region of greatest importance) was above this value and so the durations would be faster than those used within the calculations (and it is unlikely that a 0.1°C difference in temperature would materially change the durations). As such, the Applicant considers that to use a lower temperature than the already conservative 12°C, particularly as low as 8°C proposed by the MMO, would be excessively conservative as to be meaningless when considering the temperature values associated with the hotspot (i.e. the primary area of spawning).</p>	<p>Please see the Applicant's justification for the temperatures used in the back-calculation in G5.3 Applicant's comments on other submissions received at Deadline 4 (REP5-081) – points 3.1.7 to 3.1.8.</p> <p>The Applicant therefore maintains its position that to use a lower temperature than the already conservative 12°C, would be excessively conservative when considering the higher temperature values associated with the hotspot (i.e. the primary area of spawning).</p>
2.1.5	<p>The hotspots in larval densities represents the areas where the highest concentrations on larval densities are found, rather than the specific locations of spawning, egg laying and egg and larval development. Therefore, whilst it can be seen as a reference point in relation to the intensity of spawning activity, it should not be delineated from spawning activity across the wider Flamborough Head spawning area, particularly in relation to the impact of noise and vibration which has a far-reaching impact. A basic interrogation of temperatures at maximum sampling depth for each mapped year (Appendix C, Figures 6 – 17) shows that temperatures within the mapped area showing larval densities of 150.1/m² and above vary considerably between years, as do the temperatures within mapped area of historic spawning ground – see Table 1 of this submission. It is also worth noting that sea temperatures at maximum sampling depth are lowest in more recent years. Accordingly, the MMO still does not support the Applicant's proposal to use a value of 12°C to determine the durations for egg development and yolk absorption, as it is not conservative. A conservative approach should take the minimum values,</p>	

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	<p>which in this instance range from 8.56°C – 9.15°C. This range accounts for six out of twenty-four (25%) of these temperatures.</p> <p>Table 1: Lowest recorded sea temperatures as maximum sampling depth during IHLS surveys:</p> <table border="1" data-bbox="315 376 1032 842"> <thead> <tr> <th>Year:</th> <th>Minimum Temp (°C) within mapped area showing larval densities >150.1 /m²:</th> <th>Minimum Temp (°C) within area of historic spawning ground based on Coull et al. (1998):</th> </tr> </thead> <tbody> <tr><td>2007</td><td>14</td><td>13.8</td></tr> <tr><td>2008</td><td>12.4</td><td>9.9</td></tr> <tr><td>2009</td><td>12.6</td><td>12.6</td></tr> <tr><td>2010</td><td>12.6</td><td>12.6</td></tr> <tr><td>2011</td><td>12.2</td><td>12.2</td></tr> <tr><td>2012</td><td>11.4</td><td>11.4</td></tr> <tr><td>2013</td><td>11.9</td><td>11.9</td></tr> <tr><td>2014</td><td>12.89</td><td>12.45</td></tr> <tr><td>2015</td><td>11.81</td><td>11.81</td></tr> <tr><td>2016</td><td>8.89</td><td>8.79</td></tr> <tr><td>2017</td><td>No data</td><td>No data</td></tr> <tr><td>2018</td><td>No data</td><td>No data</td></tr> <tr><td>2019</td><td>9</td><td>9.15</td></tr> <tr><td>2020</td><td>8.56</td><td>8.96</td></tr> </tbody> </table>	Year:	Minimum Temp (°C) within mapped area showing larval densities >150.1 /m ² :	Minimum Temp (°C) within area of historic spawning ground based on Coull et al. (1998):	2007	14	13.8	2008	12.4	9.9	2009	12.6	12.6	2010	12.6	12.6	2011	12.2	12.2	2012	11.4	11.4	2013	11.9	11.9	2014	12.89	12.45	2015	11.81	11.81	2016	8.89	8.79	2017	No data	No data	2018	No data	No data	2019	9	9.15	2020	8.56	8.96	
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2.1.6	<p>Since Russell (1976) only provides egg development periods for temperature ranges of 7 - 8°C (14 - 18 days) and 10 - 11°C (10 - 12 days) (Table 2 of this submission) but not for temperatures between 8 - 10°C, the MMO recommends that the Applicant uses an egg development period of 14 days for their calculations, based on using the lower temperature range of 7-8°C and the minimum development period for this range i.e., 14 days rather than 18 days.</p> <p>Table 2: Egg development periods (Russell, 1976):</p> <table border="1" data-bbox="315 1142 1046 1378"> <thead> <tr> <th>Average temperature:</th> <th>Days:</th> </tr> </thead> <tbody> <tr><td>12 - 13°C</td><td>7 - 9</td></tr> <tr><td>10 - 11°C</td><td>10 - 12</td></tr> <tr><td>7 - 8°C</td><td>14 - 18</td></tr> <tr><td>3 - 4°C</td><td>49</td></tr> </tbody> </table>	Average temperature:	Days:	12 - 13°C	7 - 9	10 - 11°C	10 - 12	7 - 8°C	14 - 18	3 - 4°C	49	<p>The Applicant maintains its position that a precautionary egg development duration of 9 days, as informed by the conservative maximum sampling depth temperature (and justified in the Applicant response above), is considered appropriate for the back calculations.</p>																																			
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2.1.7	<p>Similarly, the yolk absorption period should be based on the nearest appropriate temperature given in Russell (1976), which in this case would be 10.3°C (Table 3 of this submission). The MMO recommends that the full 20-day period is used in the Applicant's calculation, on the basis that temperatures observed in IHLS data shown in Table 1 of this submission have been below 10.3°C in more recent years, and because the calculation being proposed needs to take a conservative approach.</p> <p>Table 3: Yolk absorption periods (Russell, 1976):</p> <table border="1" data-bbox="315 520 1032 759"> <thead> <tr> <th data-bbox="315 520 707 560">Average temperature:</th> <th data-bbox="707 520 1032 560">Days:</th> </tr> </thead> <tbody> <tr> <td data-bbox="315 560 707 608">12.8°C</td> <td data-bbox="707 560 1032 608">3 & 9</td> </tr> <tr> <td data-bbox="315 608 707 655">12.0°C</td> <td data-bbox="707 608 1032 655">5 & 14</td> </tr> <tr> <td data-bbox="315 655 707 703">10.7°C</td> <td data-bbox="707 655 1032 703">7 & 16</td> </tr> <tr> <td data-bbox="315 703 707 751">10.3°C</td> <td data-bbox="707 703 1032 751">7 & 20</td> </tr> </tbody> </table>	Average temperature:	Days:	12.8°C	3 & 9	12.0°C	5 & 14	10.7°C	7 & 16	10.3°C	7 & 20	<p>The Applicant maintains its position that a yolk absorption period of 5 days as informed by the conservative maximum sampling depth temperature (as justified in the Applicant response above), is considered appropriate for the back calculations.</p>
Average temperature:	Days:											
12.8°C	3 & 9											
12.0°C	5 & 14											
10.7°C	7 & 16											
10.3°C	7 & 20											
2.1.8	<p>The Applicant notes the MMO's request to present the modelled noise contours for Group 3 stationary receptors, based on the thresholds described in Popper et al. (2014) in Figure 4 of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction (REP5-048). In response, to this, the Applicant has overlaid the noise contours from the HVAC booster station search area (piling location closest to the IHLS hotspot) over the sampling depth temperature data (see Figure 4 of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction submitted at Deadline 5 (REP5-048)). The Applicant can confirm that within the noise contours, the mean sampling depth temperatures from the temporal dataset range from 12.9°C to 13.7°C, is significantly higher than the 12°C mean temperature used to inform the parameters presented within the Clarification Note, ensuring that a precautionary approach has been utilised. As has been stated in previous submissions, the Applicant does not deem it appropriate to present the 135dB SEL threshold. This is due to the use of the 135dB SEL threshold (which is based on a study within a quiet loch) being expressly recommended by the authors of the paper (Hawkins et al. 2014) as not</p>	<p>Noted.</p>										

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>appropriate for use in determining impacts from underwater noise on fish. Notwithstanding the above, it would not be considered appropriate to use a threshold based on study from a quiet loch within a much noisier area such as the southern North Sea (which is subject to high levels of anthropogenic activity and consequently noise) as the fish within this area will be acclimated to the noise and would be expected to have a correspondingly lesser sensitivity to noise levels.</p>	
2.1.9	<p>The MMO thanks the Applicant for presenting the modelled noise contours in Figure 4 of the revised Clarification Note, as requested. This provides a useful visual overview of the predicted noise impact range for mortality and potential mortal injury, recoverable injury, and temporary threshold shift (TTS) (207dB, 203dB and 186dB respectively). However, we refer to our comments in points 2.1.4 – 2.1.7 of this submission, regarding sea temperatures across the whole spawning grounds (rather than just hotspot) and the need to take a precautionary approach to using an appropriate and precautionary minimum sea temperature. Accordingly, the MMO does not support the Applicant's statement <i>"that within the noise contours, the mean sampling depth temperatures from the temporal dataset range from 12.9°C to 13.7°C, significantly higher than the 12°C mean temperature used to inform the parameters presented within the Clarification Note, ensuring that a precautionary approach has been utilised"</i>.</p>	<p>The Applicant refers the Examining Authority to the Applicant response above, and the average maximum sampling depth temperatures presented within G1.10 Hornsea Four Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction (REP5-048), and maintains its position that the average temperatures within the noise contours range from 12.9°C to 13.7°C as shown in Figure 4 of G1.10 Hornsea Four Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction (REP5-048).</p>
2.1.10	<p>In reference to the second part of the Applicant's response, regarding modelling of behavioural responses in herring, the MMO requested that the modelled noise contour was presented for the received levels of the 135dB single strike sound exposure level (SELs) at the herring spawning ground, based on the findings in Hawkins et al. (2014) as this is considered best available scientific evidence by Cefas Fisheries and Underwater Noise specialists. In this instance the paper was co-authored by a scientist with extensive experience and a strong publication record in the field of fish bioacoustics. The application of the 135dB threshold has been accepted and widely used in underwater noise modelling by other offshore wind farm developers during the planning process. Our advice is based on scientific</p>	<p>Please see the Applicant's justification for the 135dB SEL threshold not being appropriate in G5.3 Applicant's comments on other submissions received at Deadline 4 (REP5-081) – point 3.1.8.</p>

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	<p>evidence and best available data. We recognise that the Applicant has a view on the level of risk, however this is not supported, in our view, in the evidence. The MMO would be willing to consider the use of an alternative threshold for modelling behavioural responses in herring (or a similar clupeid fish), should the Applicant be able to provide one which is based on suitable, peer-reviewed literature. In the absence of a suitable alternative threshold, we again request that this threshold is modelled, and the mapped noise contour presented for review.</p>	
2.1.11	<p>The Applicant notes previous work undertaken by Rampion Offshore Wind Farm to estimate migration periods for herring to reach the Banks spawning ground prior to spawning. The Applicant confirms that the Banks herring stock migrate in a clockwise circuit in the North Sea, migrating from the Northeast to the Banks spawning ground, and then continuing in a northerly direction (Cushing, 2001). This migration circuit has been mapped alongside the herring larval hotspots, and the underwater noise contours for stationary receptors with a swim bladder involved in hearing (see Figure 18 of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction, updated at Deadline 5 (REP5-048)). The Applicant notes that as illustrated in Figure 18, the noise contours fall outside of the migration circuit, and therefore noise effects from the Hornsea Four construction works will not cause a barrier effect to herring migration and as such, there is no need to allow additional time for a migration period within the peak spawning period timing.</p>	Noted.
2.1.12	<p>We thank the Applicant for mapping the herring migration route shown in Figure 18, however, please refer to comments in point 2.1.10 of this submission regarding the requirement for modelling the behavioural responses in herring. Behavioural responses based on the 135dB threshold will cover a much wider area, compared to those modelled for mortality and potential mortal injury, recoverable injury and TTS, so there remains uncertainty regarding behavioural responses in herring at the spawning grounds and migrating to/from spawning grounds owing to the lack of modelling for behavioural responses in herring.</p>	<p>Please see the Applicant's justification for the 135dB SEL threshold not being appropriate in G5.3 Applicant's comments on other submissions received at Deadline 4 (REP5-081) – point 3.1.8.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
2.1.13	<p>The Applicant notes the MMO's request to adopt a slower growth rate in line with that proposed by Heath (1993). The Applicant however is confident that the equation presented by Oeberst et al. (2008) to calculate growth rates is appropriate to estimate the growth rate for the Banks herring stock. The growth rate presented by Heath (1993) is based on herring stocks distributed across the northeast Atlantic, which would equate for significant variations in temperature, with the temperatures within the more northerly stocks much lower than those within the Banks stock region. The calculation as presented in Heath (1993) does not account for temperature as a variable, whilst it is widely accepted that sea temperature affects herring larvae growth rates (Stevenson 1962; Keegen et al. 1986; McGurk 1984; Ottersen and Loeng 2000). It is on this basis, that the Applicant does not consider Heath (1993) to be a reliable source for the determination of growth rates. The Applicant is therefore confident that the calculation presented in Oeberst et al. (2008), which accounts for temperature as a variable, is appropriate to determine the growth rate of the Banks stock herring. The Applicant also draws the MMO's attention to Figure 4 of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction (updated at Deadline 5 (REP5-048)), where the noise contours from piling at the HVAC booster station search area (the piling location closest to the herring spawning grounds) have been overlaid on the temperature data. Within the noise contours, the sampling depth temperatures range from 12.9°C to 13.7°C. These values are significantly higher than the 12°C mean temperature used to inform the calculation of the growth rate. The Applicant has utilised a lower temperature to inform the growth rate calculation, which results in a slower growth rate and as such, is therefore confident that a precautionary approach has been utilised.</p>	Noted.
2.1.14	<p>Please see points 2.1.4 – 2.1.7 of this submission regarding the use of an appropriate conservative temperature. This is a key parameter when calculating daily larval growth rates. In our previous advice the MMO highlighted our concerns that a calculated growth rate of 0.46 mm d-1 was not conservative. The Oeberst et al. (2009) study used in the Technical Note</p>	<p>The Applicant welcomes the MMO's acceptance of the use of the growth rate defined by Oeberst <i>et al.</i> (2009).</p> <p>The Applicant requested MMO and Cefas availability for a meeting to discuss the peak spawning period with a view to reaching agreement prior to the end of Examination on the</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>to calculate daily larval growth rates collected larval growth rates in the field using Baltic Sea herring larvae which are a spring-spawning stock, that are anatomically different to Banks stock, and are located in an area where significant increases in temperature (from 5°C to 20°C) are observed during the larval growth period. The main difference in growth rates found by Oeberst et al. (2009) was at warmer temperatures which is probably a reflection of the different feeding conditions in the Baltic (along with spring versus autumn spawners). In the case of autumn spawners (e.g., Banks herring), the temperature is dropping and daylength shortening (the opposite in spring spawners).</p>	<p>timeframe associated with this restriction. This meeting was requested on 16/06/22 and to date, no availability has been provided by the MMO and Cefas despite several attempts by the Applicant to get this meeting secured. In the absence of this discussion, the Applicant has proposed a compromise position to the MMO (prior to Deadline 7) as set out below and the Applicant awaits a response from the MMO on this matter.</p> <p>Whilst the Applicant believes it has presented a scientifically accurate and robust justification for the proposed 'peak' herring spawning period throughout this Examination, in response to the MMO's ongoing concerns, the Applicant has submitted its final position as Appendix D of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction at Deadline 7. This Appendix sets out a compromise piling restriction period for the HVAC booster stations commencing 21st August (10 days earlier than originally proposed) to 23rd October (7 days later than originally proposed). Further, in order to provide the MMO with comfort around impacts from increased suspended sediment concentrations and smothering on spawning herring, the Applicant proposes a restriction on seabed preparation activities using either dredgers or control flow excavator (CFE) tools seaward of Mean High Water Springs (MHWS) out to the westernmost extent of the HVAC Booster Station Works Area during the same time period above.</p> <p>The updated piling restriction period is updated in the draft DCO at Deadline 7. The updated restriction on seabed preparation activities has been incorporated into F2.15 Outline Cable Specification and Installation Plan updated and submitted at Deadline 7.</p>
2.1.15	<p>Whilst we maintain that using a larval growth rate based on Heath (1993) is appropriate for the purpose of a conservative calculation, we recognise that this paper has a more limited view on potential variability in herring larvae growth rates. Heath does at least remove the problem of having to figure out the thermal regime in a particular year (be it for forward or backward projections).</p>	
2.1.16	<p>In summary, there are pros and cons with using either Heath (1993) or Oeberst et al. (2009) and we do acknowledge that the Oeberst et al. (2009) equation had strong agreement with values in the literature at the lower temperatures. On this basis, we are content to accept the use of the Oeberst et al. (2009) model using all the literature data ($G=0.11+(0.017*T)$) subject to the use of an appropriate temperature (as per our comments 2.1.4 – 2.1.7 of this submission) and caveated that the model was not based on autumn spawning, Banks herring larvae. Workings for the calculated daily larval growth rate value should be presented in the Applicant's response.</p>	
2.1.17	<p>With reference to number 3.1.11 of the clarification note (REP5-048), the Applicant directs the Examining Authority to the Applicant's response to point 3.1.9 of the document. The Applicant welcomes the MMO's review of the additional information presented as part of this response. However please see section 2.1.12 of this submission for our comments to the Applicant's response to point 3.1.9.</p>	Noted.

