Date: 04 April 2011 Our ref: 297741 Your ref: EN010087

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BY EMAIL ONLY



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### Dear Ms Fernandes

Application by Norfolk Boreas Limited for an Order Granting Development Consent for the Norfolk Boreas Offshore Wind Farm- Rule 6 Letter

Thank you for your consultation on the Rule 6 letter dated 11 October 2019. The following constitutes Natural England's formal statutory response.

## **Procedural changes**

Natural England recognises that there has been changes to the examination time table structure since Norfolk Vanguard examination which may be discussed at the hearing. Similarly Natural England has also reviewed our engagement on Offshore Windfarm (OWF) NSIPs over the last 12 months and have identified some changes that we will be making going forwards. Therefore, please accept this letter as Natural England's comments in relation to contents of the Rule 6 letter and an explanation of how Natural England proposes to provide our statutory advice to the Examining Authority (ExA) during the examination.

# **Attendance at Preliminary Meeting**

Thank you for the invitation to the Preliminary Meeting on the 12 November. Natural England can confirm they will not attend. We hope this letter will suffice in providing our input into the Hearing.

#### Issue Specific Hearings (ISH)

As issues have not significantly progressed since the submission of our detailed combined Relevant Representation and Written Representation, we will have no new information to discuss and propose not to attend ISH in November (12<sup>th</sup>, 13<sup>th</sup> and 14<sup>th</sup>).

However, given the gravitas of our concerns and the potential for Adverse Effect on Integrity Natural England does intend to attend the ISHs at the end of January (28<sup>th</sup>, 29<sup>th</sup>, 30<sup>th</sup>). We hope other interested parties with similar interests to ours will also be present.

Natural England requests that an agenda with times, themes and areas of discussions is provided by the ExA at least 7 days before the date of all ISHs. Based on our experience from other NSIPs it would be helpful to Natural England and our specialists if the ISH agendas could be focused on specific questions from the ExA. This will enable us to appropriately prepare for the hearing; give due consideration to any issues both internally and externally with the Applicant beforehand; and provide robust evidence-based advice to the ExA. This will reduce the need for further discussion and advice post ISHs, prior to the next Deadline.

The decision on attendance at any subsequent ISH will be based on the outstanding issues, wider resource requirements and ensuring best value. However, Natural England will continue to engage with the Applicant throughout the examination to ensure issues are progressed and wherever possible

resolved.

## Statement of Common Ground (SoCG)

Natural England notes the request for the provision of a SoCG by 4 November and have been actively engaging with the Applicant to achieve this, with two separate SoCG (separate ornithology and all other areas). We note that the contents of SoCG will be limited at this time as we are still working on various outstanding issues with the Applicant. Nevertheless, whilst incomplete, we will set out those areas where there is common ground with the Applicant. The SoCG will, necessarily, be subject to change over the course of the examination.

Natural England has also developed its own Risk and Issues log to sit beside the Applicant led SoCG. The updated Risk and Issues log will be provided at all Deadlines, 1-9, as it may be of assistance to the ExA in understanding Natural England's current outstanding issues. The issues log is owned by Natural England and reflects our position. The Risk and Issues log (as submitted 4 November) reflects the issues raised by Natural England at Relevant Representation 31 August. Natural England and the developer have been in discussion as part of the SoCG process and progress has been made on a number of issues, this progress will be reflected in the SoCG and in the updated Risk and Issues log when submitted at Deadline 1.

Natural England note the request for updated SoCG at Deadlines 2 and 6. However, having spoken with the Applicant we do not believe that there will be any changes in our position prior to Deadline 2 and equally it is highly likely that our position will remain unchanged through a substantial part of the examination whilst further project specific work is completed and we understand more of the outcomes from the other projects waiting determination. Therefore, we advise that the development of SoCG should not be to the detriment of the actual resolution of issues during the process and so Natural England is proposing not to issue mid examination SoCG( i.e. Deadlines 2 and 6) but work with the Applicant and submit a final SoCG, once all issues have been either resolved or progressed as far as possible i.e. Deadline 8. However, the regular update and submission of the Risk and Issues Log will assist the ExA to monitor the progress on outstanding issues.

In addition, Natural England is interested to know if this request for early completion of SoCG is an examination specific change in process or if this will be adopted across the wider PINS process. If this is a change to process please can PINS notify stakeholders at the earliest opportunity so we can prepare accordingly.

# **Examiners Questions**

Unless there is a specific question posed by the ExA on other interested parties Relevant or Written Representations Natural England will not provide comment on these Representations.

### **Response to Deadlines**

Throughout the examination it is expected that many documents will be submitted and published on the PINS website. Natural England will check all documents, however, we will only conduct detailed review and provide feedback on documents deemed relevant to our statutory function and the issues we have raised. We will advise the ExA in writing at each Deadline of which documents we have reviewed. If there is a document Natural England has not reviewed that the ExA wishes to have our opinion on then please inform us as soon as possible and we will endeavour to review ahead of the next Deadline or advise which Deadline comments could be expected. Any documents not listed within our Deadline responses should be assumed to have not undergone detailed review by Natural England.

Additionally, if the ExA wishes Natural England to have reviewed specific documents for discussion at the ISH, please advise as early as possible and no later than within the draft agenda which documents you wish to discuss so we can prepare appropriately. This will help ensure best value is obtained by all parties attending the ISH.

### **Draft Examination Timetable**

Natural England has some significant concerns regarding the overlap of the proposed examination timetable with the timetables of various other projects including EA1N and EA2 (Submitted DCO on 25 October), Sizewell C Nuclear Power Station (Submit DCO in February), Hornsea Project 4 (Submit DCO in February) and those yet underdetermined projects i.e. Hornsea Project 3 OWF advice request by Business Energy and Industrial Strategy, with a further request expected on Vanguard OWF decision. All of these projects will require specialist time and resources and will affect the in combination advice we provide for this and other projects.

#### Deadline 2:

Natural England has already provided a detailed combined Relevant Representation and Written Representation (31 August) in order to provide as much information upfront and to front load the process. We will therefore not be submitting a Written Representation at Deadline 2 unless new information has arisen.

## Site Visits:

Natural England advises that, while we rarely attend site visits, any access to designated sites will require assent from Natural England under The Wildlife and Countryside Act 1981 (as amended) unless the visits are restricted to public rights of way.

#### Deadline 4 and 7:

Deadlines 4 and 7 are very soon after ISH, which will only allow a turnaround of 3 to 4 days. Natural England request that there was a greater time period between ISHs and Deadlines, or that extensions can be granted if required.

### Deadline 9:

There is currently only a week scheduled between Deadline 8 and Deadline 9. Due to the large volume of documents expected to be submitted at Deadline 8 we would welcome a move of Deadline 9 to 8<sup>th</sup> May to allow time for review and providing a response.

# **Introduction of new Deadlines**

During previous examinations ExAs have allowed Applicants to submit documents in between Deadlines, effectively introducing additional Deadlines, for example, Thanet OWF and Vanguard OWF had several half deadlines.

Please be advised that we will be working with Applicant in between Deadlines under our Discretionary Advice Service. There is an expectation that the Applicant would then submit documents into examination at the next appropriate Deadline. Half deadlines are not helpful as we are duty bound to review documents submitted at Deadlines, which could create duplication of effort reviewing out of date documents and confuse the process. Should there be documents that the Applicant wants to submit between Deadlines we suggest these are issued at the next appropriate Deadline, and we will respond at the following Deadline, or if time does not allow the subsequent Deadline.

For any queries relating to the content of this letter please contact me using the details provided below.

Yours sincerely,

Tamara Rowson
Norfolk and Suffolk Team
E-mail: tamara.rowson@naturalengland.org.uk
Telephone:

This section outlines the principal issues that Natural England has with the application. The issues set out below require further work, or clarification, to enable a complete and robust assessment to be undertaken. If the issues are not resolved Natural England will not be able to exclude beyond all reasonable scientific doubt that there will be no adverse effect on the integrity of the relevant SACs and SPAs, having regard to the conservation objectives for those sites. Each issue has been assigned a risk rating and colour coded accordingly, please see Table xxx which sets out Natural England's categorisation, which has been developed for all our OWF NSIP representations from Section 42 consultations onwards. In the interests of brevity, Natural England has only included issues which are identified as amber risk or higher within their Representations and Risk and Issues Log.

In relation to SACs and SPAs the risk to which Natural England refers to in Table xxxx Issues Log is the risk of the decision-maker proceeding without sufficient information to allow it to be convinced, beyond reasonable scientific doubt, of an absence of adverse effect on the sites concerned. A high risk rating indicates a grave risk of adverse effect(s) unless further information and/or assessment and/or project modifications suffice to dispel scientific doubt. To be clear, Natural England is not ranking these issues in terms of the acceptability of impacts on sites or their features.