Reference	Stakeholder's Written Representation	Applicant's Response
2.1.18	<p>In conclusion, the MMO maintains that the proposed 'peak' spawning period of 1st September – 16th October is not appropriate for the reasons outlined above. We believe that the calculated 'peak' spawning period is neither precautionary nor conservative. Further revisions and amendments are needed including the requirement for behavioural response noise modelling and the use of appropriate minimum sea temperatures which influence the duration of egg and larval development, and larval growth rates, all of which are factors which will affect the calculation of a 'peak' spawning period. The MMO maintains the position that the restriction should be between 1st August and 31st October each year.</p>	<p>To conclude, the Applicant strongly maintains its position that that the originally proposed restriction period of 1st September to 16th October each year utilises a sufficiently precautionary approach and as a result, provides a robust mitigation of the potential effects of piling of the HVAC booster station on herring spawning.</p> <p>The Applicant requested MMO and Cefas availability for a meeting to discuss the peak spawning period with a view to reaching agreement prior to the end of Examination on the timeframe associated with this restriction. This meeting was requested on 16/06/22 and to date, no availability has been provided by the MMO and Cefas despite several attempts by the Applicant to get this meeting secured. In the absence of this discussion, the Applicant has proposed a compromise position to the MMO (prior to Deadline 7) as set out below and the Applicant awaits a response from the MMO on this matter.</p> <p>Whilst the Applicant believes it has presented a scientifically accurate and robust justification for the proposed 'peak' herring spawning period throughout this Examination, in response to the MMO's ongoing concerns, the Applicant has submitted its final position as Appendix D of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction at Deadline 7. This Appendix sets out a compromise piling restriction period for the HVAC booster stations commencing 21st August (10 days earlier than originally proposed) to 23rd October (7 days later than originally proposed). Further, in order to provide the MMO with comfort around impacts from increased suspended sediment concentrations and smothering on spawning herring, the Applicant proposes a restriction on seabed preparation activities using either dredgers or control flow excavator (CFE) tools seaward of Mean High Water Springs (MHWS) out to the westernmost extent of the HVAC Booster Station Works Area during the same time period above.</p> <p>The updated piling restriction period is updated in the draft DCO at Deadline 7. The updated restriction on seabed preparation activities has been incorporated into F2.15 Outline Cable Specification and Installation Plan updated and submitted at Deadline 7.</p>
<p><i>Comments on any other submissions received at Deadline 5a: Clarification Note on Marine Mammals - Revision: 01 [REP4-045]</i></p>		
2.2.1 – 2.2.9	<p>[MMO comments provided in Section 2.2 of their Deadline 6 response (REP6-050)]</p>	<p>The Applicant can confirm that F2.5 Outline Marine Mammal Mitigation Protocol (REP6-011) has been updated at Deadline 6 to include the following text confirming that the final MMMP will include mitigation of cumulative PTS impact ranges. As such, the Applicant considers all MMO comments in this section have been addressed.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		<p><i>"It is acknowledged, by both the Applicant and Natural England, that there are limitations to the assumptions used in the modelling of SELcum PTS and that there is active research into the area of cumulative PTS. As such, better methods for estimating cumulative PTS distances are expected to become available in the near future. The Applicant agrees that new methods should be considered when finalising the mitigation measures in the final MMMP post-consent. Therefore, the final MMMP will include mitigation of cumulative PTS impact ranges that will be modelled based on the latest research and methods available at the time of the final MMMP post-consent."</i></p>
<p><i>Comments on any other submissions received at Deadline 5a: Outline Marine Mammal Mitigation Protocol [APP-240]</i></p>		
2.3.2	<p>Section 4.2.1.3 of the MMMP states "It is important to note that this Outline MMMP focuses on mitigating only the "instantaneous" SPLpeak PTS-onset impact ranges". The MMO disagree with this approach. As advised previously for this development, the MMMP should focus on mitigating both the predicted SPLpeak and SELcum impact ranges. Nevertheless, this same section then states: "One of the potential mitigation measures that will be considered at this point, will be the use of at-source noise reduction measures in order to reduce the potential for cumulative PTS-onset risk to negligible levels".</p>	<p>The Applicant can confirm that F2.5 Outline Marine Mammal Mitigation Protocol (REP6-011) has been updated at Deadline 6 to include the following text confirming that the final MMMP will include mitigation of cumulative PTS impact ranges. As such, the Applicant considers all MMO comments in this section have been addressed.</p> <p><i>"It is acknowledged, by both the Applicant and Natural England, that there are limitations to the assumptions used in the modelling of SELcum PTS and that there is active research into the area of cumulative PTS. As such, better methods for estimating cumulative PTS distances are expected to become available in the near future. The Applicant agrees that new methods should be considered when finalising the mitigation measures in the final MMMP post-consent. Therefore, the final MMMP will include mitigation of cumulative PTS impact ranges that will be modelled based on the latest research and methods available at the time of the final MMMP post-consent."</i></p>
2.3.3	<p>Cumulative PTS is later discussed in more detail specifically in section 4.4.3 of the MMMP. The document acknowledges that in order to mitigate the large SELcum PTS ranges (i.e. up to 12 km for harbour porpoise and 11 km for minke whale), this would require extended duration of ADD activation which is likely to cause significant levels of disturbance and is therefore not considered to be a feasible mitigation option, which the MMO agree. Therefore, the Applicant will commit to providing at-source noise reduction measures (for example bubble curtains and double bubble curtains) in order to reduce the potential for cumulative PTS risk to negligible levels. The choice of at-source noise reduction method will be confirmed in the final MMMP and the need for any</p>	<p>The Applicant can confirm that the specific mitigation measure (or suite of measures) that will be implemented during the construction of Hornsea Four will be determined, in consultation with the relevant SNCBs, following confirmation of final hammer energies and foundation types, collection of additional survey data (noise or geophysical data) and/or acquisition of noise monitoring data, and/or information on maturation of emerging technologies. This additional data and information will allow the noise modelling to be updated to feed into the final MMMP and discussions on the appropriate mitigation measure(s). This process includes provision for at-source mitigation, if required.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	ADD activation periods will be confirmed (see section 4.4.3.3). The MMO fully support this proposal and welcome that the Applicant will commit to providing at source mitigation.	
2.3.4	It is appropriate that frequency is considered in Appendix B of the MMMP under "Additional Modelling of Underwater Noise from Impact Piling Using Bubble Curtains". As highlighted in the document, the efficacy of a noise abatement system to reduce the risk of impact depends on the frequency range at which sound energy is reduced and on the target species, as each species is sensitive to a certain frequency range.	Noted. The Applicant welcomes confirmation of the appropriateness of the frequency consideration in the modelling. The Applicant can confirm that the attenuations predicted for the modelling in Appendix B are based on measured Big Bubble Curtain and Double Big Bubble Curtain installations. These use 1/3 rd octave band attenuation data applied to measured piling data at appropriate distances, as well as the weighting curves for each marine mammal hearing group to derive the attenuation appropriate to each group. Further details are provided in Section 7.5 of F2.5 Outline Marine Mammal Mitigation Protocol (REP6-011) .
2.3.5	The MMO advises that it will be important to ensure that appropriate mitigation is put in place to reduce the risk of potential impact of underwater noise on marine receptors, and the MMMP for piling operations should focus on mitigating both instantaneous and cumulative auditory injury. The MMO fully support the commitment by the Applicant of using at-source noise reduction measures for the Hornsea Project Four Offshore Wind Farm. Using noise abatement technologies would also reduce the risk of Temporary Threshold Shift in marine mammals (for which large effect ranges are predicted), which is still a form of auditory injury.	Please see the Applicant responses to 2.3.2 – 2.3.4 above.
n/a	The MMO's latest statement of common ground submitted at Deadline 7 states: <i>"The MMO outline that it would be helpful if the Applicant could clarify the following point: Table 1 of the Outline MMMP states that "there will only be a maximum installation of 2 piled foundations within a 24-hour period. 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. The two piled foundation locations may also be piled simultaneously". The MMO advises that this statement is confusing as 'concurrently' and 'simultaneously' have the same meaning. Presumably, the Applicant means that consecutive piling is likely (i.e. up to two piles installed in a 24-hour period, one after the other) but simultaneous piling may also occur</i>	At the request of consultee feedback, the Applicant at Deadline 1 updated the conditions within C1.1: Draft DCO including Draft DMLs (APP-203) to provide clarity on the concurrent and simultaneous piling scenarios permitted (RR-029-APDX:D-B). The Applicant confirms the MMO's understanding is correct. Concurrent piling refers to up to two piles being installed within a 24-hour period, one after the other. Simultaneous piling, which may also occur, refers to two piles being installed at the same time within a 24-hour period. This could occur at the HVAC booster station or within the array area.

Reference	Stakeholder's Written Representation	Applicant's Response
	<i>(two piles installed in different locations at the same time within either the HVAC area or within the array). However, we ask that the Applicant could please clarify this."</i>	
<i>Comments on any other submissions received at Deadline 5a: Clarification Note on Marine Sediment Contaminants [REP5a-014]</i>		
2.4.2	Reference 4.2.3 in document referenced in section 2.3.1, states that all samples were collected from the seabed surface and that the results template has been updated to reflect sediment sampling depth (0m). The Applicant states that the results template has been updated and submitted to the MMO. As the Applicant has confirmed the sample depths, the MMO consider this comment as now resolved.	The Applicant welcomes MMO's confirmation that the sampling depth comment is now resolved.
2.4.3	Reference 4.2.4 and 4.2.5 in document referenced in section 2.3.1, states that SOCOTEC completed the contaminant analyses for both the offshore array and offshore ECC samples. The Applicant states that the results template has been updated and submitted to the MMO. As the applicant has confirmed the laboratory for contaminant analysis, the MMO consider this comment as now resolved.	The Applicant welcomes MMO's confirmation that the laboratory for contaminant analysis comment is now resolved.
2.4.4	Reference 4.2.4 and 4.2.5 in document referenced in section 2.3.1, states that the PSA was completed by Gardline Environmental Ltd. for samples collected within the array and by Benthic Solutions Ltd. for those samples collected across the export cable corridor. The Applicant has confirmed via an email of 22 July 2022 that Gardline Environmental Ltd. subcontracted the PSA analysis to Thomson Ecology.	The Applicant can confirm that Benthic Solutions Ltd undertook the PSA analysis in relation to the ECC, with Thomson Ecology undertaking the array area PSA analysis.
2.4.5	Neither Gardline Environmental Ltd, nor Thomson Ecology are validated by the MMO for PSA analysis.	
2.4.6	The MMO notes the Applicant's email of 22 July to the MMO in which they advised: "The MMO provided detailed comments on the benthic and intertidal ecology elements of the PEIR, including specific comments related to the array area PSA, with no comments flagging this issue with PSA contractor validations. The Applicant considers that this mandate for all PSA laboratories to be validated by the MMO should have been raised at that time rather than being flagged at this late stage in the Examination process." The MMO confirms we would not standardly check the details of the laboratories	The Applicant notes the MMO's comment and directs the Examining Authority to the Applicant's post-hearing note under item 6.1 in G6.10 Written Summary of the Applicant's Oral Case at Issue Specific Hearing 10 (REP6-037) .