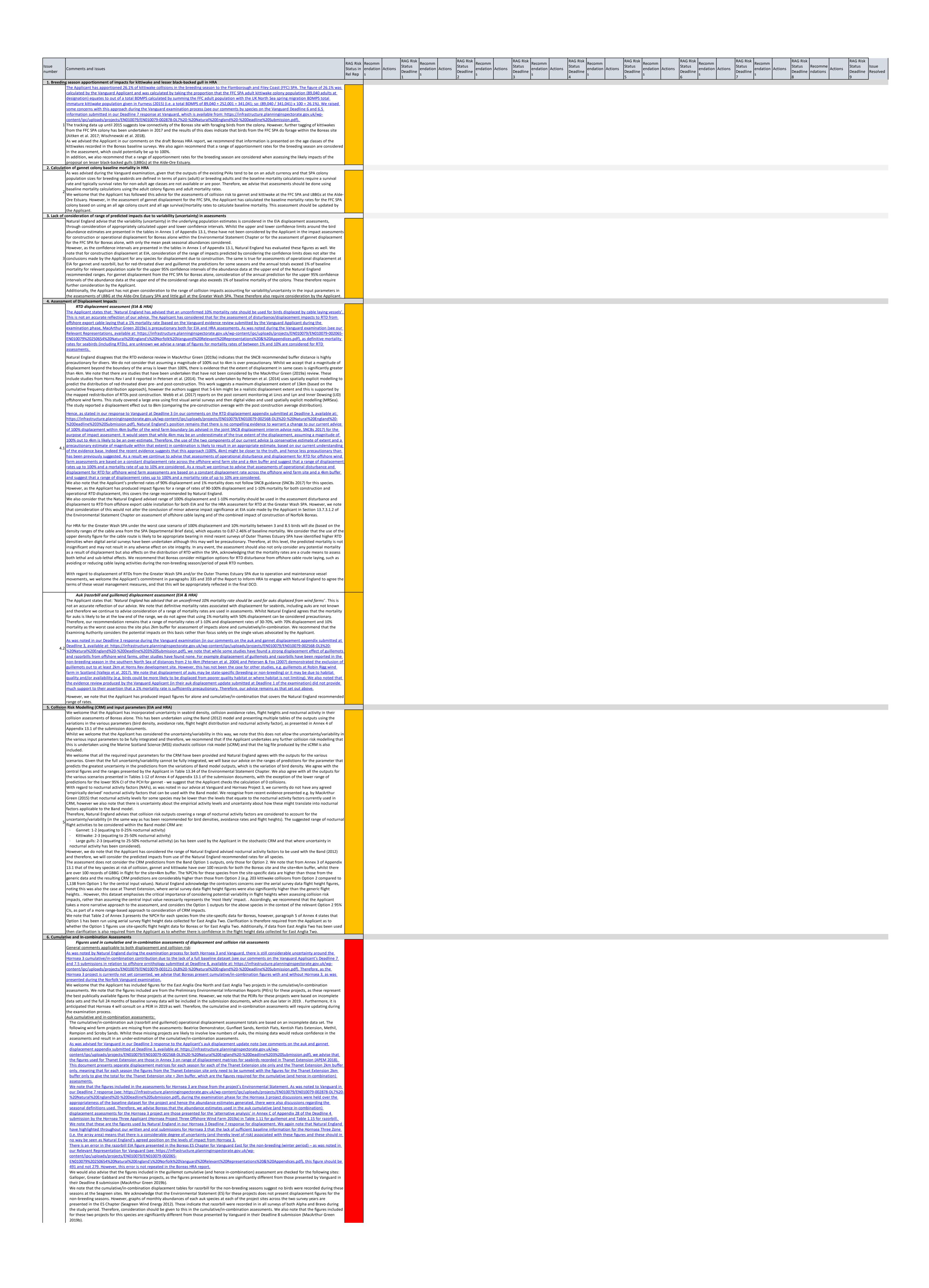
Natural England's Comment	Risk
Purple	
Note for Examiners and/or competent authority. May relate to DCO/DML	
Red	
Natural England considers that unless these issues are resolved it will have to advise that (in relation to any one of them,	
and as appropriate) it is not possible to ascertain that the project will not affect the integrity of an SAC/SPA and/or	
comply fully with the Environmental Impact Assessment requirements and/or avoid significant adverse effect on	
landscape/seascape, unless the following are satisfactorily provided:	
new baseline data;	
significant design changes; and/or	
significant mitigation; เงินเนเลเ England Teers นาลมารรมยร given neu รเลเนร สาย รบ complex, บา require นาย provision บา รบ เทินดา บนเรเลทนเทฐ	
information, that they are unlikely to be resolved during examination, and respectfully suggests that they be addressed	
Amber	
Natural England considers that if these issues are not addressed or resolved by the end of examination then they would	
become a Red risk as set out above. Likely to relate to fundamental issues with assessment or methodology which could	
be rectified; preferably before examination.	
Yellow	
These are issues/comments where Natural England doesn't agree with the Applicant's position or approach. We would	
flag these at the PEIr stage with the view that they would be addressed in the Application. But otherwise we are satisfied	
for this particular project that it will not make a material difference to our advice or the outcome of the decision-making	
process. However, it should be noted that this may not be the case for other projects. Therefore it should be noted by	
interested parties that just because these issues/comments are not raised as part of our Relevant Representations in this	
instance it should not be understood or inferred that in other cases or circumstances Natural England will take this	
approach. Furthermore, these may become issues should further evidence be presented.	

Green

Natural England supports the Applicant's approach.