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>used within the context of benthic and intertidal ecology during the Preliminary Environmental Information Report (PEIR) stage. This is due to the fact that lab validation for PSA and contamination is required for disposal sediment analysis. These matters further relate to distinct benthic and intertidal ecology specialists, who would not comment on the validity of laboratories for sediment contaminants. As laboratory validation was not queried by the Applicant during the PIER stage, and the data was not presented using the MMO template until later in the Examination, the information was not presented in a way that validation would be checked until this later stage.</p>	
2.4.7	<p>Please see the guidance at https://www.gov.uk/guidance/marine-licensing-sediment-analysis-and-sample-plans#laboratory-validation for further information on laboratory validation and the requirements for sediment sample analysis.</p>	<p>The Applicant welcomes the provision of a link to the guidance and would encourage the MMO to effectively communicate this requirement to other offshore windfarm developers currently collecting data to inform their subsequent EIAs.</p>
2.4.8	<p>The MMO will consider its ability to review the sample analysis, without a validated laboratory for PSA, but would regardless be unable to provide a complete response regarding sediment contaminants without confirmation of the use of valid laboratories. We request an updated MMO results template capturing the clarifications to date to allow us to consider this further.</p>	<p>The Applicant welcomes the MMO's consideration of its ability to review the sample analysis and notes the caveat provided.</p> <p>The Applicant can confirm that the samples are currently being re-analysed by a laboratory that has been validated by the MMO. The Applicant is using best endeavours to ensure the results are made available to the MMO prior to DCO award and has included a new requirement in the updated F2.7: Outline Marine Monitoring Plan at Deadline 7 in relation to this. The Applicant notes the MMO have recently agreed to review the original results with the caveat that they're from an unvalidated PSA laboratory, to allow them to provide some comments on the analysis by the close of Examination.</p>
2.4.9	<p>It should be noted that the validation process is a long process and even if an application was submitted to the MMO for validation, it will not be completed before the examination for Hornsea Project Four has closed.</p>	
<p><i>Comments on any other submissions received at Deadline 5a: Professor Mike Elliot's Marine Processes Report Review [REP5-066]</i></p>		
2.5.2	<p>This substantive and authoritative report considers a wide range of issues encountered within the progression and review of the Environmental Impact Assessment for the Hornsea Project Four. It is well considered and backed up by the latest publicly available research papers.</p>	<p>The Applicant welcomes the MMO's positive feedback on G5.10 Professor Mike Elliot's Marine Processes Report Review (REP5-066).</p>
2.5.5	<p>In 2.5.17 the position of the cable crossing is discussed east of Smithic. The latest chart showing the location of the bank and the proposed crossing point is shown in Figure 2 in REP5a-017. This shows approximately 2.943km from</p>	<p>The Applicant welcomes the MMO's confirmation that there is no significant impact expected on sediment transport associated with the flanks of Smithic Bank as a result of the Hornsea Four and Dogger Bank A & B crossing.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	the active edge of the bank to the northern crossing point and 3.24km to the southern crossing point. Whilst these crossing point are approximately 1.5km long and 1.8m high we do not expect a significant impact on sediment transport associated with the flanks of Smithic Bank.	
2.5.9	In section 2.13.1.4 the cumulative impact of the Hornsea Project Four, Dogger Bank A&B and the Scotland to England Green Link 2 cables are discussed. Whilst no formal assessment methodology has been agreed, coastal geomorphologists usually take a precautionary, conservative and pragmatic approach. For instance, are there indications of changes in sediment transport from existing cables (scour pits, scour streaks, freespans) that may cause a potential for cumulative impacts between two adjacent cables. Furthermore, the mobility of the local sediment should also be considered.	<p>The Applicant notes that a Marine Licence application in relation to the Eastern Green Link 2 (EGL2) project was made publicly available in the MMO's Public Register on 26 July 2022. In light of this, the Applicant has submitted G7.5 Updated Onshore and Offshore Cumulative Assessment at Deadline 7 to give, as far as is reasonably possible, due consideration to EGL2 in the context of the Hornsea Four CEA.</p> <p>Based on the level of detail available on EGL2 at the time of writing, the Applicant is confident that there would be no additional likely significant cumulative effects beyond those previously described in the Hornsea Four ES.</p>
<i>Comments on any other submissions received at Deadline 5a: Benthic ecology- Table outlining the MMO's Deadline 6 comments on Benthic, Subtidal, and Intertidal ecology matters</i>		
2.7.2	Regarding Benthic Monitoring, the MMO requests a minimum of 10% of the total amount of turbines proposed for construction should be monitored for benthic impacts.	<p>The Applicant can confirm that F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 to include provision for the following monitoring of relevance to benthic ecology:</p> <ul style="list-style-type: none"> • Undertake monitoring of the benthic communities comprising grab samples in the form of a cruciform design at one of each GBS foundation type. • The location of the monitored GBS would be identified following the post-construction geophysical survey and would be the location with the greatest level of scour for each foundation type. • Analysis of sample data to determine potential changes to the benthic community structure from before and after construction. <p>Same foundations will be used to consider non-native invasive species (grab samples and video to determine species composition and presence of any marine non-native species)</p>
MMO RR (RR-020) 3.4.3	<p>The clarification regarding the prioritisation of site-specific survey data over predictive mapping is noted.</p> <p>However, the MMO notes the response provided by the Applicant states that all biotope classifications were analysed through a standardised approach using multivariate analysis. For the Export Cable Corridor, whilst this appears to be true for the two large faunal groups (see Figure 3 of this submission) which were assigned biotopes based on the dominant species present, it does</p>	<p>The Applicant has provided additional text detailing the dominant infauna found at these stations within paragraph 5.5.4.8 of the Deadline 7 submission of A5.2.1 Benthic and Intertidal Ecology Technical Report, and within paragraph 2.7.1.25 of the Deadline 7 submission of A2.2 Benthic and Intertidal Ecology.</p> <p>In recognition of the MMO's comments on the dominance of <i>S. spinulosa</i> in some samples, the Applicant can confirm that <i>S. spinulosa</i> has been added to the tables of Valued Ecological</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>not appear to be true for the three faunal groups within the same nMDS ordination comprising stations ECC_17 to ECC_21, which were all dominated by Sabellaria spinulosa. Neither this species nor other abundant species observed in grab samples at these stations were used in the biotope classification nor mentioned in the text as the dominant infaunal taxa at these stations. The fauna observed from the drop-down video were solely used to classify the biotope (A5.444 'Flustra foliacea and Hydrallmania falcata on tideswept circalittoral mixed sediment) for these stations (as mentioned in paragraph 5.5.4.8 of Volume A5, Annex 2.1). Paragraph 5.5.4.9 of ES Volume A5, Annex 2.1 also describes the characterising epifaunal species present at stations EEC_17 to ECC_23 but fails to mention the presence of <i>S. spinulosa</i> (and other abundant infaunal species) despite the dominance of this species in the infaunal samples. The EUNIS description for A5.444 states that "This biotope represents part of a transition between sand-scoured circalittoral rock where the epifauna is conspicuous enough to be considered as a biotope and a sediment biotope where an infaunal sample is required to characterise it and is possibly best considered an epibiotic overlay." <i>S. spinulosa</i> and other dominant infauna at these stations must therefore be mentioned as additional characterising species if a suitable infaunal biotope is not found. Paragraph 5.5.4.9 of ES Volume A5, Annex 2.1 also erroneously states that Flustra foliacea and Hydrallmania falcata were present in the grab samples of EEC_17 to ECC_23. Neither species are listed in the Macrofauna abundance tables in Appendix D5 of ES Volume A5, Annex 2.1. The MMO requests that this misleading erroneous text is corrected in all reports that state this.</p>	<p>Receptors (VERs) in the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report (Table 13), and A2.2 Benthic and Intertidal Ecology (Table 2.9). This additional VER has also been discussed within the ecological assessment.</p> <p>The Applicant can also confirm that the erroneous text identified in paragraph 5.5.4.9 has been corrected in the Deadline 7 submission of A5.2.1 Benthic and Intertidal Ecology Technical Report.</p>
MMO RR (RR-020) 3.4.4	<p>The MMO is not requesting that the Applicant replicates the significant detail of the technical report, we are asking that the Applicant presents a complete description of the biotopes and characterising species. This has not been undertaken for ECC17-ECC_21 as noted above.</p>	<p>Please see the Applicant response to 3.4.3 above in relation to the changes made in relation to sampling sites ECC17 to ECC_21 and the dominant fauna that those stations.</p>
MMO RR (RR-020) 3.4.5	<p>Amphiura filiformis is present in relatively high abundances (abundances in brackets) at stations ENV16 (66), ENV17(127), ENV19(177) and ENV21(81). In comparison, Mysella (Kurtiella) bidentata has a maximum abundance of five individuals at ENV16 and ENV19 and three individuals at ENV17. Only one</p>	<p>The Applicant has made the following updates within the Deadline 7 submission of A2.2 Benthic and Intertidal Ecology:</p> <ul style="list-style-type: none"> The dominance of <i>A. filiformis</i> at the stations mentioned has been highlighted in paragraph 2.7.1.23.

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>record of <i>Thyasira flexuosa</i> is recorded in the entire Array dataset (ENV21), However, both ENV17 and ENV19 have been assigned to the biotope A5.443: SS.SMx.CMx.MysThyMx - <i>Mysella bidentata</i> and <i>Thyasira</i> spp. in circalittoral muddy mixed sediment. The MMO recognises that the biotope description states that <i>A. filiformis</i> may be found at high abundances at some sites, but overall the biotope is only loosely based on the fauna present. This needs to be highlighted in the ES Chapter (A2). The dominance of <i>A. filiformis</i> at the stations mentioned above also needs to be highlighted in the ES chapter. We also note that the biotope A5.351, 'Amphiura filiformis, <i>Mysella bidentata</i> and <i>Abra nitida</i> in circalittoral sandy mud' has been considered in the ES chapter (A2) under the predictive mapping section, however according to paragraph 2.11.1.12 it was not assigned to any of the stations within the Hornsea Four Order Limits. This biotope was assessed as having medium sensitivity to disturbance. The MMO therefore recommends stating that the fauna and sediments observed at these stations are representative of both A5.351 and A5.443.</p> <p>Whilst the evidence suggests that the stations where <i>Sabellaria spinulosa</i> dominates do not represent reef habitat, the numbers of individuals per m2 are indicative of reef potential. The MMO therefore recommends mention of this dominant species observed in grabs in the ES chapter (A2) as the current biotope classification does not sufficiently cover the infaunal community.</p>	<ul style="list-style-type: none"> Additional text has been added to paragraph 2.7.1.23 to describe that these stations also have similarity to the biotope A5.351, '<i>Amphiura filiformis</i>, <i>Mysella bidentata</i> and <i>Abra nitida</i> in circalittoral sandy mud' which has already been taken through to the assessment, but this has been made clearer based on the evidence. Table 2.9 has been updated so this information is presented within the table of VERs. This detail has also been included within Table 13 of the Deadline 7 submission of A5.2.1 Benthic and Intertidal Ecology Technical Report. <p>As detailed in the Applicant response to 3.4.3 above, further detail has been provided on the presence of dominant infauna within the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report and A2.2 Benthic and Intertidal Ecology.</p> <p>In recognition of <i>S. spinulosa</i> individual dominance at sites ECC_19 and ECC_20 where 102 and 109 individuals were sampled, whilst the evidence suggests that these stations don't represent reef habitat, this species has been added to the tables of VERs in the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report (Table 13), and A2.2 Benthic and Intertidal Ecology (Table 2.9) and is discussed within the ecological assessment.</p>
MMO RR (RR-020) 3.4.6	The MMO notes that bar graphs have been provided in the ES technical report, but still believe that maps of dominant species should be included as per other offshore wind project ES's. However, if the ES text can be amended to mention the presence and assess the sensitivity of <i>S. spinulosa</i> at EEC_17-EEC_21 and <i>A. filiformis</i> at ENV 16-ENV21, that will appease the MMO concerns.	The Applicant can confirm that paragraph 5.5.4.8 of the Deadline 7 submission of A5.2.1 Benthic and Intertidal Ecology Technical Report has been amended to mention the presence and assess the sensitivity of <i>S. spinulosa</i> at EEC_17-EEC_21, with paragraph 5.5.4.6 having been amended to mention the presence and assess the sensitivity of <i>A. filiformis</i> at ENV 16, ENV17, ENV19 and ENV21. The Applicant can confirm that both of these species have been carried through into the subsequent assessment.
MMO RR (RR-020) 3.4.7	Whilst the characterising species from multivariate analysis have been noted in the ES technical report, some of the dominant species e.g. <i>S. spinulosa</i> and <i>A. filiformis</i> , are not mentioned as additional characterising species of specific stations/biotopes in the ES chapter (A2). These species should be mentioned	The Applicant can confirm that paragraph 2.7.1.25 of the Deadline 7 submission of A2.2 Benthic and Intertidal Ecology has been amended to mention the presence and assess the sensitivity of <i>S. spinulosa</i> at EEC_17-EEC_21, with paragraph 2.7.1.23 having been amended to mention the presence and assess the sensitivity of <i>A. filiformis</i> at ENV 16, ENV17, ENV19

Reference	Stakeholder's Written Representation	Applicant's Response
	as they are dominant at certain stations but are not necessarily official characterising species of the biotopes assigned.	and ENV21. The Applicant can confirm that both of these species have been carried through into the subsequent assessment.
MMO RR (RR-020) 3.4.9	The Valued Ecological Receptors (VER's) table should include reference to <i>S. spinulosa</i> and <i>A. filiformis</i> as these are dominant species but not currently satisfactorily considered.	The Applicant can confirm that the tables of VERs in the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report (Table 13) and A2.2 Benthic and Intertidal Ecology (Table 2.9) have been updated to include reference to <i>S. spinulosa</i> and <i>A. filiformis</i> .
MMO RR (RR-020) 3.4.11	<p>The MMO notes that the Applicant states that <i>A. filiformis</i> has been considered in Table 2.9 and agree with this. However, the text associated with biotope 'AfilMysAnit', states that this biotope was not observed within the Hornsea Four Order Limits. Whilst the biotope was not assigned to any of the stations from within Hornsea Four, the species was present in high numbers and therefore should be recognised as present in the Order Limits and assessed accordingly.</p> <p>We further note the Applicants response regarding <i>S. spinulosa</i> not being considered as a VER in Table 2.9 as it is not a reef. However, although we agree that the evidence suggest the absence of Annex I <i>S. spinulosa</i> reef, the presence of the species in the Order Limits is important to note in the ES Chapter (A2).</p>	<p>The Applicant can confirm that the tables of VERs in the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report (Table 13) and A2.2 Benthic and Intertidal Ecology (Table 2.9) have been updated to include reference to <i>S. spinulosa</i> and <i>A. filiformis</i>.</p> <p>The Applicant has provided additional text detailing the dominant infauna found at these stations within paragraph 5.5.4.8 of the Deadline 7 submission of A5.2.1 Benthic and Intertidal Ecology Technical Report, and within paragraph 2.7.1.25 of the Deadline 7 submission of A2.2 Benthic and Intertidal Ecology.</p> <p>In recognition of <i>S. spinulosa</i> individual dominance at ECC_19 and ECC_20 where 102 and 109 individuals were sampled, whilst the evidence suggests that these stations don't represent reef habitat, this species has been added to the tables of VERs in the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report (Table 13), and A2.2 Benthic and Intertidal Ecology (Table 2.9). and is discussed within the ecological assessment.</p>
MMO RR (RR-020) 3.4.13	The MMO notes the Applicants response. However, refers to our comments on the need to include <i>S. spinulosa</i> and <i>A. filiformis</i> as characteristic of certain stations in the ES chapter (A2) as the biotopes assigned to the stations within the Hornsea Four Order Limits do not reflect the presence of these species sufficiently.	Please see the Applicant responses to 3.4.3 – 3.4.11 above in relation to <i>S. spinulosa</i> and <i>A. filiformis</i> .
MMO RR (RR-020) 3.4.17	The MMO notes that <i>A. filiformis</i> is included in a biotope that has been assessed for impacts, although the biotope has not been assigned to any stations within the Hornsea Four Order Limits. We agree that the biotope SS.SBR.PoR.SspiMx may not completely represent the habitats observed at EEC_17 to EEC_21, however the biotope currently assigned to these stations (Flustra foliacea and Hydrallmania falcata on tideswept circalittoral mixed sediment) does not represent the infauna present. An appropriate infaunal biotope needs to be assigned to these stations that represents the	The Applicant can confirm that paragraph 5.5.4.8 of the Deadline 7 submission of A5.2.1 Benthic and Intertidal Ecology Technical Report has been amended to mention the presence and assess the sensitivity of <i>S. spinulosa</i> at EEC_17-EEC_21, with paragraph 5.5.4.6 having been amended to mention the presence and assess the sensitivity of <i>A. filiformis</i> at ENV_16, ENV17, ENV19 and ENV21. The Applicant can confirm that both of these species have been carried through into the subsequent assessment.