Issue Number	Natural England's comment	IRAG Rick	ecomme dations	ons RAG Risk Status Recomme Deadline Indations	ns RAG Risk Status Recomme Deadline Indations Action 2	RAG Risk Status Deadline ndations Actions	RAG Risk Status Deadline ndations Action	RAG Risk Status Recomme Deadline ndations 5	RAG Risk Status Deadline ndations 6	RAG Risk Status Deadline ndations 7	RAG Risk Status Deadline Notions Recomme ndations	RAG Risk Status Issue Deadline Resolved 9
Offshore C	Summary of Natural England's key concerns:  Breeding season apportionment of impacts for kittiwake and lesser black-backed gull in Habitats Regulations Assessment (HRA); Calculation of gannet colony baseline mortality in HRA; Consideration of range of predicted impacts due to variability (uncertainty) in EIA and HRA assessments; Assessment of displacement impacts; Collision risk modelling (CRM) and input parameters; Cumulative and in-combination assessments (displacement and CRM);											
Breeding s	<ul> <li>Additive impacts (collision plus displacement for gannet);</li> <li>Population modelling (Environmental Impact Assessment, EIA and HRA);</li> <li>Scale of predicted cumulative and in-combination impacts and requirement for mitigation.</li> <li>Post-construction monitoring.</li> </ul> eason apportionment of kittiwake at Flamborough & Filey Coast (FFC) SPA and lesser black-backed gull at the Alde-Ore Estuary SPA											
	It is not currently possible to ascertain no adverse effect on integrity to FFC SPA or Alde-Ore Estuary SPA. Natural England does not consider the apportionment of 26.1% of kittiwakes to the FFC SPA to be appropriate. We advise that information should be presented on the age classes of the kittiwakes recorded in the Boreas baseline surveys to inform the apportioning. We also recommend that a range of apportionment rates for the breeding season are considered when assessing the likely impacts of the proposal on kittiwake at the FFC SPA and LBBGs at the Alde-Ore Estuary, which for the	1										
	former could potentially be up to 100%.  of gannet colony baseline mortality in HRA  We advise that the assessment of displacement of gannets at the FFC SPA is conducted using baseline mortality calculations using the adult colony figure											
Considerat	Natural England requires that the variability (uncertainty) in the underlying population estimates (i.e. through consideration of appropriately calculated upper and lower confidence intervals) is considered in the displacement assessments. This has not been considered by the Applicant in the impact assessments for construction or operational displacement for Boreas alone at EIA, or for the assessment of gannet displacement for the FFC SPA for Boreas	as										
	alone, with only the mean peak seasonal abundances considered.  Neither has the Applicant given consideration to the range of collision impacts, in order to account for variability/uncertainty in the input parameters in the assessments of lesser black-backed gull (LBBG) at the Alde-Ore Estuary SPA and little gull at the Greater Wash SPA. These also require consideration.											
Assessmer	It is not currently possible to ascertain no adverse effect for RTD in Greater Wash SPA or that the EIA information is insufficient to allow a full understanding of the position.											
	Red-throated diver (RTD) displacement assessments for EIA and HRA  The Applicant states that: 'Natural England have advised that an unconfirmed 10% mortality rate should be used for birds displaced by cable laying vessels' and that for displacement of RTDs from the array that 'Natural England's preferred method assumes 100% of birds will be displaced and mortality of displaced birds will be 10%'. This is not an accurate reflection of our advice. Definitive mortality rates for seabirds, including RTDs, are unknown due to											
	lack of empirical data. Therefore, Natural England advise that a range of figures for mortality rates of between 1% and 10% are considered for RTD displacement assessments.  Natural England disagrees that the RTD evidence review in MacArthur Green (2019a) indicates that the SNCB recommended buffer distance is highly precautionary for divers. We do not consider that assuming a magnitude of 100% out to 4km is over- precautionary – further details regarding the											
	In relation to the HRA, for the installation of the offshore export cable through the Greater Wash SPA, the predicted impacts both alone and incombination for the upper rates of the Natural England advised range (i.e. 100% displacement and 10% mortality) are not insignificant and may result in an adverse effect on the integrity of the designated site. The assessments should also not only consider any potential mortality as a result of displacement											
Collision ri	but also effects on the distribution of RTD. We suggest that Boreas consider mitigation options for RTD disturbance from offshore cable route laying, such Auk (razorbill and guillemot displacement assessments for EIA and HRA  The Applicant states that: 'Natural England has advised that an unconfirmed 10% mortality rate should be used for auks displaced from wind farms'. This sk modelling (CRM) and input parameters											
	It is not currently possible to ascertain no adverse effect for collision risk for features of the Alde Ores Estuary SPA, FFC SPA or Greater Wash SPA, and the EIA information is insufficient to allow a full understanding of the position.  Natural England welcomes that the Applicant has considered the uncertainty/variability in the CRM parameters by using the Band (2012) model and presenting multiple tables of the outputs using the variations in the various parameters (hird density avaidance rate flight height distribution and											
	presenting multiple tables of the outputs using the variations in the various parameters (bird density, avoidance rate, flight height distribution and nocturnal activity factor). However, we note that this does not allow the uncertainty/variability in the various input parameters to be fully integrated and therefore, we recommend that if the Applicant undertakes any further collision risk modelling that this is undertaken using the Marine Scotland Science (MSS) stochastic collision risk model (sCRM) and that the log file produced by the sCRM is also included. Given that the full uncertainty/variability cannot											
	be fully integrated, we will base our advice on the ranges of predictions for the parameter that predicts the greatest uncertainty in the predictions from the variations of Band model outputs, which is the variation of bird density.  With regard to nocturnal activity factors (NAFs), we currently do not have any agreed 'empirically derived' nocturnal activity factors that can be used with the Band model. Therefore, Natural England advises that collision risk outputs covering a range of nocturnal activity factors are considered to account for											
	the uncertainty/variability – further details regarding our advised rates are set out in the attached Annex.  The assessments do not consider the CRM predictions from the Band Option 1 outputs, only those for Option 2. We note that from Annex 3 of Appendix 13.1 that of the key species at risk of collision, gannet and kittiwake have over 100 records for both the Boreas site and the site+4km buffer, whilst there are over 100 records of great black-backed gull (GBBG) in flight for the site+4km buffer. The proportions at collision height (%PCHs) for these species from											
	the site-specific data are higher than those from the generic data and the resulting CRM predictions for Boreas alone at the EIA scale are considerably higher than those from Option 2 (e.g. 203 kittiwake collisions from Option 2 compared to 1,138 from Option 1 for the central input values). Whilst we acknowledge the contractors concerns over the aerial survey data flight height figures, we recommend that the Applicant takes a more narrative approach											
Cumulativ	to the assessment, and considers the Option 1 outputs for the above species in the context of the relevant Option 2 figures for the 95% confidence intervals (CIs) of the density data, as part of a more range-based approach to consideration of CRM impacts.  e and in-combination assessments (displacement and CRM)  It is not currently possible to ascertain no adverse effect on integrity on features of the Alde-Ore SPA, FFC SPA, and Greater Wash SPA. The EIA information	n										
	is insufficient to allow a full understanding of the position with regards:  Gannet (displacement + collision combined)  Red-throated diver (displacement)											
	Kittiwake (collision) Lesser black-backed gull (collision) Herring gull (collision) Great black-backed gull (collision)											
	7 Little gull (collision) Razorbill (displacement) Guillemot (displacement) Natural England is currently unable to reach any conclusions at present regarding cumulative and in-combination displacement and collision impacts (to											
	features of Alde-Ore SPA, FFC SPA, and Greater Wash SPA) due to missing projects and incorrect figures for certain projects (e.g. Vanguard) in the assessments.  Natural England is currently unable to reach any conclusion at present regarding cumulative RTD displacement impacts (to Greater Wash SPA) due to an											
Additive in	inappropriate approach having been taken by the Applicant. Further details regarding this and recommendation for a more appropriate approach can be found in Appendix 1. However, we note that at the end of the Vanguard examination Natural England concluded that a significant adverse) impact could not be ruled out for Red Throated Diver cumulative displacement impacts – the Boreas project is adding more birds to this total.  Inpacts (collision plus displacement for gannet)											
Population	Natural England considers the two impacts of collision and displacement as additive for gannet and advises that they should be summed. We welcome that the Applicant has undertaken this assessment for in-combination combined displacement plus collision for the FFC SPA. However, such an assessment should also be undertaken for Boreas alone for both EIA and HRA scales and also cumulatively at the EIA scale.  In modelling (EIA and HRA)	nt										
	Within the EIA there is insufficient information regarding gannet, kittiwake and GBBG. For HRA there is insufficient information with regards features of FFC SPA.  Natural England does not consider that the Population Viability Analysis (PVA) models used for the EIA cumulative assessments (namely the SOSS gannet PVA and the EIA PVA models for kittiwake and GBBG) are adequate to inform the assessments for Norfolk Boreas. This is because these models have not:											
	<ul> <li>Been run using a 'matched' pairs/runs approach as advised by Natural England;</li> <li>Do not present outputs for the Natural England required metrics of counterfactuals of both population size and population growth rate;</li> <li>Been run over 30 years (the lifespan of the Boreas project) – these models have been run over only 25 years.</li> <li>Further details regarding these issues can be found in Appendix 1. We recommend that these PVAs are updated by the Applicant to address these issues.</li> </ul>											
Scale of pr	At the end of the Vanguard examination Natural England concluded that a significant adverse impact could not be ruled out for gannet cumulative collision plus displacement impacts combined, kittiwake and great-black backed gull (GBBG) cumulative collision impacts, or razorbill and guillemot cumulative displacement impacts.											
1	Natural England also concluded that an adverse effect on site integrity could not be ruled out for in-combination collision impacts to kittiwake and the seabird assemblage from the FFC SPA or to lesser black-backed gulls from the Alde-Ore Estuary SPA. This is as well as gannet, guillemot and razorbill when Hornsea 3 was included in the in-combination assessment due to the concerns about the incompleteness of the Hornsea 3 baseline data. We note that the											
	Boreas project is adding more birds to these totals.  Natural England, therefore, recommends that the Applicant (and all relevant future projects located in the North Sea) considers raising turbine draught height, as has been done by other projects (e.g. Hornsea 2, East Anglia 3 and Vanguard). This is in order to minimise their contribution to the cumulative/in-combination collision totals by as much as is possible. Further details can be found in Appendix 1.											
1	Natural England does not agree with the HRA conclusions set out by the Applicant in the In Principle Monitoring Plan for offshore ornithology. We consider the aspects that are likely to be relevant for consideration for post-consent monitoring are: improving understanding of collision risk and etailed comments in Appendix 2)											
	Summary of Natural England's key concerns; Adverse effect on the integrity of Haisborough Hammond Winterton (HHW) SAC Consideration of alternative cable routes Sandwave Levelling and evidence to support recovery											
	Effectiveness of the proposed mitigation for Cable Installation Cable protection within designated sites Use of a Site Integrity Plan for benthic issues											
Adverse Ef	Favourable condition status of the reef features of the HHW SAC  Colonisation of foundations / cable protection / scour protection may affect benthic ecology and biodiversity  fect on Integrity of the Haisborough, Hammond and Winterton SAC  As part of the Vanguard Examination both the Applicant and Natural England have identified several impact pathways that could impact on the Annex I											
1	Sandbank and/or Reef features of the HHW SAC, when considered alone and cumulatively.  Natural England has concerns in relation to the Applicant's use of data sets, the over-reliance on the evidence presented, and assessment of the impacts against the conservation objectives for the designated site, which has resulted in a disagreement between the Applicant and Natural England on the significance of these impacts.											
	Therefore, Natural England is unable to agree with the conclusions within the Habitats Regulation Assessment for Boreas Offshore Windfarm (OWF) that there will be no adverse effect on the integrity of Haisborough Hammond and Winterton SAC Annex I sandbanks and reef features both alone and incombination.											
Considerat	Whilst we welcome the engagement by the Applicant during the Evidence Plan Process when considering site selection and their commitment to avoiding the Cromer Shoal Chalk Beds MCZ, we still have outstanding concerns in relation to the cable route through HHW SAC. As our understanding of cable installation has developed over the last 10 years and especially so over the last 18 months we are aware that installation impacts are considerably greate											
	than once thought. For example, the impacts from cable protection have the potential to persist and have been considered by the Applicant to be permanent habitat loss. Permanent loss of Annex 1 habitat from an SAC has a high likelihood of amounting to an adverse effect on the integrity of that SAC.  Therefore, Natural England advises that where possible sites designated for habitat features should be avoided. Where avoidance is not possible impacts											
	must be minimised to a level which allows the competent authority to be confident that there will be no adverse effect on the integrity of designated sites.  As set out below Natural England has concerns in relation to the ability to effectively implement some of the proposed mitigation measures i.e. microsite/route around Sabellaria spinulosa reef, and thus we believe that the conservation objectives for the site could be undermined. Therefore we do											
	not currently agree with the conclusions of the HRA and believe that there is a risk of an adverse effect on site integrity. We will continue to work closely with the Applicant on this matter, and highlight that cable routes avoiding areas with known areas of designated sites and/or Annex I reef is the best guarantee of avoiding adverse effects.											
Sandwave	It should be noted that we do not agree that you can separate out sandwaves from the form and function of Annex I sandbanks – they are the mobile pa of the sandbank and therefore affecting sandwaves would be affecting the form and function of sandbanks.  Generally, Natural England is content with the sandwave levelling assessment that has been undertaken. We also welcome the commitment by the	rt										
	Applicant to ensure that the dredged material will be deposited within HHW SAC such that the sediment will remain within the sandbank system. We would wish areas of Annex I Sabellaria spinulosa reef to be avoided when depositing the sediment.  Natural England acknowledges that the mobile nature of this particular sandbank system would make it more likely to recover from changes in structure then less mobile ones. But, there is no empirical data that relates to interventions of similar spatial and temporal scale to the proposals and for this											
1	particular sandbank system to support the modelling. Therefore, Natural England continues to have residual concerns in relation to the overall impacts to the form and function of the Annex I sandbank sandwave fields and their potential recoverability.  The main factors that are considered to influence the recovery potential (i.e. the mechanism and speed of recovery) of the levelled sandwaves are:											
	The dimensions of the dredged area, particularly the width and depth of the dredged channel relative to the overall sandwave height, and the alignment of the dredged channel relative to the crest axis; and. The degree of sediment mobility at the dredge location, which is in turn controlled by the environmental forcing conditions and water depth.  In addition, it is not clear in 'Appendix 5.3.7.1 sandwave levelling' as to how a single build vs phased build - and either option in-combination											
	with Boreas - has been assessed against the conservation objectives for the site. That is, it remains unclear whether the impacts are better, wors or no different.  Therefore, due to the limited amount of supporting evidence and uncertainty in the cumulative/in-combination assessment we are currently unable to advise beyond reasonable scientific doubt that there will be no adverse effect on integrity of HHW SAC Annex I sandbanks in-combination from sandwave											
Effectivene	levelling.  Sess of proposed mitigation for Cable installation (incl. non-sandwave levelling ground preparation)  Natural England agrees that where Annex I Sabellaria spinulosa reef can be successfully avoided, there is a reduced risk of adverse effects on the SAC from ground preparation and installation activities associated with the project.	1										
	However, consideration also needs to be given to the conservation objective to <u>restore</u> the reef features of the SAC, and therefore efforts must be made to minimise impacts on areas that have the potential to support reef in the future - please see point below regarding restoration of the reef features. In the above context, <b>Natural England currently has significant doubt regarding the evidence presented to i) support the successful avoidance of reef and</b>											
	ii) the ability of reef to recover if impacted through cable installation.  a) Mapping: The maps presented in relation to extent of Sabellaria spinulosa reef are hard to interpret because no evidence is presented in relation to the ability to distinguish reef from surrounding substrata. Furthermore there are differences in extent of the surveys and timing of the surveys.											
	b) Analysis: Some complex analyses have been applied to the data, but it is not clear why the methods have been used and what advantage they have over standard methods. It would be helpful to understand what challenges or limitations each method is attempting to overcome, and why the method selected is preferred. In addition, the use of multiple methods on multiple datasets a once conflates the confidence issues surrounding ability to identify reef and changes in space and time. Therefore, if the intention of	at										
	the consensus mapping is to deal with the variation in distribution over time then there are significant limitations with the way in which this has been approached.  c) Survey timings: Due to changes in the distribution of Sabellaria spinulosa over time as well as space, it should be recognised											
	that there are limitations with the use of ground truth data collected several years apart from a geophysical dataset to determine the current location of reef. (This information will help inform probable areas of reef however.) Furthermore, due to the patchiness of reef unless the same data point for grabs and other surveys are utilised and collected on the same day there may be a discord between the two. Therefore, on the evidence presented, the SNCBs have reservations regarding any approach to categorically	ie										
	determine the likelihood of reef being present/absent in the future at a given part of the SAC.  d) Restore Conservation objective: Site management measures are being developed for other operations likely to damage the interest features of the site and will be implemented in the future. In the absence of those pressures there is a high likelihood that Sabellaria spinulosa reef will recover/develop. One such management measure that is being considered is the use of fisheries byelaw	vs										
1	to protect areas where Sabellaria spinulosa reef have been shown to be regularly present. Therefore it is hoped that more extensive Sabellaria spinulosa reefs will be restored in these areas, and that existing encrusting and low quality reef will develop into higher quality reef habitat. Natural England would therefore advise that cable installation activities are avoided in these areas.											
	Given the above, the applicant's survey data and the recent CEFAS survey data, Natural England believes that there is a high probability that Sabellaria spinulosa reef could develop in a way that straddles the cable corridor route in the post-consent period. This would leave insufficient space to 'microroute' around the reef feature. Therefore, whilst Natural England continues to advocate that the standard mitigation measure/marine licence condition to avoid reef features is included in the Projects DML, it may not be feasible to fully micro route the cables. To address this the Applicant has included the	0										
	caveat 'where possible', but Natural England has concerns about the increased level of risk to the integrity of the site such a caveat would endorse, as there are no parameters to assess and agree what is "possible".  Natural England considers that a worst case scenario can be identified during the consenting phase. The Applicant proposes to use a Grampian condition to aid consenting and then a Site Integrity Plan to demonstrate no adverse effect on site integrity post consent/preconstruction. This is not helpful											
	especially as based on best available evidence an adverse effect on site integrity cannot be ruled out at this time. The AA should be undertaken now, and on the best available evidence. The Applicant's proposals would push the regulatory duty from BEIS SoS (consenting) to MMO/DEFRA SoS (post consent). We advise that under The Conservation of Habitat and Species Regulations 2017 (as amended) this is addressed at the consenting phase. The DCO											
	consenting process represents the best opportunity for the decision-maker to be presented with all relevant evidence and arguments and Natural England advise that all evidence is submitted as part of the application to allow the statutory authority to make an informed decision.	u e										