Reference	Stakeholder's Written Representation	Applicant's Response
	characteristic infaunal species e.g. <i>S. spinulosa</i> , and an impact assessment should be undertaken.	
MMO RR (RR-020) 3.4.18	We note the Applicants comments regarding non-native invasive species (NIS), however, Hornsea Four does represent a potential vector and stepping-stone to other offshore infrastructure and the coast. Whilst we recognise the commitment of a marine biosecurity plan to prevent introduction of NIS during construction and maintenance, this will not prevent NIS from colonising Hornsea Four turbines during the operation lifetime. As such, we advise monitoring of NIS is undertaken.	Please see the Applicant response to 2.7.2 above in relation to non-native invasive species monitoring.
MMO RR (RR-020) 3.4.19	The MMO notes the Applicants response in confirming that it is anticipated that the gravel laid during seabed preparations will be retained and is not proposed to be removed. We recognise that the permanent nature of this infrastructure has been acknowledged in paragraph 2.11.2.5 of the ES chapter (A2), however paragraph 2.11.2.11 of the ES chapter (A2) still states that '...the introduction of the Hornsea Four infrastructure and will be long term, lasting for the duration of the development.' We request that the Applicant changes 'long term' to 'permanent' based on the information provided in the response to comments and ensure that this is consistent throughout the chapters.	The Applicant can confirm that the requested change has been made to paragraph 2.11.2.11 in the Deadline 7 submission of A2.2 Benthic and Intertidal Ecology .
MMO RR (RR-020) 3.4.22	The MMO agrees with the Applicants response regarding the replication of significant detail across both the ES chapter and ES technical report as not being proportionate or appropriate. However, there is some information, as alluded outlined in our Deadline 6 comments, that has not been brought across from the ES technical report. This information (mentioned above) should be provided in the ES chapter (A2) for consistency and transparency.	Please see the Applicant responses to 3.4.3 – 3.4.11 above in relation to information that has been added to the Deadline 7 submissions of A5.2.1 Benthic and Intertidal Ecology Technical Report and A2.2 Benthic and Intertidal Ecology .
MMO RR (RR-020) 3.4.29	The MMO notes the Applicants response that the presence of this species is noted in the Benthic Technical Report (A5), however this information has not been translated to the ES Benthic Chapter (A2). Whilst the evidence provided (grab, DDV and acoustic) does not point towards the presence of reef, the presence of this species in high abundances should be mentioned in the main ES Benthic chapter (A2). We appreciate the inclusion of a pre-construction	Please see the Applicant response to 3.4.3 above in relation to the changes made in relation to ECC17-ECC_21 and the dominant fauna that those stations. Please see the Applicant response to 3.4.11 above in relation to the changes made in relation to the high abundances of <i>S. spinulosa</i> at certain stations.

Reference	Stakeholder's Written Representation	Applicant's Response
	survey to identify any biogenic features for micrositing and recommend EEC_17 to EEC_21 to be included in this survey.	

3 Applicant's comments to Natural England – Risk and Issues Log (REP6-057)

Reference	Stakeholder's Written Representation	Applicant's Response
<i>Compensation</i>		
M12	We note that the preferred offshore structure to repurpose as an ANS has been identified (Wenlock platform). The structure is within the North Norfolk Sandbanks and Saturn Reef SAC, which is designated for features that are currently in unfavourable condition and have restore conservation objectives. We would welcome further assessment by the Applicant on the implications of the proposals for the site.	The Applicant is aware of the location of the Wenlock platform within the North Norfolk Sandbanks and Saturn Reef SAC, and can confirm that the Wenlock Platform does not overlap with Annex 1 habitat (Reefs or Sandbanks) according to JNCC (Sandbanks: 2019 and Reefs: 2021) data. Furthermore, given as the proposal here is for the repurposing of an existing platform and not the construction of a new structure, it is not envisaged that any additional infrastructure will be placed on the seabed as a result of the repurposing of the Wenlock platform (please see Revision 2 of A4.6.1 Compensation Project Description (submitted at Deadline 7) and the EIA and HRA of the compensation measures A4.6.5 Compensation Environmental Impacts Assessment (EIA) Annex Part 1-6 and Revision 3 of B2.2.2 Habitats Regulations Assessment Compensation Measures Part 1 & Part 2 (submitted at Deadline 7)) and the Applicant does not envisage that any material technical changes will be required to the form or function of the existing foundations.
M14	Natural England's position on the provision of further onshore artificial nesting as a compensatory measure remains unchanged. We have no further comment to make.	The Applicant remains confident that onshore artificial nesting is a viable compensatory measure. A detailed evidence report (B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)) was submitted with the DCO Application which presents the evidence to support the scale and efficacy of the Compensation Measure. Further details of the measure to demonstrate its deliverability have been provided in Revision 3 of B2.7 FFC SPA: Kittiwake Compensation Plan (submitted at Deadline 7), in updates provided in Revision 5 of B2.7.4 Compensation measures for FFC SPA: Kittiwake Onshore Artificial Nesting Roadmap (submitted at Deadline 7) and in G6.3 Kittiwake Onshore Artificial nesting Structure Site Selection and Evidence on Nesting Limitations update (REP6-031) during the Examination.
M18	Natural England remain concerned by the proposed timeline for implementation of compensatory measures in relation to the windfarm becoming operational. Predator eradication is to be initiated 2 years prior to	Bycatch is a direct reduction in mortality with compensation therefore delivered instantaneously. As part of the Applicant's Bycatch Implementation Study, the Applicant has currently managed to secure 22 fishers for the Bycatch Implementation Study (with a high

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>operation, and bycatch reduction just 1 year prior. As previously noted, the predator eradication measure must account for the lag in delivering adult birds into the breeding population. The high level of difficulty in eradicating mammalian predators should also be considered, it is highly uncertain that eradication will be achieved within the proposed timeframe.</p> <p>If the intention is to account for this by increasing the provision of bycatch reduction until the predator eradication is proven to be successful (in terms of additional auk productivity) it should be confirmed that the bycatch reduction measure can be successfully scaled accordingly.</p>	<p>likelihood these fishers would be included in the delivery of the compensation measure (if required)). Based on results presented within G5.13 Bycatch Reduction Technology Selection Phase Summary (REP5-068), this number of vessels would deliver significantly more guillemot than the 1:1 ratio targeted by the measure and can therefore be used, if deemed necessary by the Applicant, to accommodate an initial lag in lead in time in predator eradication.</p> <p>The Applicant is focussing on delivering optimal rat free habitat to increase productivity of guillemot and razorbill. Based on the feasibility assessment and the evidence of previous eradication examples, the Applicant is confident that the delivery of suitable nesting habitat following the eradication will be implemented prior to operation.</p> <p>The Applicant has stayed abreast of recent DCO decisions for other projects requiring compensation and is therefore aware of the acceptability of using a 'balance sheet' to determine mortality debt and payback during the 35 years of the Project's lifetime. Due to the relatively small compensation population required by the suite of measures, and the high confidence in delivery, the Applicant is confident that implementation timelines would not hinder the success of the measure. The Applicant has made representations (see updated Compensation Plans and Roadmaps submitted at Deadline 7) as to the necessity for a time-lag between implementation of a measure and operation of the wind farm. It is open to the Secretary of State, consistent with a change in policy as set out in the British Energy Security Strategy to remove these timescales and the Applicant would continue to urge the Secretary of State to do so.</p>
M20	<p>NE welcomes that the implementation of both predator eradication and bycatch reduction is secured in the draft DCO. However, a new condition has been added to the draft DCO indicating that a change from delivering project-level to strategic consultation could be made 'at the sole discretion of the undertaker'. Again, we would expect this to be a decision requiring the agreement of the established steering group and approval by SoS. See also point I31.</p>	<p>The Applicant has amended the draft DCO (C1.1 Draft Development Consent Order (submitted at Deadline 7)) and the without prejudice DCO wording (B2.8.2 Compensation measures for FFC SPA: Guillemot and Razorbill Bycatch Reduction: Roadmap and B2.8.4 Compensation measures for FFC SPA: Predator Eradication: Roadmap (submitted at Deadline 7)) to include approval by the Secretary of State in consultation with the H4 OoEG in the event the Applicant elects to pay a contribution in lieu of a compensation measure or measures and or in lieu of an adaptive management measure. The wording "at the sole discretion of the undertaker" has been deleted.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
M23	<p>We note the emerging evidence for auks breeding on offshore structures (B2.7.2, Figure 2). Given the uncertainties relating to both measures within the proposed auk compensation package it may be worthwhile considering the provision of specifically designed habitat for auks on an offshore ANS, alongside kittiwake. These species tend to breed in mixed colonies at natural sites. It seems likely that it is the kittiwakes ability to build a nest structure that has enabled their colonisation of a range of structures. Auks do not build nests, and are therefore more restricted in their site selection for egg laying. However, if structures were designed with the requirements of auks in mind (ledge slope, depth, orientation, provision of 'crevices' for razorbill etc.) it is possible that a mixed seabird colony could be established at the ANS.</p>	<p>Whilst the Applicant is confident the suite of compensation measures proposed for auks is sufficient, NE's comments regarding additional space for auks on kittiwake nesting structures is noted and will be considered. The Applicant will make best endeavours to create a mixed seabird colony at the ANS.</p> <p>It should also be noted that the Applicant is actively supporting strategic compensation workstreams which will look to provide artificial nesting structures for guillemot and razorbill based on the evidence collected by the Applicant and recognised by Natural England.</p>
M26	<p>Natural England welcome the updates on further work that has been undertaken by the Applicant to refine site selection and evidence the suitability of those sites for predator eradication. We note that work is ongoing, and should deliver a final report in autumn to "aid the final decision of location" for the predator eradication measure. We remain concerned that a fully justified location may not be identified within the examination period.</p> <p>We note that there are now three documents relating to the implementation of predator eradication at the Bailiwick of Guernsey. Effective review of the measure across a number of technical documents is becoming increasingly difficult. It is suggested that the information presented could be refined into a single document allowing a clearer understanding of the relative merits of the locations proposed and an outline strategy setting out where eradication/control is being proposed.</p>	<p>The Applicant has presented within G5.4 Predator Eradication Implementation Study Update (REP5-082) a detailed account of the feasibility study undertaken by eradication experts. The document provided a robust account of reasons why the shortlisted locations (i.e., those islands within the Bailiwick of Guernsey) are suitable for a predator eradication project to benefit guillemot and razorbill. During ISH 12, the Applicant noted that their preference would be to focus on the Herm Island complex, with locations in Alderney providing an adaptive management option. The final components of information will allow fine tuning of details such as biosecurity measures, resistance to rodenticide and final breeding seabird numbers. It is the Applicant's view that these final, less substantive although equally important details, do not limit the decision on whether compensation can be implemented at the shortlisted locations. Rather they will aid the Offshore Ornithology Engagement Group discussions on exact execution. Through lessons learnt during the Hornsea Project Three compensation process, the OOEG approach has been an invaluable process where finer details of compensation implementation can be discussed and guided by stakeholders to provide a robust and long-term measure.</p>
M31	<p>Natural England acknowledge the significant amount of work undertaken by the Applicant to date to identify potential sites to implement predator eradication. Table 6 in document G5.13 appears to summarise much of this work. It is suggested that this table should clarify how many of the potential (currently unutilised) nest sites identified on islands with rats present would be accessible to those rats. Guillemot tend to breed on inaccessible ledges and</p>	<p>The Applicant welcomes the acknowledgement from Natural England. G5.13 refers to a bycatch related document. It is therefore assumed that this comment refers to Table 6 the Applicant's G1.33 Predator eradication island suitability assessment: Bailiwick of Guernsey (REP5-057).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>thus are generally less susceptible to mammalian predators. Although the Applicant has demonstrated that guillemots are present in areas that rats can access, it will be important to consider the degree of overlap between potential guillemot and rat habitat. Crucially, if un-utilised guillemot habitat is identified at candidate sites that is not accessible to mammalian predators it is logical to assume that some other factor is the cause of non-occupancy. We note that sites for predator eradication have not be finalised at this point, so we can not advise further.</p>	<p>Due to the majority of the habitat within the shortlisted sites (and indeed, generally across the region) across the Bailiwick of Guernsey being low lying and/ or accessible, most potential, current or historic nesting locations are susceptible to mammalian predators. Table 6 of the aforementioned document shows that only one location included within the report is likely to offer habitat which is rat free. This coincides with the location being one of the few sites supporting guillemot in high numbers despite other areas of suitable habitat and increasing guillemot populations. Within the Applicant's recent submission, including REP5-082, they have evidenced (using camera traps and other methods) a high degree of overlap between the potential guillemot (some of which historically supported guillemot) and rat habitat. No un-utilised guillemot habitat which was deemed to be not accessible to mammalian predators was identified by the Applicant across the shortlisted locations.</p> <p>All locations included within G5.4 Predator Eradication Implementation Study Update (REP5-082) are demonstrated as being suitable and feasible for rat eradication to support guillemot and razorbill. During ISH 12, the Applicant noted that their preference would be to focus on the Herm Island complex, with locations in Alderney providing an adaptive management option.</p>
M34	<p>Natural England have reviewed REP5a-019.</p> <p>Natural England continue to advise that predator eradication, rather than control, will be required. It is accepted that, following eradication, ongoing control may be required (as part of ongoing biosecurity measures) in those locations where natural re-incursion of rats by swimming is possible. The case study examples given show positive responses of seabirds to control. However, it must be acknowledged that in some instances these control measures refer to a wide range of predators. Further, the control measures described tend to be highly intensive, requiring ongoing monthly servicing of bait stations and traps. In all case studies, improvements in productivity of extant seabird populations are noted, although some studies highlight that control is inherently inferior to eradication. Crucially, it is not clear that controlling rats at currently unutilised habitat will be sufficient to enable breeding auks to colonise that habitat. In the absence of any evidence, it</p>	<p>The Applicant acknowledges the comments from Natural England.</p> <p>Control is being proposed at locations if initial, and subsequent (i.e., if re-invasion were to occur) eradication were to prove unsuccessful. Control is therefore seen as a back-up measure should the initial eradication attempts fail. The Applicant is committed to providing a long-term and sustainable compensation measure and has therefore employed and sought advice from world eradication experts on what is required to deliver a predator eradication project for the lifetime of the Project.</p> <p>It is welcoming to see Natural England acknowledge that predator control could benefit existing breeding populations of auks, if it is proven that there is nesting habitat overlap and predation pressure from rats. The Applicant has been able to demonstrate this with visual evidence (and other methods) at numerous locations within G5.4 Predator Eradication Implementation Study Update (REP5-082).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>should be assumed that only predator eradication would be sufficient in this case. Nevertheless, we do acknowledge that predator control could benefit existing breeding populations of auks, if it is proven that there is nesting habitat overlap and predation pressure from rats. Ultimately, it appears inevitable that some ongoing predator control effort may be required as part of the compensatory measure. Natural England continue to advise that full eradication is likely to be required to facilitate any new or recolonisation of suitable habitat that is currently unutilised by breeding auks due to the presence of rats.</p>	
M36	<p>No change.</p> <p>Natural England retains previously raised concerns regarding our ability to properly review the results of the bycatch reduction technology trial. A proportional reduction in bycatch is reported from vessels where the technology was deployed compared to those where it was not. We do not consider this sufficient to form a view on the likely effectiveness or scalability of the measure.</p>	<p>As previously stated in G1.9 Applicant's comments on Relevant Representations (REP1-038), due to contractual restrictions, the results of the bycatch reduction technology selection phase can only be disclosed as percentage reductions in bycatch, i.e. not specific numbers of birds, without consent from the participating fishers. It is vital that the Applicant maintains their excellent relationship with fishers to ensure the long-term implementation of the measure. However, as part of the Applicant's Bycatch Implementation Study which will be undertaken during the non-breeding season of 2022/2023, the Applicant has managed to secure a data sharing agreement with six participating fishers. This information will be shared with stakeholders to provide further insight into seabird bycatch and support the Bycatch Reduction Technology Selection Phase results presented within G5.13 Bycatch Reduction Technology Selection Phase Summary (REP5-068).</p> <p>The Applicant would like to reinforce the fact that significant consultation was undertaken with Natural England, and fisheries and bycatch experts (including Yann Rouxel from BirdLife International) during the planning stages of the Bycatch Reduction Technology Selection Phase. The Applicant took advice onboard and used it to inform the design of the trial to enable robust results to be collected. It should also be noted that the Bycatch Reduction Technology Selection Phase built upon the positive results of the Looming Eyes Buoy (acknowledging the difference in species and impact) shown by the Rouxel et al., 2021. It should not therefore be seen as a standalone trial of this technology. The Applicant has gone above and beyond what other projects have done at this stage of development notwithstanding that the case remains on a without prejudice basis.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
M37	<p>No change.</p> <p>Bycatch rates are not reported in document G5.13 due to confidentiality agreements with fishers. Understanding how bycatch varies across vessels is essential when considering uncertainty in delivery and scalability of the measure. It is possible that the study could identify predictive variables within the fishery that could be used to target vessels most likely to experience seabird bycatch. We note that application of reduction technology would be most effective if implemented on these vessels.</p>	<p>As previously stated in G1.9 Applicant's comments on Relevant Representations (REP1-038), due to contractual restrictions, the results of the Bycatch Reduction Technology Selection Phase can only be disclosed as percentage reductions in bycatch, i.e. not specific numbers of birds, without consent from the participating fishers.</p> <p>As part of the Applicant's Bycatch Implementation Study, which will be undertaken during the non-breeding season of 2022/2023, the Applicant has managed to secure a data sharing agreement with six participating fishers. This information will be shared with stakeholders to provide further insight into seabird bycatch and inform variations in bycatch rates across locations, months, and vessels. Furthermore, it will support the Bycatch Reduction Technology Selection Phase results presented within REP5-068 (G5.13 Bycatch Reduction Technology Selection Phase Summary).</p> <p>With regard to scalability; the Applicant has managed to secure 22 fishers for the Bycatch Implementation Study (with a high likelihood these fishers would be included in the delivery of the compensation measure (if required).</p>
M39	<p>No change.</p> <p>It is assumed that bycatch reduction calculations now take account of actual bycatch rates. However, this data has been gathered from a limited number of vessels over a single non-breeding season and does not account for inter-annual variation. Further, these rates are not reported by the Applicant due to confidentiality agreements with fishers engaged on the trial. The results of the Applicant's investigations into the significance of the observed reduction in bycatch by the application of LEBs have not been reported on. Therefore, Natural England cannot currently adopt an informed position on the likely success of the bycatch reduction technology.</p>	<p>Please see the above responses on this matter.</p>
M44	<p>We note that the Applicant now reports that a 25% reduction in bycatch of guillemots has been achieved by the application of the LEB in the target fishery. This is encouraging, but Natural England retain serious concerns relating to the reporting of the proportional reduction only, with no</p>	<p>Please see the above responses on this matter.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>supporting raw data, and the fact that this trial represents a single non-breeding season and does not account for inter-annual variation. Further, document G5.13 details a statistical analysis of the data in the methods, but no results or discussion of that analysis are presented. It remains unclear if the reduction in bycatch observed can be considered significant.</p>	
M57	<p>The recently published British Energy Security Strategy (BESS) commits to speeding up the deployment of offshore wind and Natural England welcome the measures proposed in the Offshore Wind Environmental Improvement Package policy paper, including strategic compensatory measures and a centralised Marine Recovery Fund (MRF) to help facilitate delivery of those measures. We acknowledge the new information and suggested commitments made by the Applicant in relation to this, however we consider it unlikely that this system will be in place in time for contributions to the MRF to be considered as an appropriately secured measure for Hornsea 4 at the point of the consent decision. In this context, anticipated use of the MRF might be best presented solely as an adaptive management measure at this time. See also I36.</p>	<p>The Applicant is confident that the Marine Recovery Fund (MRF) or an equivalent fund will be in place in time for a payment to be made, if elected by the Applicant and if approved by the Secretary of State in consultation with the HF OoEG.</p> <p>This option was included in recognition of the strong commitment to strategic compensation, including for those projects already in the system, in the British Energy Security Strategy (BESS). As an unequivocal commitment in published Government policy, weight can be attached. This drafting has been included as an "option", to provide flexibility as to the means and form of compensation that can be delivered post-consent. There is no down-side to including this optionality. The Applicant's package of project-specific compensation measures has not been withdrawn and will remain secured should a contribution to the MRF not be made, or if the MRF is not in place in sufficient time. The proposed DCO drafting (updated at Deadline 7) secures delivery of project-specific compensation measures, with a contribution to the MRF in lieu of project-specific compensation measures only available to the undertaker if approved by the Secretary of State.</p>
C45	<p>Natural England have reviewed the calculation methods presented in REP1-063. Natural England consider the basic methodologies presented to be sound and fit for purpose. However, we highlight the importance of reaching agreement on the data that will ultimately inform these calculations. Notably, Natural England have significant concerns regarding the quantification of a baseline level of bycatch (see our response to point C29 above).</p>	<p>The detail of the compensation measures calculations is presented in G1.41 Calculation Methods of Hornsea Fours Proposed Compensation Measures for Features of the Flamborough and Filey Coast (FFC) Special Protection Area (SPA) (REP1-063). The Applicant welcomes Natural England's conclusion that the methodologies are sound and fit for purpose. The Applicant has provided robust evidence and implementation studies to demonstrate the deliverability and viability of the measures (presented in the Evidence Reports, Roadmaps, Compensation Plans and Implementation Study Updates). To provide further detail for the ExA and the Secretary of State the compensation levels required for the different impact assessment positions are presented in Appendix B Predicted Compensation Values. The Applicant is confident in the Applicant's position presented in B2.6: Compensation Measures for FFC SPA Overview (submitted at Deadline 7), Revision 3</p>