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This advice differs from that provided to Vanguard as recent evidence, being generated in connection with Triton Knoll OWF, has now demonstrated that
            micro siting around Annex I reef within Inner Dowsing Race Bank and North Ridge SAC is not possible and therefore a risk based decision needs to be
            made as to whether or not the cable can be installed. Given that there is evidence to demonstrate that there is a higher probability for Vanguard/Boreas
            to have Annex I Sabellaria spinulosa reef within the cable corridor than at Triton Knoll we advise that an adverse effect, both now and post consent, can't
            be ruled out. Therefore we advise that alternatives and/or compensation is secured
            In addition, the evidence presented in the HRA to support conclusions on recoverability relates only to individuals/abundance, but not to reef per se
            (being the Annex 1 habitat). Thus we have limited confidence in the ability of reef to recover from cable installation activities. Therefore, we further
            advocate that the standard mitigation measure of avoidance is adhered to.
            Natural England's consistent advice is that all qualities of reef (from low to high) are protected. Therefore, it is our view that targeting the impact on
            'inferior' areas of reef to minimise the significance of the effect is not Habitat Regulations compliant.
            Furthermore whether reef is avoided or not during installation there does remain a risk during O&M cable remediation activities that reef could establish
            across the cable corridor. Accordingly, every effort should be made, with input from the MMO and Natural England, to minimise the impacts at the time of
            undertaking the works.
Cable protection within designated sites
           In general, Natural England strongly advises against the use of cable protection within designated sites as the addition of hard substrata is often
            incompatible with the conservation objectives for Annex I sandbanks and reef features. Natural England notes that there is a potential worst case scenario
Use of a Site Integrity Plan for benthic issues
            The use of a Site Integrity Plan (SIP) for SAC benthic habitat features has only been used previously by Vanguard. We have reviewed our advice with the
            MMO in light of the Triton Knoll OWF case and we do not believe that SIPs are an appropriate means of avoiding adverse effect on site integrity for benthic
            issues where a worst case scenario can be determined. In addition they do not enable in-combination assessments with other plans and projects and may
          17 therefore restrict other development within the SAC. Therefore, Natural England does not support the use of this Grampian style condition within the
            Please note that unlike with the Southern North Sea SAC where the in-combination assessment is dependent on factors outside the control of the project
            and there are several options to mitigate the impacts, this is not the case for benthic SACs.
Favourable condition status of the reef features of the HHW SAC
            The HHW SAC features, Sandbanks which are slightly covered by sea water all the time and Reefs, are both in unfavourable condition (Link to Feature
             Condition Assessment).
            The HHW SAC is under pressure from historic and ongoing activities from proposed offshore windfarm cables plus existing oil and gas pipelines and
            associated pipeline protection.
          18 Cable installation in sandbank sites has been shown to be challenging due to impacts associated with cable installation such as sandwave clearance and
           use of hard substrate as cable protection. Cabling through this site may be possible if evidence is provided that impacts are short-lived and the feature will
            recover. Consideration would need to be given as to how sufficient cable burial is achieved without the need for cable protection. Should sandwave
            clearance be necessary to achieve burial depth and avoid the use of cable protection then, as above, it would need to be demonstrated that impacts are
            short-lived, the feature can recover, and that dredged material is retained in the system and can be deposited on material of the same grain size.
Colonisation of foundations / cable protection / scour protection may affect benthic ecology and biodiversity
            We agree that potential beneficial effects may occur from introduction of hard substrate into a soft substrate system. However, within MPAs where the
            features of interest include soft mixed sediments, the establishment of any artificial hard reef on soft/mixed sediments must be considered against the
            conservation objectives to restore or maintain the features for which the site is designated. As such, any potential benefits from the introduction of hard
            substrate are outweighed in HHW SAC by the impact that the hard substrate will have on habitat change and the features of the site and the achievement
          of recovery.
            Furthermore, any suggestion that the loss of natural Annex I feature is being compensated for by the creation of new artificial reef brings in issues of
            compensation, and therefore Imperative Reasons of Overriding Public Interest and Article 6.4.
Operation and Maintenance Activities
            It is the view of Natural England that Operations and Maintenance activities should either be excluded from within this designated site (at the consenting
         20 stage with option to apply for a separate marine licence at a later date) or sufficiently restricted to ensure no adverse effect. This is because repeated
           O&M activities can result in continued disturbance which would prevent recovery of Annex I reef, as seen for Race Bank.
Marine Mammals (detailed comments in Appendix 3)
            As per Natural England's advice on other recent NSIP applications, a mechanism needs to be developed by the regulators to ensure continuing adherence
            to the SNCB thresholds over time. Multiple SIPs will be developed, piling can take place over several years, and new projects can come online during this
            time. Should potential exceedance of the thresholds occur, a process for dealing with this issue needs to be in place – the affected developers / industries
            will need to work together with the regulator and SNCBs to prevent adverse effect on the Southern North Sea SAC.
          21 Until the mechanism by which the SIPs will be managed, monitored and reviewed is developed, Natural England are unable to advise that this approach is
            sufficient to address the in-combination impacts and therefore the risk of adverse effect on integrity on the Southern North Sea SAC cannot be fully ruled
            This is not an issue unique to the project and work will need to be undertaken to reduce the noise levels of multiple wind farms potentially constructing at
            the same time.
Onshore works (detailed comments in Appendix 4)
            Summary of Natural England's Key concerns;
            Further information required regarding potential HDD effect to River Wensum SAC
            Inclusion of mitigation for Paston Great Barn SAC
            Consultation on Water Crossing Plans
             Inclusion of mitigation for impacts on Air Quality
            Impacts on Protected Species
            Inclusion of mitigation for impacts to Broadland SPA and Ramsar
            Post construction monitoring
Mitigation of impacts to Terrestrial Ecology
           Given the number of Horizontal Directional Drilling (HDD) drilling mud breakouts experienced recently during the construction of other wind farms a more
            thorough HDD methodology should be presented and the potential effects of a drilling break out on designated sites and species assessed as part of the
           Broadland SPA and Ramsar are currently scoped-out, These sites were scoped-in for Vanguard and mitigation agreed and incorporated within the Outline
            Landscape and Environmental Management Strategy (OLEMS). Natural England advises that these sites are scoped-in and the same mitigation
           Mitigation agreed during the Vanguard examination, as detailed within the Code of Construction Practice (CoCP) and OLEMS should be incorporated into
           the Boreas OWF DCO documents at the earliest opportunity. For example mitigation agreed as part of the Vanguard Examination process for Broadland
           There is currently only limited onshore post construction survey or monitoring proposed to ensure protected habitats and species have been successfully
            reinstated post construction. Within the OLEMS post construction monitoring is currently only proposed for water voles and newts. Natural England advise
            There is currently no inclusion of net gain within the proposed project design. We recommend the Applicant incorporate net gain into their design at the
         26 earliest opportunity and produce a net gain DCO document. This is required in order to demonstrate how the development will contribute to net gain and
            contribute a biodiversity legacy to the Norfolk environment.
More detail required on the mitigation in relation to HDD
            We consider that there is insufficient information to enable us to conclude that the designated site will be safeguarded from impact from HDD during
          There is insufficient detail in the CoCP for measures to safeguard the designated site in relation HDD drilling mud 'breakout' (where the drilling fluid leaves
           the bore and escapes into the surrounding substrate). This comment relates to crossings of all water dependant designated sites including River Wensum
            SAC, Norfolk Valley Fens SAC, The Broads SAC and SSSI sites downstream.
The need for a mitigation plan for Paston Great Barn SAC
          We advise that, as a requirement of the development, that prior to removal of hedgerows, a mitigation plan should be drawn up and agreed with Natural
          England. The plan should include for the improvement of the hedgerows either side of the section to be removed including any gapping up, tree
          During the Vanguard OWF examination process the Applicant committed to producing site specific water crossing plans on which Natural England would
          be consulted Natural England is particularly concerned regarding where the onshore cable route may impact upon water dependant designated sites, such
The need for mitigation for impacts on Air Quality
        The EIA identified that the development may have in combination air quality impacts on designated sites in proximity to traffic and transport routes, in
            particular The River Wensum SAC/SSSI and Felbrigg Woods SSSI. Natural England advises the Applicant to include commitments within the Outline Traffic
Impacts on Protected Species
           Natural England has received a draft Great Crested Newt Licence Application and is currently considering issuing a Letter of No Impediment.
           We advise the Applicant to submit licence applications for protected species as soon as possible.
The need for Mitigation for Impacts to Onshore Ornithology
            During the Vanguard examination it was noted that the survey data collected for onshore ornithology species was not of sufficient duration and had not
            been linked to crop rotations so it would not be possible to comment on where Broadland SPA and Ramsar species may be using Functionally Linked Land,
            during the construction phase and that there could be direct effects on ex situ habitats. The Applicant committed to providing ornithological mitigation in
         32 a Clarification Note and the Vanguard OLEMS.
           These commitments are not reflected in the Boreas documents as submitted, namely the integrity matrices, Information to support HRA, Schedule of
            Mitigation or OLEMS. We advise that these documents are amended to include mitigation as incorporated as part of Vanguard OWF OLEMS (Deadline 9)
            and submitted as soon as possible during the examination process.
Development Consent Order (detailed comments in Appendix 5)
            There are several areas of concern where Natural England advises that further clarification is required in order to ensure that the DCO accurately captures
            the various commitments and parameters of the project that have been agreed through consultation thus far.
            Many of the volumes assessed in the Environmental Statement project description (disposal, cable protection and scour protection) do not appear to
          33 match those used in the DCO/DMLs. Clarification should be requested from the Applicant on these issues.
            Natural England requests that a period of 6 months be allowed for submission, consultation and approval of pre-construction plans.
            Natural England reiterates its support of the MMO position on the inclusion of appeals process as raised in the Vanguard OWF hearings.
            Natural England welcomes that decisions made on the DMLs have been excluded from the arbitration provision.
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We therefore advise that the Applicant updates the cumulative/in-combination assessments to take account of the above points. As a result of the
            above, we are currently unable to make any conclusions regarding the level of cumulative/in-combination operational displacement impact on auks.
             However, we note that at Vanguard, Natural England was unable to rule out a significant adverse effect for cumulative operational displacement on
           razorbill or guillemot at the EIA scale.
                    Additionally, we note that during the Vanguard examination, Natural England were able to rule out adverse effect on integrity of the FFC SPA due
                   to in-combination operational displacement on the razorbill and guillemot features of the site when Hornsea 3 was not included in the in-
                    combination total. However, due to Natural England's significant concerns regarding the incomplete baseline surveys for the Hornsea 3 project,
                   and the associated level of uncertainty as regards the potential impacts of that project, Natural England was not in a position to advise that an
                    adverse effect on integrity could be ruled out for the razorbill and guillemot features of the FFC SPA for impacts in-combination with other plans
                   and projects when Hornsea 3 was included in the in-combination total (see our comments on the Applicant's Deadline 8 updated auk
                    displacement assessment submitted at Deadline 9, available from: https://infrastructure.planninginspectorate.gov.uk/wp-
                   content/ipc/uploads/projects/EN010079/EN010079-003190-DL9%20-%20Natural%20England%20-%20Deadline%20Submission.pdf).
                   The Boreas project is adding further birds to these totals.
           <u>Cumulative and in-combination collision assessments</u>:
             The following wind farm projects are missing from the assessments: Kentish Flats Extension and Methil.
            Clarification is required as to which set of collision risk figures have been used for Vanguard in the assessments. The figures that should be included are
            those from the final set of updated figures for the project (i.e. those for the 10MW turbine, revised layouts and raised draught height and using the full
            breeding season for gannet, kittiwake and LBBG, as presented in the Applicant's additional submission, MacArthur Green 2019c).
             Clarification is also required as to which set of collision risk figures have been used for Thanet Extension in the assessments. We suggest that the figures
             included for Thanet Extension are those presented in Table 3 of Appendix 39 of the Deadline 3 submission for this project's examination (available from:
             https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010084/EN010084-001282-
             D3 Appendix39 TEOW CRM RevB.pdf). The approach taken for all species for the Thanet Extension figures should be consistent (i.e. all the upper
             figures, or all the central figures of the range presented in Table 3 of Appendix 39 of the Deadline 3 Thanet Extension submission).
            There are differences in the figures used in the EIA cumulative assessments for Vanguard, Thanet Extension and Moray West to those that are then used
            in the apportioning to the SPA colonies in the in-combination assessment. The figures used should be consistent in the ES and the HRA reports.
                    As was noted in our Deadline 7 responses at Vanguard (see: https://infrastructure.planninginspectorate.gov.uk/wp-
                    content/ipc/uploads/projects/EN010079/EN010079-002878-DL7%20-%20Natural%20England%20-%20Deadline%20Submission.pdf), we suggest
                   that the figures included in the assessments for the Hornsea 3 project are those from our Deadline 7 response (Natural England 2019). These
                    figures were used for an illustrative assessment of collision impacts based on the parameter values that were most closely aligned with the
                    approach advised by Natural England. However, it should still be noted that Natural England have highlighted throughout our written and oral
                    submissions for Hornsea 3 that the lack of sufficient baseline information for the Hornsea 3 Zone (i.e. the array area) means that there is a
                    considerable degree of uncertainty (and thereby level of risk) associated with these figures and these should in no way be seen as Natural
                   England's agreed position on the levels of impact from Hornsea 3.
                    · We would advise the Applicant checks the summing up of the LBBG collisions in the breeding season of the offshore wind farms located
                   within 141km of the Alde-Ore SPA, as Natural England calculates the total for the wind farms and figures currently presented to be 102.6 birds
                   (rather than the Applicant's calculation of 87.2).
                        Natural England also does not consider it is appropriate to apply the 30% calculated by Boreas to apportion figures from the other OWFs
                    within 141km of the Alde-Ore during the breeding season. Natural England notes that a range of approaches have been used to conduct in-
                    combination assessments for OWFs, with applicants applying a blanket apportioning rate across projects out to a certain distance, using the
                   figures from the Environmental Statements (or associated examinations), or using a mixture of values from these two main approaches. . Until
                   such time that a robust alternative methodology is agreed, Natural England continues to advise that the figures used in in-combination
                   assessments should be based on the apportionment rates agreed during the assessments of that project. We would welcome further discussions
                   regarding the best approach to in-combination apportioning.
             We therefore advise that the Applicant updates the cumulative/in-combination assessments to take account of the above points. As a result of the
             above, we are currently unable to make any conclusions regarding the level of cumulative/in-combination operational collision impact on any of the
             relevant species or to the combined impact of gannet cumulative/in-combination displacement plus cumulative/in-combination collision.
             However, we note that at Vanguard, Natural England was unable to rule out a significant adverse effect for cumulative operational collision impacts on
             gannet, kittiwake or GBBG. We were also unable to rule out adverse effect on integrity due to in-combination collision risk on the LBBG feature of the
             Alde-Ore Estuary SPA or the kittiwake feature of the FFC SPA (see our Deadline 8 response, available at:
             https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-003121-DL8%20-%20Natural%20England%20-
             %20Deadline%20Submission.pdf).
                    Additionally, we note that during the Vanguard examination, Natural England were able to rule out adverse effect on integrity of the FFC SPA due
                   to in-combination operational displacement plus collision impacts on the gannet feature of the site when Hornsea 3 was not included in the in-
                    combination total. However, due to Natural England's significant concerns regarding the incomplete baseline surveys for the Hornsea 3 project,
                    and the associated level of uncertainty as regards the potential impacts of that project, Natural England was not in a position to advise that an
                    adverse effect on integrity could be ruled out for the gannet feature of the FFC SPA for impacts in-combination with other plans and projects
                    when Hornsea 3 was included in the in-combination total (see our Deadline 8 response, available at:
                    https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-003121-DL8%20-
                    %20Natural%20England%20-%20Deadline%20Submission.pdf).
                    We note that the Boreas project is adding further affected birds to these totals.
                RTD cumulative operational displacement assessment
           We welcome that all OWFs in the south-west North Sea BDMPS have been considered in the RTD cumulative operational displacement assessment.
           However, the Applicant has considered that all OWFs at which turbines were installed before or during 2012 form part of the Boreas baseline. Whilst we
           agree that as Boreas's baseline characterisation surveys didn't start until 2016, any displacement effects from OWFs operating at that time would be
           picked up in Boreas's survey data if the effects from the other wind farms cover the Boreas survey area. However, Natural England does not agree that
           these wind farms should be considered part of the baseline. This is because, although some of the wind farms included in the Applicant's list have been
           operational for over 10 years, the RTD population data pre-date the installations (e.g. that used in Furness 2015 to inform the RTD BDMPS comes from a
           variety of sources including O'Brien et al. 2008, which draws on aerial survey data from 2001-06 and Wetland Bird Survey and county bird records from
           1995-2005). Therefore the baseline cannot be assumed to include the effects of these wind farms. In addition, we note that no figures have been included
           in the cumulative assessment for the East Anglia One North and East Anglia Two projects.
           In Table 13.41 of the Environmental Statement Chapter many of the OWFs are listed as having no RTD displacement assessments or qualitative
           assessments with no numbers available. We would therefore recommend that a better approach would be to take the same approach as for auks, i.e.
           present the seasonal mean peak abundances (as we would assume that even if no RTD displacement assessment was done, the survey data from the
           relevant Environmental Statements would be available) and then sum figures across the OWFs and put this through the matrix. However, we note that not
           all Round 1 or 2 OWFs may have survey data covering the OWF sites and a 4km buffer and therefore, the data may not be 'like for like' in terms of the
           survey areas covered.
            An alternative way of undertaking the cumulative RTD assessment using a 'like for like' approach could be to take a similar approach to that taken by
           Thanet Extension (and was taken by Vanguard during the examination in the Applicant's Deadline 6 Updated Offshore Ornithology Assessment, MacArthu
           Green 2019d), which used the predicted density map and the underlying dataset of the SeaMaST project (Seabird Mapping and Sensitivity Tool) described
            in Bradbury et al. (2014) as a common data source of RTD density in the North Sea. The underlying dataset can be accessed from Natural England following
            a specific data request. This approach is outlined in Annex C of Thanet Extension's Appendix 1, Annexes A to G to Deadline 1 Submission (available from:
           https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010084/EN010084-001076-
           Vattenfall%20Wind%20Power%20LTD%20-%20summary%20of%20RR%20annex%20A%20-%20G.pdf). .
           We therefore do not agree that the cumulative RTD operational displacement mortality total combines several sources of precaution, as the calculated
           figure does not include estimates of displacement for wider region projects and the calculated total is a massive under-estimate of the level of
           displacement. As highlighted above a method that takes account of the contribution of RTD operational displacement from all projects, whether or not
           figures have been presented in their Environmental Statements, needs to be brought forward. Therefore, we are currently unable to consider the
           significance of the cumulative impact from operational displacement until the full extent of displacement from all relevant OWFs.
           However, we note that at Vanguard, Natural England were unable to rule out a significant adverse effect for cumulative operational displacement on RTD
           at the EIA scale (see our Deadline 7 response, available at: https://infrastructure.planninginspectorate.gov.uk/wp-
            content/ipc/uploads/projects/EN010079/EN010079-002878-DL7%20-%20Natural%20England%20-%20Deadline%20Submission.pdf). We note that the
            Boreas project is adding further affected birds to this total.
                Gannet cumulative and in-combination operational displacement assessment
           Whilst we agree that the impacts to gannet from operational cumulative displacement at the EIA scale is likely to be negligible, we suggest that a similar
            approach to that undertaken for the auk cumulative displacement assessments is undertaken for gannet, i.e. to sum the bird abundance estimates for
        6.3 each relevant offshore wind farm and put this total through a displacement matrix, and then assess with a range of displacement of 60-80% and mortality
           of 1-10% (as was undertaken by Vanguard during the examination in the Applicant's Deadline 6 Updated Offshore Ornithology Assessment, MacArthur
           Green 2019d), as has been undertaken by the Applicant for in-combination gannet displacement for the FFC SPA.
7. Additive impacts (collision plus displacement for gannet)
           Natural England considers the two impacts of collision and displacement as additive and advises that they should be summed – this is of particular
            relevance for gannet both for Boreas alone and cumulatively/in-combination. We welcome that the Applicant has undertaken this assessment for in-
           combination combined displacement plus collision for the FFC SPA. However, such an assessment should also be undertaken for Boreas alone for both EIA
           and HRA and also cumulatively at the EIA scale.
           We acknowledge that in summing the predicted mortalities that may arise via these two mechanisms, there is a risk of double counting. Thus it is
           acknowledged that this simplistic approach will therefore incorporate a degree of precaution. However, the extent of that is hard to gauge given that the
           predictions of the number of fatalities due to collisions depends critically upon application of an assumed overall avoidance rate (i.e. an assumed
           percentage of individuals which alter their flight behaviour to avoid collisions) which in some cases can be considered to incorporate some degree of
           macro-avoidance of entire wind farms and might otherwise be classed as barrier impacts. The SNCBs are seeking further evidence from ongoing and
             proposed studies into avoidance rates that will help clarify the relationship between collision risk, displacement and so called 'macro' avoidance.
8. Population modelling (EIA and HRA)
           The significance of the predicted in-combination collision impacts has been considered by reference to various PVA models that are currently in existence:
            For HRA: the PVA undertaken during the Vanguard OWF examination for LBBG at the Alde-Ore Estuary SPA; and the PVAs undertaken during the Hornsea
             3 OWF examination for gannet and kittiwake at the FFC SPA.
            For EIA: the national gannet PVA undertaken by the SOSS-04 work (WWT 2012) and the kittiwake and great black-backed gull EIA PVAs undertaken for the
            East Anglia 3 OWF assessment (EATL 2015 & 2016).
           We note that Natural England had some outstanding concerns/queries regarding this PVA during the Vanguard Examination (namely regarding the
           adjustment of the productivity to take account of the proportion of birds that miss breeding each year; and that we were unable to check the baseline
           growth rate predicted by the model from the outputs of counterfactuals presented, see our Deadline 8 response, available at:
           https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-003121-DL8%20-%20Natural%20England%20-
           %20Deadline%20Submission.pdf). We also had outstanding concerns with the Hornsea 3 PVAs which were not resolved by the close of the Examination,
           relating to the number of simulations and the demographic data not being updated (see our Deadline 6 response to the Hornsea 3 Examination – written
            summary of representations of ISH5, available at: https://infrastructure.planninginspectorate.gov.uk/wp-
            content/ipc/uploads/projects/EN010080/EN010080-001688-Natural%20England%20-