Reference	Stakeholder's Written Representation	Applicant's Response
		of B2.7 FFC SPA: Kittiwake Compensation Plan (submitted at Deadline 7) and B2.8 FFC SPA: Guillemot and Razorbill Compensation Plan (submitted at Deadline 7).

4 Applicant's comments to Natural England – Action Log (REP6-058)

Reference	Stakeholder's Written Representation	Applicant's Response
<i>Marine Mammals</i>		
MM1	<p>We welcome the Applicant's commitment to mitigating cumulative PTS impact ranges that have been calculated using the latest research and methods available at the time of the final MMMP.</p> <p>However, it is imperative that this position is included in the Outline MMMP, as this document should outline the principles upon which mitigation is based, not solely the options for mitigation measures.</p>	<p>The Applicant can confirm that F2.5 Outline Marine Mammal Mitigation Protocol (REP6-011) has been updated at Deadline 6 to include the following text confirming that the final MMMP will include mitigation of cumulative PTS impact ranges. As such, the Applicant considers that this action can be closed.</p> <p><i>"It is acknowledged, by both the Applicant and Natural England, that there are limitations to the assumptions used in the modelling of SELcum PTS and that there is active research into the area of cumulative PTS. As such, better methods for estimating cumulative PTS distances are expected to become available in the near future. The Applicant agrees that new methods should be considered when finalising the mitigation measures in the final MMMP post-consent. Therefore, the final MMMP will include mitigation of cumulative PTS impact ranges that will be modelled based on the latest research and methods available at the time of the final MMMP post-consent."</i></p> <p>The revised Outline MMMP submitted at Deadline 6 outlines the principles of the mitigation in that the largest predicted PTS-onset impact range (based on both instantaneous and cumulative PTS) will be mitigated.</p>
MM2	We request that the OMMP is updated with the suggested monitoring objectives.	The Applicant maintains that operational WTG noise and bottlenose dolphin monitoring is not required. Please see G1.9 Applicant's comments on Relevant Representations (REP1-038) , points RR-029-APDX:D-U, RR-029-APDX:D-V, and RR-029-APDX:D-W for justification as to why this monitoring is not considered necessary.
MM3	Natural England request that the Applicant provide information on the likely geophysical equipment, and commit to mitigation and/or the inclusion of text in relation to the mitigation process for geophysical surveys.	The Applicant highlights that the pre-construction geophysical equipment is unknown at this stage. Once this information is known (post-consent), an European Protected Species (EPS) risk assessment will be drafted which will identify any requirement for mitigation measures. The Applicant also highlights that geophysical surveys are not licensed under the DCO and

Reference	Stakeholder's Written Representation	Applicant's Response
		as such, the information requested is not required for the MMMP associated with the DCO Application.
MM4	<p>Secure submission of the SIP 6-9 months prior to construction in the DCO.</p> <p>See also MM5.</p>	<p>The Applicant can confirm that the Deadline 7 submission of F2.11: Outline Southern North Sea Special Area of Conservation Site Integrity Plan has been updated to include additional text setting out the timescales for consultation on the Site Integrity Plan with the MMO and the Statutory Nature Conservation Body (SNCB). The Applicant will submit a first draft of the Site Integrity Plan 12 months prior to construction which will include an updated assessment based on final project design and an updated ground model. Consultation will take place with the MMO and SNCB on that first draft, with a final draft submitted four months prior to construction, providing final confirmation of mitigation (if required). The Applicant does not consider it necessary to make any updates to the timescales set out in the DCO, noting that F2.11: Outline Southern North Sea Special Area of Conservation Site Integrity Plan is a certified document as detailed in Schedule 15 of the DCO. In light of these updates, the Applicant considers this action closed.</p>
MM5	<p>Natural England's position is that a commitment should be made to deliver mitigation, with the option to demonstrate that it is not needed post-consent. We acknowledge Hornsea 4's position of not committing to specific mitigation measures due to potential advances in technology, and welcome that the need for mitigation has been budgeted for (pers comm). We would therefore welcome the inclusion of text outlining the process for mitigation identification, to demonstrate that the requirement for mitigation has been factored into the Project's plans.</p>	<p>The Applicant can confirm that the Deadline 7 submission of F2.11: Outline Southern North Sea Special Area of Conservation Site Integrity Plan has been updated to add text outlining the process for mitigation identification to demonstrate that the requirement for mitigation has been factored into the Hornsea Four planning. As such, the Applicant considers this action closed.</p>
MM6	<p>Natural England recommend that Hornsea 4 commits to using PAM as well as MMObs and ADD for pre-piling searches.</p> <p>The exact timings of the ADD duration could be finalised post-consent. However, the principles which determine ADD duration should be discussed and agreed at this stage (i.e. whether ADD duration corresponds to the instantaneous PTS zone or the cumulative PTS zone).</p>	<p>The Applicant can confirm that F2.5 Outline Marine Mammal Mitigation Protocol (REP6-011) has been updated at Deadline 6 to include the use of PAM as part of the suite of mitigation measures.</p> <p>Please see Applicant response to MM1 above in relation to the principles upon which the mitigation is based.</p>
MM7	<p>Provide an updated figure to include:</p> <ul style="list-style-type: none"> -the contribution of Hornsea 4 to winter area min/max figures 	<p>The Applicant can confirm that Figure 23 was amended as requested and included in the updated B2.2: Report to Inform Appropriate Assessment (RIAA) which was submitted at Deadline 5 (REP5-012).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>- the contribution of Dogger Bank C to in-combination disturbance in the summer max scenario</p>	<p>For clarity, the Applicant has copied the version of Figure 23 included in the RIAA as part of the DCO Application (APP-167) (Appendix A, Error! Reference source not found.), followed by the updated version of Figure 23 submitted at Deadline 5 (REP5-012) Appendix A, (Error! Reference source not found.). The changes can be summarised as the inclusion of a buffer around a piling location at Dogger Bank C in the Summer Max frame (which does not overlap with the Southern North Sea Special Area of Conservation (SNS SAC), and the inclusion of a buffer around a piling location within the HVAC booster station works area for Hornsea Four in the Winter Max and Winter Min frames. The Applicant considers that these changes address the comments raised by Natural England and as such, the Applicant considers this action closed.</p>
<p><i>Marine Processes</i></p>		
<p>MP1</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 would like to see monitoring secured within the Outline Marine Monitoring Plan which will validate the assumptions made in the ES and other assessments.</p>	<p>The Applicant considers that engineering and design studies, as detailed in Table 2 of F2.7: Outline Marine Monitoring Plan (APP-242) will provide information on the recovery of the seabed and associated habitats in the vicinity of areas where Controlled Flow Excavator techniques have been used. The Applicant does not consider any additional monitoring, over and above that outlined in Table 2 of F2.7: Outline Marine Monitoring Plan (APP-242) to be necessary.</p>
<p>MP2</p>	<p>The current version of the outlined Cable specification and installation plan does not mention HDD exit pits. Natural England would need to see this document updated to include our advice on restoring the seabed profile following excavation of exit pits before the issue can be resolved.</p>	<p>The Applicant can confirm that following discussions with Natural England on this point, additional text has been added to the Deadline 7 submission of F2.15 Outline Cable Specification and Installation Plan to provide clarity on the priority for sediment retention and for this sediment to be used to backfill the HDD exit pits in the first instance. As such, the Applicant considers this action closed.</p>
<p>MP3</p>	<p>This point has been addressed by the Applicant, however we would wish to see this clarity secured within the DCO in order to avoid future confusion.</p>	<p>The Applicant does not consider it necessary to amend the DCO, noting that the additional information was added to the Deadline 6 submission of A1.4 Project Description (REP6-002) which is a certified document as detailed in Schedule 15 of the DCO and forms part of the ES (which informs the scope of the authorised development). In light of this update, the Applicant considers this action closed.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
MP4	<p>Natural England request the applicant confirms the number/location height of mounds post construction and that should any mounds stand at a height greater than 3m (i.e. the maximum height of the scour protection in the Array Area), we would expect further monitoring to determine if the material is winnowing away as expected, with the option for intervention to remove some of the material if it persists. If this can be appropriately secured within the DCO/DML or relevant certified document, Natural England would consider this issue resolved (subject to the clarification highlighted above).</p>	<p>The Applicant can confirm that in response to the concerns raised by Natural England, the Applicant has made the following updates:</p> <ul style="list-style-type: none"> • Text added to the Deadline 7 submission of A1.4 Project Description (after paragraph 4.8.4.34) which states that should drilling be utilised to install piled foundations, the Applicant will make best endeavours to ensure that no mounds persists above 3 m from the surrounding seabed. • Provision added to the Deadline submission of F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 for an appropriate monitoring campaign to be developed with the MMO and its statutory advisors in the event that any drill mounds persist above 3 m from the surrounding seabed. <p>In light of these updates, the Applicant considers this action closed.</p>
MP5	<p>Throughout the Examination we advised that the Applicant / examiner gives full consideration to the management of the export cables and other infrastructure both through the lifetime of the project, and beyond, with particular consideration of the nearshore Zone. The impacts of infrastructure left in situ beyond the lifetime of the project needs to be assessed in terms of impacts on marine processes. Similarly, the benefits and impacts of infrastructure removal at decommissioning needs to be evaluated in terms of marine processes.</p> <p>As this is unlikely to be addressed within the remaining examination period, we advise that this assessment is undertaken prior to the submission of the draft decommissioning plan and that this requirement is secured within the DCO.</p>	<p>As set out in the Applicant response to RR-029-APDX:E-EJ within G1.9 Applicant's comments on Relevant Representations (REP1-038), it is the Applicant's position that the potential impacts associated with infrastructure remaining in situ during the decommissioning phase of the project has been robustly assessed in the EIA.</p> <p>The Applicant does not believe it is necessary to include the need for such assessment prior to the submission of the draft decommissioning programme since the requirement to prepare a decommissioning programme for the offshore works is subject to a separate regulatory regime operated by the Secretary of State under the Energy Act 2004, outside of the development consent order process under the Planning Act 2008. Requirements should only be imposed where necessary, and any such requirement would encroach on another statutory regime.</p> <p>However, the Applicant would highlight that as set out in the Department for Business, Energy and Industrial Strategy guidance (Decommissioning Of Offshore Renewable Energy Installations Under The Energy Act 2004: Guidance notes for industry (England and Wales) (2019)), the decommissioning programme should be informed by an Environmental Impact Assessment and should set out the extent of infrastructure to be removed, methods and processes. The guidance also states that decommissioning programmes should include a base case of all infrastructure being removed, alongside any alternatives that the operator proposes, backed up by evidence and reasoning for the preferred option.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
MP7	<p>The Marine Processes Supplementary report REP4-043 confirms that bedform clearance for sandwaves will not occur across Smithic Bank (2.4.1.2) and that excavated sediment will either be side cast or dispersed using a controlled flow excavator, therefore sediment should be retained within the sandbank system. This is yet to be secured within the DCO.</p> <p>These points to be secured within the DCO. See also monitoring requirements highlighted in MP11 below</p>	<p>The Applicant does not consider it necessary to secure this commitment in the DCO, noting that the additional information was added to the Deadline 6 submission of A1.4 Project Description (REP6-002) which is a certified document as detailed in Schedule 15 of the DCO and forms part of the ES (which informs the scope of the authorised development). In light of this update, the Applicant considers this action closed.</p> <p>Please see the Applicant responses to MP11 in relation to monitoring requirements.</p>
MP8	<p>Moderate elevation changes to the sandbank and significant changes to sandbank morphology through cable installation activities, associated cable protection, and remedial works by Hornsea Four alone, or in-combination with other developments, could alter the nearshore hydrodynamic regime, sediment transport (including longshore flux), shoreline response to storms, and alter shoreline morphology over the long-term.</p> <p>Natural England offered suggestions for the mitigation of these impacts within AS-048 and our joint memo with MMO/Cefas for our advice on proposed mitigation and monitoring for Smithic Bank. We would welcome further discussions with the Applicant as part of the SoCG process to determine if suitable measures to reduce these impacts can be identified.</p>	<p>The Applicant has made a number of commitments in relation to mitigation and monitoring of impacts to Smithic Bank within G5.33 Clarification Note on Marine Processes Mitigation and Monitoring (REP5a-017), which are over and above the negligible effects assessed.</p> <p>Furthermore, the Applicant can confirm that F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 to include provision for the monitoring of relevance to Smithic Bank. This includes a pre-construction high-resolution multi-beam bathymetry survey followed by six monthly surveys for the first three years (asset crossing), with the requirement for further surveys reviewed thereafter. The pre-construction survey will be reviewed to validate the baseline Smithic Bank and dogger bank cable crossing) and the post-construction surveys will be reviewed against the pre-construction survey to determine any change with reviews reported annually to MMO. The Applicant would like to highlight that any notable changes will need to consider natural variability (such as seabed response to metocean events) and potential influences due to installed structures.</p> <p>The Applicant will continue to engage with Natural England though would take this opportunity to reassure the Examining Authority that suitable measures to reduce the impacts (mitigations) have been identified and committed to (see G5.33 Clarification Note on Marine Processes Mitigation and Monitoring (REP5a-017) and F2.7: Outline Marine Monitoring Plan).</p>
MP9	<p>We seek a commitment to have no cable protection inshore of the 20m depth contour in order to avoid impacts to sediment transport, and we would wish to see this secured in the dML/DCO in order to fully rule out the potential for significant impacts/adverse effects.</p>	<p>The Applicant has already committed via F2.15 Outline Cable Specification and Installation Plan (see Co188 in A4.5.2: Commitment Register (REP6-008)) to exclude cable protection within 350 m seaward of MLWS to protect nearshore sediment transport processes and avoid effects upon the Holderness coastline. This commitment aligns with the Dogger Bank A & B project.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>Should the ExA/SoS take an alternative view and consider that a 5% requirement can remain, it remains the case that a more detailed assessment would be required to understand the potential impacts of rock placement on Smithic Bank, both alone and cumulatively/in combination. As the detail of the likely scale and location of the rock placement will not be understood until post consent survey work has been undertaken to inform a cable burial risk assessment, we would advise that the DCO/dML should require that a plan is produced prior to construction that quantifies a more precise requirement (i.e. location and extent) within and around Smithic Bank and then revisits the findings of the Environmental Statement and subsequent updates. This plan would then need to be subject to Assessment/HRA prior to discharge by the MMO. If electing to pursue this option, the ExA/SoS may wish to seek assurance from the Applicant that suitable alternatives/mitigation/remediation would be available should significant impacts be determined at this stage.</p> <p>See also monitoring requirements highlighted in MP11 below</p>	<p>The Applicant has made a further commitment to reduce the cable protection requirement from the standard 10% to 5% specifically across Smithic Bank and this is secured in the DCO (Condition 3 of Schedule 12 of C.1.1 Draft Development Consent Order (REP5a-003)). Further reduction in cable protection requires the conclusion of the Cable Burial Risk Assessment (CBRA) before the Applicant can conclude no cable protection across Smithic Bank is feasible. The CBRA is not complete until appointment of the Principal Contractor however, which is some time in the future (anticipated to be 2027 at the earliest). While the Applicant acknowledges the request for no cable protection inshore of the 20m depth contour, such as the requirement to exclude cable protection on Smithic Bank, to the Applicant's knowledge, such rigors have not been placed upon other developers who have also crossed (Dogger Bank A and B) or will cross the Smithic Bank to attain landfall on an otherwise highly physically constrained coastline.</p>
MP10	<p>Natural England notes the response to our deadline 5 advice. Based on the proposed cable crossing location and the MDS for the rock berm height (3m) we would be unable to rule out the potential for significant impacts to Smithic Bank. However, should the berm height be set at 1.8m we would have confidence that the risk of impact was reduced to a more acceptable level. This should be secured in the DCO/DmL. We note that the 3m option for the MDS is to allow for protection from anchor strike. Given the location of the cable crossing we would question if this level of precaution is necessary and whether a 1.8m berm would offer sufficient protection.</p> <p>We also advise that appropriate monitoring of the order limits between the Holderness Coast and 1km seawards of the Cable Crossing is secured in the DCO/dML, and that additional mitigation/remediation can be triggered through an appropriate mechanism if the impacts are greater than anticipated.</p>	<p>The Applicant would welcome sight of the assessment and risk management information that gives Natural England confidence that a reduction of berm height to 1.8m is acceptable in environmental terms to remove any concern on this matter.</p> <p>In relation to the request to move the Dogger Bank A & B cable crossing further seaward of Smithic Bank, the Applicant has already committed via F2.15 Outline Cable Specification and Installation Plan (see Co188 in A4.5.2: Commitment Register (REP6-008)) to ensuring the crossing is positioned as far east as is currently possible, past the 20 m depth contour east of Smithic Bank. A final decision on the implementation of further mitigation is dependent upon receipt of the final location of the Dogger Bank A & B cables, confirmation of the Hornsea Four decision on HVAC (6 cables) or HVDC (2 cable) electrical system and the appointment of a principal contractor. The principal contractor is responsible for the production of a Cable Burial Risk Assessment (CBRA) before the Applicant is able to confirm cable crossing requirements or precise locations. The CBRA is not complete until appointment of the principal contractor, which is some time in the future (anticipated to be</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>We would also like to see options to move the crossing further seaward explored as part of the layout plan, to ensure that the mitigation heirarchy (avoid/reduce/mitigate) continues to be followed in the post consent phase of the project. We would welcome the inclusion of this as a commitment and would like to see this appropriately secured within the DCO/dML.</p> <p>See also monitoring requirements highlighted in MP11 below</p>	<p>2027 at the earliest). The Applicant can commit to review the proposed mitigation at the point when all the necessary information is available. A cable specification and installation plan will be submitted to the MMO for approval post-consent, in accordance with the requirements of condition 13(1)(h) of Part 2 of Schedules 11 and 12 of the DCO.</p> <p>Furthermore, the Applicant can confirm that F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 to include provision for the monitoring of relevance to Smithic Bank. This includes a pre-construction high-resolution multi-beam bathymetry survey followed by six monthly surveys for the first three years (asset crossing), with the requirement for further surveys reviewed thereafter. The pre-construction survey will be reviewed to validate the baseline Smithic Bank and dogger bank cable crossing) and the post-construction surveys will be reviewed against the pre-construction survey to determine any change with reviews reported annually to MMO. The Applicant would like to highlight that any notable changes will need to consider natural variability (such as seabed response to metocean events) and potential influences due to installed structures.</p> <p>No further monitoring is proposed to reduce negligible effects above that secured in the Deadline 7 submission of F2.7: Outline Marine Monitoring Plan and secured by the Cable Specification and Installation Plan (which has been updated at Deadline 7 - F2.15 Outline Cable Specification and Installation Plan).</p>
MP11	<p>Natural England welcome the proposal to monitor the cable corridor from the Dogger Bank cable crossing across Smithic Bank to the coastline REP5a-017 (G5.33). However, we advise high-resolution swath bathymetry, total seabed coverage surveys, of the Order Limits Area between the Holderness Coastline and Smithic Bank, between Smithic Bank and the Dogger Bank A&B Cable Crossing, and to 1km seawards of the Cable Crossing are all required. This is to confirm the conclusions of the ES that: (a) cable installation will have no detrimental impact on the sandbank (in terms of accelerated sandbank lowering or migration); and (b) any impacts from multiple cable remedial and maintenance activities over the lifetime of the project will not lead to morphological change of the sandbank. The first step in this monitoring plan should be a pre-construction survey, in order to establish a</p>	<p>The Applicant can confirm that F2.7: Outline Marine Monitoring Plan has been updated at Deadline 7 to include provision for the monitoring of relevance to Smithic Bank. This includes a pre-construction high-resolution multi-beam bathymetry survey followed by six monthly surveys for the first three years (asset crossing), with the requirement for further surveys reviewed thereafter. The pre-construction survey will be reviewed to validate the baseline Smithic Bank and dogger bank cable crossing) and the post-construction surveys will be reviewed against the pre-construction survey to determine any change with reviews reported annually to MMO. The Applicant would like to highlight that any notable changes will need to consider natural variability (such as seabed response to metocean events) and potential influences due to installed structures.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>robust and accurate baseline. This should then be followed by a post-cable installation survey every 6 months for 2 years (including two winters periods and one summer) and further surveys every 5-years for the duration of the project. Comparison reports should be produced, incorporating a comparison with existing bathymetric survey data (as presented in G4.9 Supplementary Report). These will enable qualification and quantification of any volumetric and spatial extent changes to the sandbank.</p>	
MP13	<p>We advise that GBS foundations be removed as a design option, in order to reduce vertical mixing and minimise impacts to stratification as far as possible within the project design.</p> <p>See also rows MP14, 15 and 16</p>	<p>The Applicant considers it unnecessary and disproportionate to remove GBS foundations as a design option. The Applicant has reviewed the Maximum Design Scenario for Gravity Base Foundations and confirms GBS foundations (WTG type) will be utilised at a maximum of 80 of the 180 WTG foundation locations. No further reduction can be made at this time.</p>
MP14	<p>A key concern is the underestimation of the spatial extent of wake/plume interaction due to monopile/pin pile foundations. Evidence from other OWFs in the North Sea has shown the potential for wakes to extend > 1km and for wake-to-wake merging to occur (see Foster, 2018). We have not been able to confirm array layout as the Applicant has not yet provided full details of their design.</p> <p>As further detail on on the foundation type and layout will be available at the post consent phase, should the ExA and SoS be minded to proceed on the basis of the information available, Natural England advise that a clear requirement is included within the DCO/dML conditions to fully assess the the proposed layout plan prior to discharge, with the option to include further measures to avoid, reduce or mitigate impacts until it can be demonstrated that significant impacts can be ruled out.</p> <p>This approach of ""deferred assessment"" is not without its own challenges and risks. Therefore we would advise that this is only considered where the ExA/SoS are satisfied that significant impacts can be avoided with all steps taken at this stage to reduce the risks as much as possible. i.e. through removing the Gravity Base option (See MP13 above)</p>	<p>The Applicant is unaware of any turbulent wakes that extend beyond 1km. However, Natural England continue to erroneously refer to wake/plumes extending for greater than 1km while referring to the work of Forster (2018*) on sediment plumes. Wakes and plumes are not comparable due to the fundamental differences in their respective physical characteristics and method of formation and maintenance and to continue to refer to wake/plumes is misleading.</p> <p>The Applicant maintains that the EIA and HRA assessments undertaken with the Hornsea Four DCO Application are proportionate and robust, with these assessment based on a worst case approach. The Applicant highlights that the design scheme that will ultimately come forward for Hornsea Four will fall within those worst case parameters and as such, impacts will be no greater than as assessed within the DCO Application. Therefore deferred assessment of the final layout is not considered required by the Applicant.</p> <p>Notwithstanding the absence of any identified significant impacts, the Applicant has updated F2.7: Outline Marine Monitoring Plan at Deadline 7 to include provision for the monitoring of relevance to the Flamborough Front, with the addition of a reconnaissance analysis of the satellite data prior to the near-field survey in order to ensure that the near-field survey will only take place when the alignment of the Flamborough Front is either across or south of the offshore array area. The survey will be put on hold if the front remains</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>It is also essential that appropriate monitoring to detect changes and trigger any necessary counter measures is secured (See MP16 below)</p>	<p>to the north as this will indicate that no stratification is present within the offshore array area. This reconnaissance step has been added to the monitoring plan as a result of the discussions with Cefas at Issue Specific Hearing 10 (as summarised within G6.10 Written Summary of the Applicant's Oral Case at Issue Specific Hearing 10 (REP6-037)).</p>
MP15	<p>Natural England do not consider that sufficient evidence has been presented to support the Applicant's assumption 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.</p> <p>At this stage in the Examination we do not expect that the Applicant will make further revisions to their assessments, therefore we would advise that the ExA and SoS should have regard to the high value of this receptor by ensuring that the risk of potential impacts are managed as far as possible and that appropriate monitoring to detect changes and trigger any necessary counter measures is secured.</p> <p>Whilst our concerns relate to the potential impact of all foundation types, the risk is significantly greater with the use of Gravity Base type foundations. Given this, our advice remains that GBS should be removed as the MDS for turbine foundations.</p> <p>As further detail on on the foundation type and layout will be available at the post consent phase, should the ExA and SoS be minded to proceed on the basis of the information available, Natural England advise that a clear requirement is included within the DCO/dML conditions to fully assess the the proposed layout plan prior to discharge, with the option to include</p>	<p>As stated in 1.11.1.95 of APP-013 "One design option may place scour protection (or a pre-lay filter layer) on the seabed prior to foundation installation. In this case scouring is likely to be mitigated". Furthermore, Table 1.18 of APP-013 summarises the MDS requirements for scour protection. The dimensions of a pre-lay filter layer are typically 8 m wider than the base of any foundation which would subsequently be installed afterwards. The dimensions for scour protection assume the rock armour material is placed around the periphery of each foundation which is intended to be more extensive than the effect of any local scouring. Therefore, the Applicant considers all foundations are considered sufficiently separated to mitigate the chance of group scour.</p> <p>Please see the Applicant response to MP13 in relation to the suggestion to remove GBS as a foundation option.</p> <p>Please see the Applicant response to MP14 in relation to the deferred assessment approach.</p> <p>In relation to monitoring, the Applicant can confirm that the commitments to additional marine processes monitoring has been captured in the Deadline 7 update of F2.7: Outline Marine Monitoring Plan.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>further measures to avoid, reduce or mitigate impacts until it can be demonstrated that significant impacts can be ruled out.</p> <p>This approach of ""deferred assessment"" is not without its own challenges and risks. Therefore we would advise that this is only considered where the ExA/SoS are satisfied that significant impacts can be avoided and that all steps have been taken by the Applicant to reduce the risks as much as possible prior to consent (i.e. through the removal of GBS).</p> <p>Natural England welcomes the Applicant's comment that pre and post construction surveys will be used to collect data on changes in seabed topography. However we require that this is adequately captured in the OMMP so it is clear that these post construction geophysical surveys are being used to validate assessments made within the Environmental Statement. This is important information for when the MMO is signing these documents off.</p>	
MP16	<p>In order to understand the potential impacts of the Hornsea Four development, alone and in-combination, on the seasonally stratified sea will require a robust monitoring strategy for the lifetime of the project.</p> <p>The initial step to monitoring proposed in G5.33, aims to assess changes to stratification at three locations within the array This is useful in terms of understanding small-scale physical processes, but it would be difficult to identify three locations that are representative of the whole array based on this plan.</p> <p>Therefore, we advise that the first step should be to use high-resolution satellite imagery to examine wakes, sediment plumes, and chlorophyll concentrations across the array and the wider zone of impact beyond the array. We recommend this monitoring should cover a temporal period to include the build-up of seasonal stratification through to breakdown of seasonal stratification. Secondly, the array-scale monitoring should be used to identify representative locations for the near-field monitoring of changes to stratification. Further consideration is also needed of the sub-surface/mid</p>	<p>The Applicant has updated F2.7: Outline Marine Monitoring Plan at Deadline 7 to include provision for the monitoring of relevance to the Flamborough Front, with the addition of a reconnaissance analysis of the satellite data prior to the near-field survey in order to ensure that the near-field survey will only take place when the alignment of the Flamborough Front is either across or south of the offshore array area. The survey will be put on hold if the front remains to the north as this will indicate that no stratification is present within the offshore array area. This reconnaissance step has been added to the monitoring plan as a result of the discussions with Cefas at Issue Specific Hearing 10 (as summarised within G6.10 Written Summary of the Applicant's Oral Case at Issue Specific Hearing 10 (REP6-037)).</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>water chlorophyll concentrations. Over the long-term, there is a need to carefully consider monitoring changes to stratification, currents, suspended sediment concentrations, pH, turbulence, light, and chlorophyll.</p> <p>This monitoring requirement should be captured within the Outline Monitoring Plan.</p>	
<i>Benthic and Intertidal</i>		
B1	<p>Current commitments only seek to avoid impacts to priority habitat ""where possible"" through the micrositing of infrastructure and these commitments only relate to the construction activity. Natural England would like to see further consideration of measures to reduce or mitigate impacts where micrositing to avoid the habitats is not possible secured within the DCO/dML. e.g. through the addition of Priority habitat to condition 13 (1) (c) (ix) of Schedules 11 and 12.</p> <p>Co48 & Co84 should be expanded to include consideration of options to avoid/mitigate impacts to Priority Habitat where micrositing is not possible and we would welcome confirmation that Co48 and Co84, as well as the construction method statement, include all aspects of construction including site preparation works and sediment disposal.</p> <p>We would like to see a commitment to avoid/reduce/mitigate impacts to priority habitat as far as possible during the O&M phase, and a reference to this within the outline O&M plan."</p>	<p>The Applicant can confirm that 'habitats of principal importance and any international or nationally designated sites' have been added to the construction method statement condition 13 (1) (c) (ix) of Schedules 11 and 12 within the Deadline 7 submission of C.1.1 Draft Development Consent Order including DMLs, as requested by Natural England.</p> <p>In relation to Co48 and Co84, the Applicant considers that the addition of 'habitats of principal importance and any international or nationally designated sites' to the construction method statement condition as noted above, is sufficient to cover consideration of these habitats by all aspects of construction, and no update to the commitment wordings is required.</p> <p>In relation to impacts on priority habitat during the operation and maintenance phase, the Applicant as a responsible developer, will use known locations of priority habitats, based upon the acquisition of pre-construction survey data, in order to inform operation and maintenance activities to ensure that these habitats are avoided, where feasible to do so.</p>
B2	<p>Natural England notes that whilst the commitment to no sandwave levelling over Smithic Bank may reduce the risk of significant impacts to nearshore benthic receptors and sites such as Flamborough Head SAC/SPA, the same cannot be said for those further offshore such as Holderness Offshore MCZ. Should the MDS be consented as it stands, there would be no mechanism to ensure that additional steps are taken in the pre construction phase to ensure impacts to designated sites and priority habitats are avoided, reduced or minimised as far as possible.</p>	<p>As noted above, the Applicant can confirm that 'habitats of principal importance and any international or nationally designated sites' have been added to the construction method statement condition 13 (1) (c) (ix) of Schedules 11 and 12 within the Deadline 7 submission of C.1.1 Draft Development Consent Order including DMLs, as requested by Natural England.</p> <p>As such, the Applicant considers that this action can be closed.</p>