           %20Written%20Submission%20of%20Natural%20England's%20Representations%20at%20Issue%20Specific%20Hearing%205%20-
           %20Offshore%20Ecology.pdf). These models nevertheless represent the best available evidence on which to base an assessment, though this should not
           be taken as a Natural England endorsement or 'acceptance' of the models.
           The appropriateness of the SOSS gannet PVA and the EIA PVA models for kittiwake and GBBG have been discussed during the Vanguard examination, and
           has been indicated to Norfolk Boreas, Natural England does not consider that these models are adequate to inform the assessments for Norfolk Boreas for
           the following reasons:
            The stochastic simulations were not run as matched pairs. Where stochastic PVA models are used, it is important to use a 'matched-runs' approach
             where a metric is derived for each matched pair of baseline and impacted simulations (as has been done for the PVAs undertaken during the Hornsea 3
            and Vanguard examinations for the FFC SPA and Alde-Ore Estuary SPA). Stochasticity is included in the population models, but the survival and
            productivity rates used for a 'pair' of impacted and un-impacted populations at each time step are the same. This means that the effect that is measured
             with the metric can be more clearly attributed to the impact, than to model uncertainties such as the variability in the demographic parameters that
            have been sampled or to observation errors. Cook & Robinson (2017) tested the effect of using unmatched compared to matched runs in PVA models
            and demonstrated that the median values of several evaluation metrics (e.g. counterfactual of population size) were greater when a matched runs
             approach was used compared to when the simulations were unmatched and the uncertainty around the metrics was much greater in the unmatched
             scenario. Models were run with 1,000 iterations. It may be the case that the median values of the matched versus unmatched runs approach will
             converge if a larger number of simulations (e.g. 5,000) are used, however the confidence limits are still expected to vary between the two approaches.
            Natural England therefore advises that one amendment required to the existing PVA models used by Boreas is to run the simulations using matched-
             Natural England recommends using the counterfactual of population growth rate and the counterfactual of population size to quantify the relative
            changes in a population in response to anthropogenic impacts. Natural England considers that assessments should focus on the counterfactual of growth
             rate and the counterfactual of final population size, as these are the two metrics that are, in Natural England's opinion, least sensitive to mis-
             specification of the population trend and demographic rates used in the PVA model. These metrics should be calculated at the end of the impact period.
             These models do not present outputs for the required metrics.
            These PVA models used were only run over 25 years and the Boreas project will have a lifespan of a maximum of 30 years. The current approach whereby
            PVA models are run over 25 rather than 30 years would lead to an underestimate of impact, given that if the OWF has an operational period of 30 years,
             then potential impacts occurring in the last five years of operation are not being accounted for in the models. Therefore, we recommend that these
            PVAs are revisited.
9. Scale of predicted cumulative and in-combination impacts and requirement for mitigation
           Natural England has previously provided regulators with our advice regarding our concerns about predicted level of cumulative and in-combination
           impacts on North Sea seabirds:
            For EIA we have been unable to rule out a significant adverse effect for cumulative operational impacts on:
                               Gannet for cumulative collision plus displacement impacts;
                               Kittiwake and GBBG for cumulative collision impacts;
                               Guillemot and razorbill for cumulative displacement impacts;
                              RTD for cumulative displacement impacts.
            For HRA we have been were also unable to rule out adverse effect on integrity for in-combination operational impacts on:
                               LBBG at the Alde-Ore Estuary SPA due to in-combination collision impacts;
                               Kittiwake at the FFC SPA due to in-combination collision impacts.
             Additionally for HRA, we have previously (at Vanguard) been able to rule out adverse effect on integrity due to in-combination impacts when Hornsea 3
             was not included in the in-combination total, but due to Natural England's significant concerns regarding the incomplete baseline surveys for the
             Hornsea 3 project, and the associated level of uncertainty as regards the potential impacts of that project, Natural England was not in a position to
             advise that an adverse effect on integrity could be ruled out for:
                               Gannet at the FFC SPA due to in-combination collision plus displacement impacts;
                               Razorbill at the FFC SPA due to in-combination displacement impacts;
                               Guillemot at the FFC SPA due to in-combination displacement impacts. .
           As noted above, these concerns are likely to only intensify at Boreas given that additional birds are being added to these totals. Three further offshore
           wind farm NSIPs are due to be submitted to PINS in the next twelve months (East Anglia One North, East Anglia Two, Hornsea Four). Natural England
           therefore considers that without major project-level mitigation being applied to all relevant projects coming forward, there is a significant risk of large-
           scale impacts on seabird populations.
           Natural England therefore recommends that the Boreas Applicant (and all relevant future projects located in the North Sea) considers raising turbine
           draught height, as has been done by other projects (e.g. Hornsea 2, East Anglia 3 and Vanguard), in order to minimise their contribution to the
           cumulative/in-combination collision totals by as much as is possible.
10. Post-construction monitoring
           We welcome the commitment from the Applicant in the In Principle Monitoring Plan regarding offshore ornithological monitoring that the Applicant will
            engage with stakeholders and that the methodology would be developed through the Ornithological Monitoring Plan (required under Condition 14(1) (I) of
           Schedule 9 and 10 of the DCO). We agree with the Applicant that the aims of monitoring should be to reduce uncertainty for future impact assessment and
           address knowledge gaps. Given Natural England's previous advice at recent projects (e.g. Vanguard) regarding our concerns about predicted levels of
           cumulative and in-combination impacts on North Sea seabirds (see point 9 above), and Boreas' likely contribution to those impacts should it be
           consented, we consider the aspects that are likely to be relevant for consideration for post-consent monitoring are as follows:
          | Improving our understanding of collision risk (which could potentially include monitoring of collisions at the site via cameras on turbines, improvements
            to modelling, options for mitigation and reduction);
             Improving our understanding of displacement (particularly understanding the consequences of displacement);
            Collection of reliable data on seabird flight heights, and;
            Colony-based studies (improvements to reference population estimates and evidence for colony phenology and connectivity).
           Once the final impact figures are agreed, the key issues should be identified and narrowed down so that discussion can be held with relevant stakeholders
           and the Applicant to identify what may need to be explored further.
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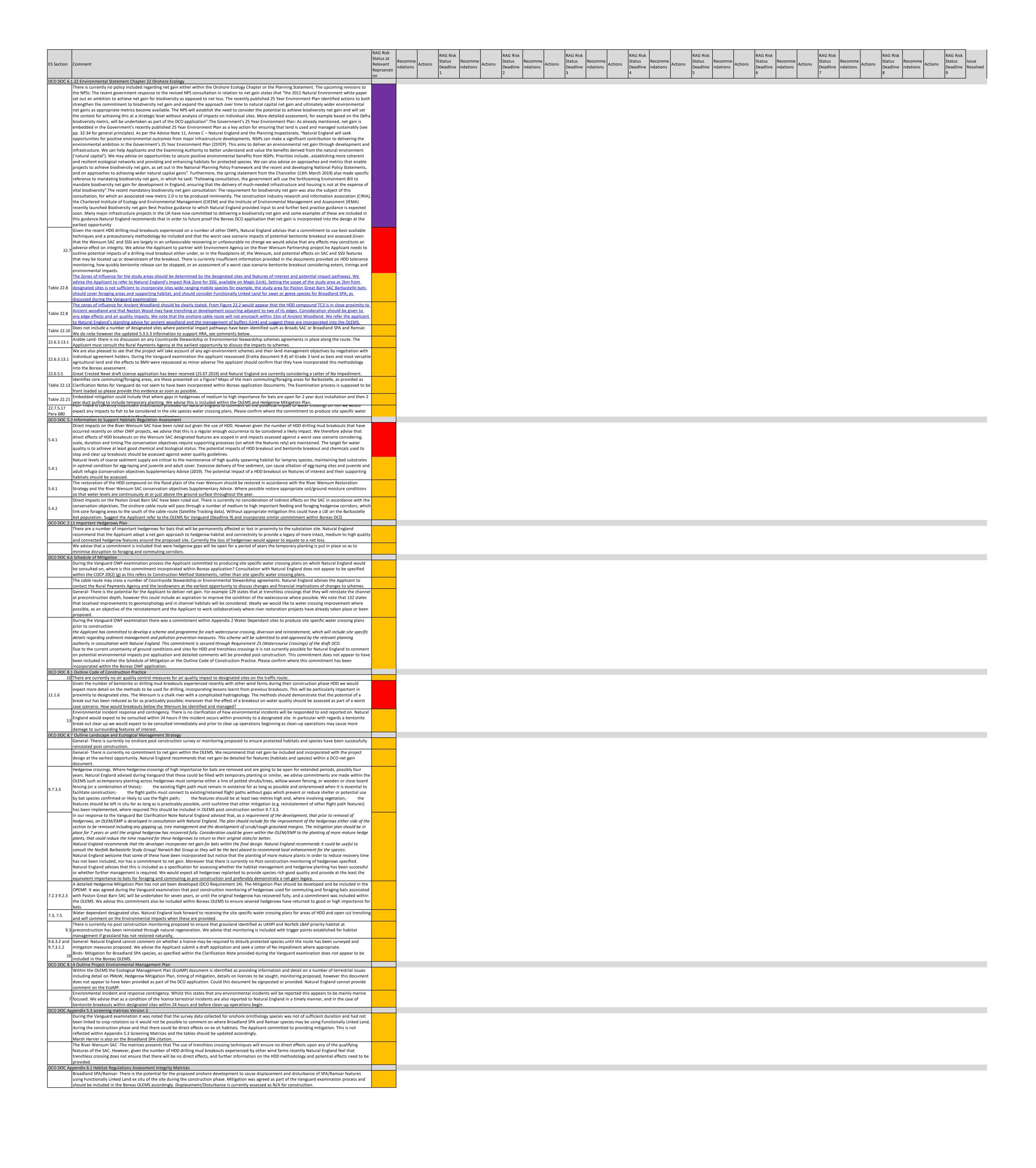
Section	IL OMMENT	RAG Risk Recomme Indations Rad Risk Status Recomme Indations Rec
	Marine Geology, Oceanography and Physical Processes  Please be advised that the placement of seabed material from cable installation to remain within HHW SAC and agreeing the approach to this (i.e. upstream of site excavated, on similar particle sized sediment, avoiding impacts on Sabellaria reef within site) needs to be implemented as a license	
8.7.5, 180	condition and assessed as part of the Appropriate Assessment for the site.  Any sandwave levelling within the SAC (if agreed) must have detailed monitoring before and after the activity, with method and frequency to be agreed with Natural England in order to monitor impact and recovery, as there is currently an evidence gap in this area. This needs documenting for the record	
202	and implementing as a specific license condition.  Please be advised that there is currently no evidence that Natural England has seen that sandwave levelling ensures cables remain buried and there is no future need for reburial or cable protection. Whilst this has been asserted by a number of projects we are yet to understand if this is the reality.  Table 8.16 – note that whilst it is intended the material remains in the system the volume of material proposed to be dredged is large and comparable to	
	some aggregates dredging  Please be advised that best practice would be to deposit any material dredged immediately upstream of where it is removed to allow natural infill as soon as possible, rather than removal to another or central site. Natural England would prefer material from the export cable route within HHW SAC to be	
270	deposited within the site and not removed to the offshore windfarm array. Additionally any sediment deposited should be deposited on material of a similar grain size to avoid habitat change whether inside or outside of an MPA.  Natural England does not agree there will be negligible impact. The issue is not just bed level changes as described here, but impacts on the sandbank	
280	feature and relevant attributes – volume, extent, morphology etc. as described in the supplementary advice on conservation objectives.  https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030369&SiteName=hais&SiteNameDisplay=Haisborough%2c+Hammo nd+and+Winterton+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=	
	Also we note that there appears to be no assessment here of the impact of the dredging itself on the attributes.  Natural England does not agree that near field effects are low in scale due to the large volume of proposed dredging and material released.  Natural England does not agree that the scale is low – what is the justification for this given the large volumes dredged?  As mentioned previously there is currently no evidence for timescales for recovery of sandwaves from sandwave clearance, or that the sandbank system	
330	will remain undisturbed. Initial monitoring from Race Bank showed that some dredged areas showed some signs of infill within a few months of dredging and other areas did not. Whilst we agree that theoretically larger morphological processes should enable the sandbank to recover, the impact is none the less significant and timescales for recovery are unclear.	
	If permitted monitoring will be required to demonstrate that recovery does occur within a year and should be a license condition.  Benthic and Intertidal Ecology (Ref. 6.1.10)  The magnitude of the impact to Sabellaria spinulosa reef is only low if micro-siting is possible.	
	Natural England queries the extent of Sabellaria spinulosa at the time of pre-construction surveys and the likelihood that it will be located across the majority of the cable corridor. In point 139 it is good the Applicant has assessed room available for micro-routing, but as set out in our Site Integrity Plan	
	and Habitat Regulations advice we have limited confidence in the feasibility of this mitigation measure.  Impact 2b - This states that disposal will be at least 50m from Sabellaria spinulosa reef identified in pre-construction surveys, which is consistent with nearshore aggregates advice —and may be acceptable for disposal on the seabed. But it should be noted that for offshore designated sites the appropriate buffer is normally 500m and therefore further justification for a reduced buffer should be considered to ensure a consistent approach across sites and	te te
Table 10.2		
214	spinulosa is tolerant to a certain amount of smothering, but the volumes being discussed here are large). This needs to be a license condition.  Please note that low reef is still reef.  endix 7.1 ABPmer Sandwave Study April 2018	
Comment	Overall, Natural England remains uncertain about what the impacts are from i.e. cable installation or cable repair - terminology seems to switch between the two with a lack of clarity. For example top of page 5 it is unclear whether the dredge corridor is 7m per cable – so 28m in total or 7m per pair so 14m in total.	in the second se
iii and 4.3.3	No evidence/ justification has been presented to show that there is no difference in deposition following surface or near bed release of disposal material.  We advise that this assessment is completed in order to ensure that the best method is used to minimise the impacts as much as possible. However, we note that this is covered in Chapter 8, but again is limited assessment and dependent on disposal location	
P1	More detailed information can be found in Natural England's supplementary advice on conservation objectives which should be used to assist in more detailed assessment of impacts of pressures, although we acknowledge the high level conservation objectives replicated here are correct:  https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030369&SiteName=hais&SiteNameDisplay=Haisborough%2c+Hammo nd+and+Winterton+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea	
P5	Natural England is currently unsure if one dredge spoil disposal zone is sufficient or whether there should be multiple zones to aid recovery. This could have potential implications for other site features such as <i>Sabellaria spinulosa</i> reef  Natural England notes that the impacts will be bigger where the cable corridor runs east of Newarp bank, and that the areas dredged will be parallel to	
P29	and therefore affect a greater proportion of sandwave. Natural England advises that options are considered to avoid and/or minimise the impacts as much as possible?  We do not agree that you can separate sandwaves out from form and function of Annex I sandbanks – they are the mobile part of the sandbank and	zh en
	therefore affecting sandwaves is affecting the form and function of sandbanks.  Natural England's understanding is unclear from an impact on the SAC perspective whether phased or single build is preferable – would be good to discuss and come to a view. P31 implies that phased build between the two windfarms will not have greater impacts, but again this needs further evidence to	SS