Reference	Stakeholder's Written Representation	Applicant's Response
	<p>We therefore suggest that condition 13 (1) (c) (ix) of schedules 11 and 12 of the DCO are expanded to ensure that the construction method statement includes details of the means to address impacts on national sites (ie. MCZs, SSSIs, HPMAs) and priority habitat.</p>	
<i>Fish and Shellfish</i>		
F1	<p>Natural England have reviewed the Applicants answer to ExQ NVL.2.2 and welcome the additional explanation as to why the EMF would be lower than levels suggested elsewhere. We would continue to advocate for a proper assessment of all information relating to this issue, but are generally satisfied that the information provided during examination provides sufficient justification.</p> <p>We recommend a reading of EMF levels over the cables is done once operational to provide some real life data to validate the predictions and provide additional evidence to support industry and research moving forward. Adaptive risk management style approach might be required if the recorded levels are higher than predicted.</p>	<p>The Applicant welcomes the confirmation from Natural England that they are satisfied with the justification provided in relation to the scoping out of EMF effects.</p> <p>The Hornsea Four envelope considers two subsea cable design options; an Alternating Current (AC) and a Direct Current (DC) option. The AC and DC cable designs are anticipated to have EMF strengths of 16.7uT and 40uT respectively at 1m from the cable (see table below).</p> <p>Following review of the publication by Scott et al. (2021), the Applicant confirms that the study investigated EMF strengths significantly higher than those that receptors will typically be exposed to as a result of offshore wind cables in the marine environment. The lowest experimental EMF strength used in Scott et al. (2021) was a factor of 10 higher than that expected for Hornsea Four, with no impacts on fish and shellfish receptors identified by Scott et al. (2021) at this experimental EMF strength. Effects were only noted by Scott et al. (2021) with EMF strengths a factor of 20 – 1,000 higher than those expected from Hornsea Four subsea cables. Specifically, the study investigated the effects of the following EMF strengths on edible crab (<i>Cancer pagarus</i>); 250 μT, 500 μT and 1000 μT (see table below), with physiological and behavioural effects on crab only observed at strengths 500 μT and 1000 μT.</p> <p>The Applicant confirms that the differences between the EMF strengths published within Scott et al. (2021) (sourced from Bochert and Zettler, 2006) and those provided by the Applicant for the proposed Hornsea Four development are due to differences in cable design between the two scenarios. The values provided by Scott et al. (2021) are sourced from a study by Bochert and Zettler (2006) which relate to a single wire system (as opposed to the proposed Hornsea Four cable design with two (AC cable) or three (DC cable) wires). When</p>

Reference	Stakeholder's Written Representation	Applicant's Response																			
		<p>multiple cables are located adjacent to each other, the magnetic fields interact in such a way as to cancel each other out. This cancelling effect has slight imperfections (associated with the cables) which leaves the residual EMF values as presented for Hornsea Four. This effect is acknowledged and discussed within Bochert and Zettler (2006), however the values used in Scott et al. (2021) suggest that this has not been accounted for by those authors. The EMF strengths presented within Scott et al. (2021) and Bochert and Zettler (2006) for a single core cable system are therefore not comparable or representative for those anticipated from the Hornsea Four subsea cables.</p> <p>Bochert and Zettler (2006) reported significant declines in magnetic intensities with distance from the cables (EMF strengths of 3200 μT near a single wire, with magnetic intensities decreasing to 320 μT 1 m from the wire, and 110 μT at a distance of 4 m) (see table below). Hornsea Four propose to bury their cables to 1 m below the seabed where feasible, therefore magnetic field intensities are anticipated to be significantly less at this distance from the cable.</p> <p>Considering the differences highlighted above, the values provided within the Scott et al. (2021) and Bochert and Zettler (2006) publications are not representative of the EMF strengths anticipated from the operation of the Hornsea Four subsea cables. The Applicant would direct the Examining Authority instead to a publication by Snyder et al. (2019) (see table below), which provides magnetic field strengths for AC cables of a similar cable design to that proposed by Hornsea Four as a more reliable source to compare the fields predicted for Hornsea Four with.</p> <p>EMF strengths predicted by Hornsea Four and reported in literature.</p> <table border="1"> <thead> <tr> <th data-bbox="1133 1134 1373 1206">Source</th> <th data-bbox="1384 1134 1597 1206">Cable Design</th> <th data-bbox="1608 1134 1821 1206">Distance from Cable</th> <th data-bbox="1832 1134 2056 1206">EMF strength</th> </tr> </thead> <tbody> <tr> <td data-bbox="1133 1214 1373 1286" rowspan="2">Hornsea Four</td> <td data-bbox="1384 1214 1597 1246">AC</td> <td data-bbox="1608 1214 1821 1246">1m</td> <td data-bbox="1832 1214 2056 1246">16.7μT</td> </tr> <tr> <td data-bbox="1384 1254 1597 1286">DC</td> <td data-bbox="1608 1254 1821 1286">1m</td> <td data-bbox="1832 1254 2056 1286">40 μT</td> </tr> <tr> <td data-bbox="1133 1294 1373 1393" rowspan="3">Bochert and Zettler (2006) (cited within Scott et al. 2021)</td> <td data-bbox="1384 1294 1597 1393" rowspan="3">Single wire</td> <td data-bbox="1608 1294 1821 1326"><1m</td> <td data-bbox="1832 1294 2056 1326">3200 μT</td> </tr> <tr> <td data-bbox="1608 1334 1821 1366">1m</td> <td data-bbox="1832 1334 2056 1366">320 μT</td> </tr> <tr> <td data-bbox="1608 1374 1821 1393">4m</td> <td data-bbox="1832 1374 2056 1393">110 μT</td> </tr> </tbody> </table>	Source	Cable Design	Distance from Cable	EMF strength	Hornsea Four	AC	1m	16.7 μ T	DC	1m	40 μ T	Bochert and Zettler (2006) (cited within Scott et al. 2021)	Single wire	<1m	3200 μ T	1m	320 μ T	4m	110 μ T
Source	Cable Design	Distance from Cable	EMF strength																		
Hornsea Four	AC	1m	16.7 μ T																		
	DC	1m	40 μ T																		
Bochert and Zettler (2006) (cited within Scott et al. 2021)	Single wire	<1m	3200 μ T																		
		1m	320 μ T																		
		4m	110 μ T																		

Reference	Stakeholder's Written Representation	Applicant's Response			
		Scott <i>et al.</i> (2021)	N/A	N/A	250 μ T 500 μ T 1000 μ T
		Snyder <i>et al.</i> (2019)	AC	1 m 2 m 3 to 7.5 m	2 – 16.5 μ T 1 – 4 μ T 0.1 – 1.5 μ T
		<p>In summary, the Applicant maintains its position that there will be no significant impacts on fish and shellfish receptors as a result of EMF emissions from Hornsea Four subsea cables. In addition, the Applicant does not consider that readings of EMF levels over the operational cables are required, due to the low EMF levels anticipated from either cable type which may be used at Hornsea Four being already well characterised through existing studies, and there being no material uncertainty in the values presented. Therefore, the monitoring of EMF at Hornsea Four would not provide any new information on the EMF from offshore wind farms cables.</p>			
F2	<p>Given the limited amount of time remaining within the Examination and recognising that the MMO as advised by Cefas are also looking for the piling restriction period to be extended; we defer to Cefas' expertise in determining a more suitable period.</p>	<p>Whilst the Applicant believes it has presented a scientifically accurate and robust justification for the proposed 'peak' herring spawning period throughout this Examination, in response to the MMO's ongoing concerns, the Applicant has submitted its final position as Appendix D of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction at Deadline 7. This Appendix sets out a compromise piling restriction period for the HVAC booster stations commencing 21st August (10 days earlier than originally proposed) to 23rd October (7 days later than originally proposed). Further, in order to provide the MMO with comfort around impacts from increased suspended sediment concentrations and smothering on spawning herring, the Applicant proposes a restriction on seabed preparation activities using either dredgers or control flow excavator (CFE) tools seaward of Mean High Water Springs (MHWS) out to the westernmost extent of the HVAC Booster Station Works Area during the same time period above.</p> <p>The updated piling restriction period is updated in the draft DCO at Deadline 7. The updated restriction on seabed preparation activities has been incorporated into F2.15 Outline Cable Specification and Installation Plan updated and submitted at Deadline 7.</p>			

5 Applicant's comments to NEO Energy (REP6-061)

Reference	Stakeholder's Written Representation	Applicant's Response
	NEO's position is as follows:	
	<p>1. A buffer zone of 3.14nm (a reduction from the 3.2nm previously sought) is necessary for the operation of the Babbage Platform. NEO may be able to accept a further reduction to this buffer (to 2.7nm, as proposed by the Applicant) provided that adequate annual compensation is made for the disruption to NEO's helicopter operations at the Platform.</p>	<p>NEO Energy in their submission have acknowledged that 2.7nm is sufficient to operate. The Applicant interprets this to mean helicopter operations to Babbage can be operated safely at this distance. The Applicant evidently agrees with this position from the submissions made at INF 2.3 of REP5-074. Reference to annual compensation affirms that NEO perceive this to be a commercial impact.</p> <p>The Applicant acknowledges there would be a minor adverse impact on helicopter operations in some weather conditions, however it is considered to be so minor that compensation is not due. Therefore, the Applicant continues to advocate for the proposed Protective Provisions originally submitted at Deadline 4 in Part 9, Schedule 9 of the draft DCO (REP4-050).</p>
	<p>2. The Applicant should meet the direct costs and reasonable overheads of the Navigational Aids to be installed on the Babbage Platform.</p>	<p>The Allision Technical report prepared for the Applicant by Anatec and submitted within (APP-087) anticipates that one additional vessel per day will pass within 2nm of the Babbage platform as a result of the presence of the windfarm. The Applicant does not consider that this changes the risk profile such that additional navigational aids require to be installed on the Babbage platform.</p> <p>Furthermore, the duty holder is required to have an Emergency Rescue and Recovery Vessel (ERRV) on standby in proximity to the platform when it is manned, to manage any risk associated with passing vessels. All ERRVs operating in the North Sea are equipped with Automatic Identification Systems (AIS), a navigational aid to monitor traffic. The Applicant therefore considers that no further navigational aids would be required.</p>
	Both parties continue to prioritise discussions with a view towards reaching a satisfactory conclusion, and NEO commits to an update at Deadline 7.	Noted

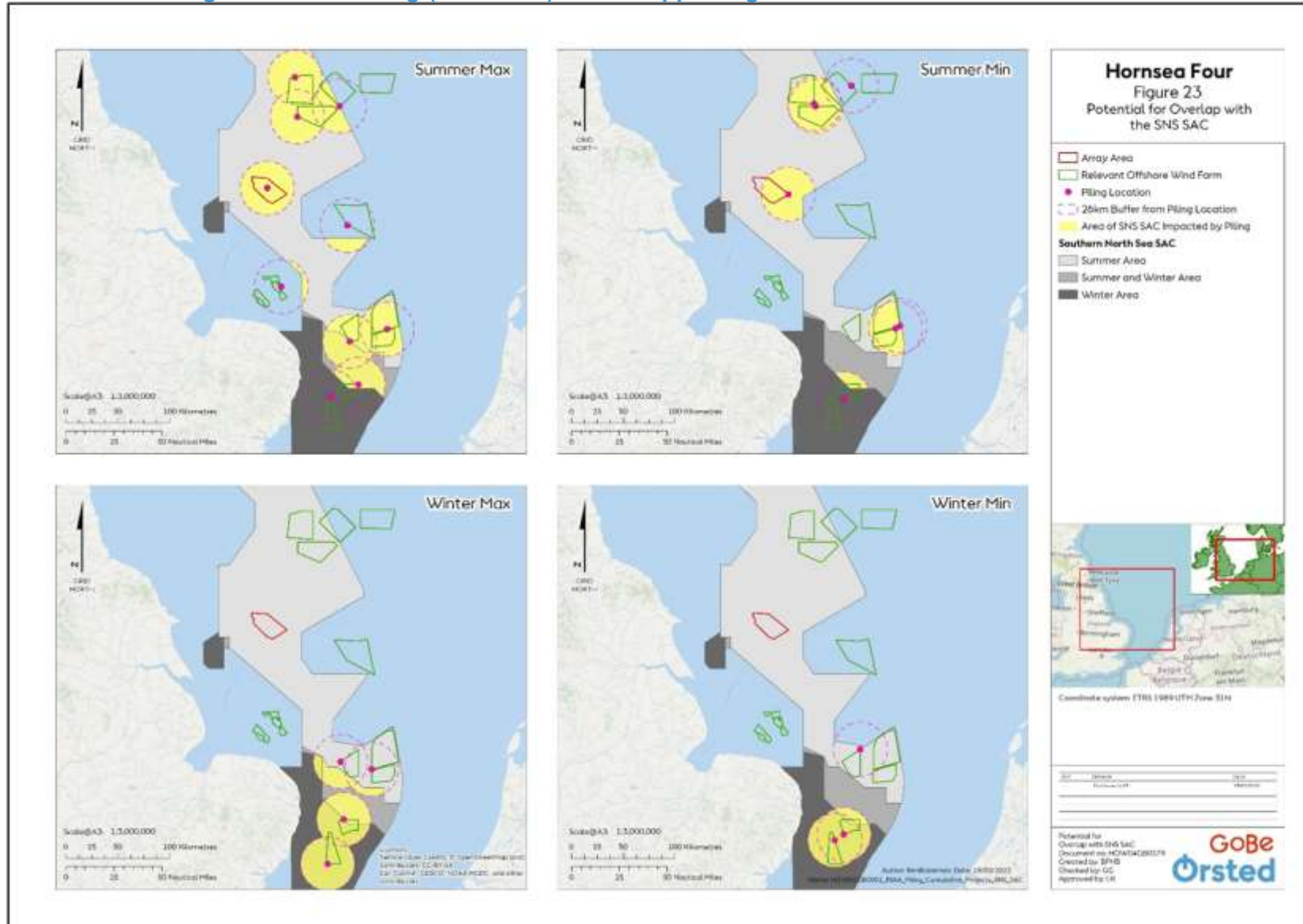


Figure 1: Version of figure 23 that was included in the RIAA as part of the DCO Application (APP-167)

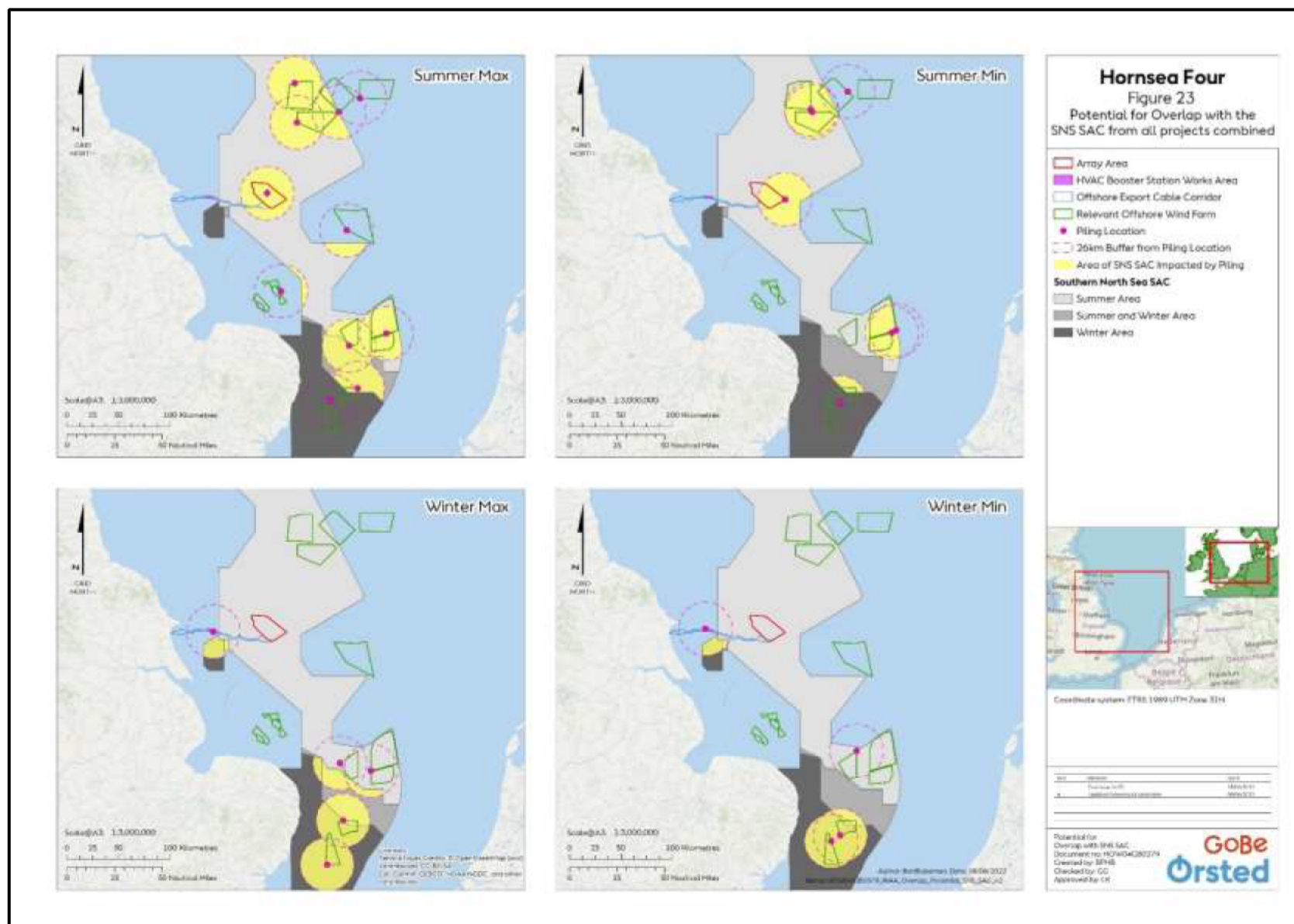


Figure 2: Updated version of Figure 23 that was included in the Deadline 5 submission of the RIAA (REP5-012).

Appendix B Predicted Compensation Values

Table 1: Guillemot predicted compensation values

Assumptions	Applicant	1	2	3	4	5	6	7	8
Displacement rate	50%	70%	70%	50%	70%	70%	50%	70%	70%
Mortality rate	1%	1%	2%	1%	1%	2%	1%	1%	2%
Approach to assessment	Applicant*	Applicant*	Applicant*	Inferred**	Inferred **	Inferred **	Natural England***	Natural England***	Natural England***
<i>Compensation Required</i>									
Predicted Impact value (breeding adult mortalities per annum)	39.5	55.3	110.6	55.1	77.1	154.2	161.5	226.2	452.3
Predator Eradication compensation value (available nesting spaces; 1:1 ratio)	174.6	244.4	488.8	243.3	340.7	681.4	713.9	999.5	1,999.0
Bycatch compensation value (vessels required; 1:1 ratio)	6.2	8.7	17.4	8.7	12.1	24.3	25.4	35.6	71.2

Table Note: *The Applicant's suitably precautionary approach to assessment is summarised in Table 3 of the [G7.4 Applicant's Ornithology Position Paper \(REP7-TBC\)](#), which uses a weighted mean peak abundance for the non-breeding bio-season, a breeding bio-season apportionment value of 55.80% and a non-breeding bio-season apportionment value of 13.12%. **The Inferred approach to assessment uses a mean peak abundance for the non-breeding bio-season, a breeding bio-season apportionment value of 100.00% and non-breeding bio-season apportionment value of 4.41%. and is based on the consents and advice to other projects (i.e. EA1 and Norfolk Boreas) ***Natural England's overly precautionary approach to assessment is summarised in Table 3 of the [G7.4 Applicant's Ornithology Position Paper \(REP7-TBC\)](#), which uses a mean peak abundance for the non-breeding bio-season, a breeding bio-season apportionment value of 100.00%, an additional bio-season assessment for the months of August and September (chick rearing/ moult period) with an apportionment value of 60% and the standard non-breeding bio-season apportionment value of 4.41% for the remaining five months of the bio-season (October to February).

Table 2: Razorbill predicted compensation values

Assumptions	Applicant	1	2	3	4	5	6	7	8
Displacement rate	50%	70%	70%	50%	70%	70%	50%	70%	70%
Mortality rate	1%	1%	2%	1%	1%	2%	1%	1%	2%
Approach to assessment	Applicant*	Applicant*	Applicant*	Inferred **	Inferred **	Inferred **	Natural England***	Natural England***	Natural England***
<i>Compensation Required</i>									
Predicted Impact value (breeding adult mortalities per annum)	1.9	2.7	5.4	2.8	3.9	7.8	16.3	22.8	45.6
Predator Eradication compensation value (available nesting spaces; 1:1 ratio)	12.0	16.8	33.5	17.2	24.1	48.2	100.5	140.6	281.3
Bycatch compensation value (vessels required; 1:1 ratio)	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	2.7	3.8	7.6

Table Note: *The Applicant's suitably precautionary approach to assessment is summarised in Table 6 of the [G7.4 Applicant's Ornithology Position Paper \(REP7-TBC\)](#), which uses a breeding bio-season apportionment value of 55.80%, apportionment value of 3.38% for the post-breeding migration bio-season, apportionment value of 2.74% in the migration-free winter bio-season and apportionment value of 3.38% for the return migration bio-season. **The Inferred approach to assessment uses a breeding bio-season apportionment value of 100.00%, apportionment value of 3.38% for the post-breeding migration bio-season, apportionment value of 2.74% in the migration-free winter bio-season and apportionment value of 3.38% for the return migration bio-season and is based on the consents and advice to other projects (i.e. EA1 and Norfolk Boreas). *** Natural England's overly precautionary approach to assessment is summarised in Table 6 of the [G7.4 Applicant's Ornithology Position Paper \(REP7-TBC\)](#), which uses a breeding season apportionment value of 100%, apportionment value of 66% for the post-breeding migration bio-season, standard apportionment value of 2.74% in the migration-free winter bio-season and standard apportionment value of 3.38% for the return migration bio-season.

Table 3: Kittiwake predicted compensation values

Assumption	Applicant	Natural England
Approach to assessment	Applicant's approach*	Natural England's approach*
<i>Compensation Required</i>		
Predicted impact value (breeding adult mortalities per annum)	23.3	71.4
Artificial nesting compensation value (breeding pairs; 1:1 ratio)	62.3	190.7

Table Note: The Applicant's and Natural England's approaches to assessment are summarised in Table 9 of the [G7.4 Applicant's Ornithology Position Paper \(REP7-TBC\)](#)