	Support conclusions  Natural England would like to discuss further and agree appropriate sediment disposal locations to maximise recovery However, it is not clear what the impact and benefit is from the one proposed/ modelled disposal location?  It is stated that dredged material being placed 'a short distance from individual bedforms' must be agreed and conditioned.	
	It is stated that dredged material being placed 'a short distance from individual bedforms' must be agreed and conditioned.  We agree with this. In order to ensure the ongoing form and function of the sandwaves and sandbank system is perpetuated, the dredged material would ideally be disposed of nearby and up-drift (i.e. to the south) from the proposed levelling works. And while disposal zones are highlighted, only one is indicated.	J Total Control of the Control of th
P35	We believe that removing material would affect the structure of Annex I sandbanks and potentially change sediment extent and distribution and/or result in a change in biological composition, which is contrary to the conclusions of the HRA. The Applicant believes that it is noteworthy that the volume of material being dredged from any individual sandbank is minimal compared to the total sediment volume contained within the sandbank and for these	lt
	reasons, the form and function of the sandbank systems within the Haisborough Hammond and Winterton SAC would not be disrupted by the proposed bed levelling works.  We would welcome the opportunity to see the detail of this assessment, in order to assess the implications for the conservation objectives of the site.	
Appendix 7.	2 Vanguard and Boreas Sabellaria Review  There are two key challenges with mapping Sabellaria spinulosa reef. In some locations, S. spinulosa reef is difficult to map at any given time due to issues such as the acoustic signal of S. spinulosa reef being similar to that of the substrates on which it most commonly forms. Secondly, the distribution of S.	
	spinulosa reef is variable in space and time and so any given survey is a snapshot in time. The report does not distinguish between these two issues, which makes it harder to interpret the data. Some complex methods have been employed, but it is not always clear why these methods have been used, and what advantage they have over standard methods, such as those described in Limpenny et al. 2010. It would increase the clarity of the project if it was	
General	It is best practice to determine the confidence in each map which will feed into this project (e.g. the East Coast REC) by reviewing how accurately the methods that project used will map reef at a given time, based on the data used in that project and the analysis techniques employed. Once the	
	confidence in each individual contributing map has been considered then the maps can be compared to consider the temporal element.  In using multiple methods on multiple datasets at once, the Applicant runs the risk of conflating the two challenges.  If the intention of the consensus mapping is to deal with the variation in distribution over time then there are significant limitations with the way in which this has been approached, and we would advise further discussion with Natural England on what would be appropriate. For example, the two EC REC	ch Charles and the second seco
	datasets are derived from the same survey and so do not deal with variation over time. The approach used does not account for survey effort, meaning the final map will be skewed. Specific examples of this issue are included in the table below.  The ground truthing data span a wide temporal range, but are all compared to a single geophysical dataset. Sabellaria spinulosa reef distribution is	
	variable spatially and temporally. If there is a considerable gap between the collection of ground truthing and that of the geophysical data (e.g. 7 years between the collection of the East Coast REC seabed samples and the Fugro geophysical data) then it will reduce the data's ability to assist in detecting reefs from the geophysical data, as the reef distribution may well change between the collection of geophysical data and ground truthing data.	
	In addition, combining data from different times will reduce the usefulness of the data collected at the same time as the geophysical data. The ability to identify a relationship between the ground truthing data and the geophysical data will be diminished by the use of ground truthing data from such a wide temporal range, as inevitably the distribution of habitats at this scale will have changed over such a time period, thus obscuring or confounding the	
Page 19	relationship between relevant ground truthing and the geophysical data.  If an area has been mapped as reef, but a grab sample or video tow at a different point in time did not find reef in the same location, then this is not sufficient information to say this area is less likely to support reef without further clarification. S. spinulosa reef is patchy, and so grab samples taken on	
paragraph	the same day at the same sampling station can differ in whether they find reef. <i>S. spinulosa</i> reef is also variable in space and time and so it can be expected that an area which is found to support reef on one occasion may not consistently support reef all of the time. One ground truthing sample compared to a map is not enough to determine the probability that the location will support reef in the future. This is particularly an issue in how individual ground truthing points have been used to change the confidence in entire polygons for Figure 9; the ground truthing point will be small relative	
Page 20.	to the polygon and so this change overestimates what the point data tells us about a patchy habitat.  The categories used in this map need defining. What were the possible mapping scenarios (for example, polygon with two ground truthing points from the relevant survey, one which indicates reef presence and one which does not) and how do these relate to the categories used in the map?	
Page 21. Table 2.	Using the Gubbay criteria, low reef is still reef, so why have areas with low reefiness been mapped as sediment? This table does not make it clear what thresholds have been used for determining whether a sample is reef. It also does not refer to the primary criteria described in Gubbay; elevation, patchiness and extent.	
	The process outlined in this paragraph takes different datasets and maps each multiple times and then compares them, which combines two issues; confidence in mapping techniques and distribution in Sabellaria spinulosa reef over time. Taking one dataset and using a number of methods to create maps, and then creating a consensus map from these maps would enable an assessment of confidence in the final map based on how many of the	
Page 27. Section 2.7.	mapping techniques had indicated that area to be that habitat i.e. consensus based on one dataset mapped using a number of techniques. This could be used to consider whether an area is appropriate to support reef. Conversely, comparing habitat maps created from many different datasets (i.e. Fugro vs East Coast REC) could feasibly be used to consider temporal variation in reef extent and distribution (given a number of caveats and a robust method). If	f
	sufficient data was available this could then be used to consider how likely an area which is appropriate to support reef is to be supporting reef at a given time. The technique outlined in this paragraph therefore does not allow us to determine whether two maps do not agree because one is of low confidence, or because there was a change in habitat distribution over time.  16 Scour and Cable Protection Plan	
General	The Scour protection and Cable protection plan doesn't cover any operation and maintenance placement of protection. Does this mean that the plan is only for construction? Where will the O&M be considered? There were concerns in relation to Vanguard and the same Applicant wanting the ability to use up to the consented about of cable protection at any point over the lifetime of the project. Natural England would not support such a proposal and the	
General	amount included on the face of the DCO/DML are for installation only. Thus the outline Operations and maintenance plan should be amended to reflect this.  Natural England notes that rather than acting as a stand-alone document, this Plan summarises the worst case scenario outlined in the project description	
	and signposts to the relevant parts of the Environmental Statement where the potential impacts have been considered.  Natural England would ordinarily expect such a Plan to include consideration of the WCS along with a more detailed analysis of the project zone identifying where scour and cable protection is more likely to be required, based on survey data gathered by the project. This should be followed by a detailed consideration of the potential impacts of installing protection in these areas. In addition, we would expect to see detail around the potential	
	options to minimise or mitigate the impact of protection as far as possible. The Plan should be considered to be a live document, subject to further refinement as the project parameters are more clearly defined post-consent.  Natural England notes that this only relates to areas outside of Haisborough Hammond and Winterton Special Area of Conservation (HHW SAC). But the	
2	section of cable route through the SAC is outlined in section 3 with reference to the Site Integrity Plan (SIP). However, Natural England advises that the SIP has insufficient detail to fully absolve the need for a scour and cable protection plan for the SAC  Natural England welcomes the consideration of the cable protection in the application. But believes that an adverse effect can't be ruled out from its	
34	placement in HHW SAC. Please Appendix 2.2, 2.3 and 2.4.  Natural England queries the justification for 100m of scour protection leading up to and from the turbines when other projects have used much less. Can this be minimised further?	
	20 HHW SIP  Based on the best available evidence at this time and a valid worst case scenario as set out in the SIP Natural England remains of the view that there is a high probably of an adverse effect on integrity on integrity of Haisborough, Hammond and Winterton SAC Annex I sandbanks and reef features both alone and in-combination. Therefore we are unable to agree with the conclusions within the Habitats Regulation Assessment.	
General General	We advise that consideration should be given to alternative methods of protecting cables other than physical protection such as marker buoys  Please note that whilst the current document focuses on the Annex I habitats with HHW SAC there are areas of good quality Sabellaria spinulosa reef	
Comment	bordering the SAC, which are priority habitats under Section 40 of the NERC Act 2006 that will also be impacted by cable installation. We advise that these areas are avoided.  Because a minimum amount of space is required per project Natural England considers that a single corridor doesn't reduce the impacts unless installed at	
	the same time and/or the infrastructure is installed once and is for both projects.  Natural England considers that a worst case scenario can be identified in the consenting phase. The Applicant propose to use a Grampian condition to aid consenting and then a Site Integrity Plan to demonstrate no adverse effect on integrity post consent/preconstruction. This is not helpful especially as have a project on integrity could not be ruled out at this time. The AA should be undertaken now on the best	d The state of the
10	based on best available evidence an adverse effect on integrity could not be ruled out at this time. The AA should be undertaken now on the best available evidence. Their proposals push the regulatory duty from BEIS SoS (consenting) to MMO/Defra SoS post consent. We advise that under The Conservation of Habitat and Species (as Amended) that this is addressed at the consenting phase. This advice differs from that provided to Vanguard as we have a current case in Triton Knoll OWF that has now demonstrated that micro siting of Annex I reef within Inner Dowsing Race Bank and North Ridge SAC	
	is not possible and therefore a risk based decision needs to be made as to whether or not the cable can be installed. Given that there is evidence to demonstrate that there is a higher probability for Vanguard/Norfolk Boreas (NB) to have Annex I Sabellaria spinulosa reef within the cable corridor than at Triton Knoll we advise that an Adverse Effect, both now and post consent, can't be ruled out. Therefore we advise that alternatives and/or compensation	at each of the same of the
	is secured  Whilst Natural England has received legal advice that supports the use of a Grampian condition; on this occasion due to the high probability of an adverse effect on integrity which can be determined at the consenting phase, that is unlikely to diminish prior to construction, (even with the ephemeral nature of	se s
11	Annex I reef), we believe that this matter should be dealt with as part of the consenting phase. It should also be noted that the only proven mitigation would be to microsite and where that is not possible then an 'alternative' route would need to be found. It is unlikely that agreement could be found on compensation for the permanent loss of Annex I reef.	
12 – 1 <sup>st</sup>	Natural England agrees that Sabellaria spinulosa is ephemeral, but there is evidence to demonstrate that it consistently occurs in some areas more than others also known as high confidence reef areas. These are the areas where fisheries management measures are being implemented in the form of byelaws and closure areas to aid in the recovery of Annex I reef. It is therefore anticipated that reef would develop and expand in these management areas (i.e. more likely to be present with the removal of fisheries pressures). Two of which overlap with the NB cable corridor. Please see Appendix 2.2 in	
	areas (i.e. more likely to be present with the removal of fisheries pressures). Two of which overlap with the NB cable corridor. Please see Appendix 2.2 in relation to our advice on the byelaw areas. It should be noted that any plan or project should not hinder the objectives of such management measures i.e. the restoration of reef.  Please Appendix 2.5 which provides rationale for Natural England's advice that an adverse effect on integrity can't be ruled out from the permanent loss	.e.
bullet point	of Annex I reef from cable protection within a designated site  Natural England recognises that remediation in discrete areas where there will be cable crossing is a necessity and due to the presence of existing infrastructure it is less likely to be Annex I reef present. However we would strongly encourage the removal of decommissioned cable rather than the use	
	of cable protection  The used of Site Integrity Plan (SIP) for SAC habitat features has only been used by Vanguard. We have reviewed our advice with the MMO as stated above in light of the Triton Knoll OWF case we do not believe that they are appropriate for benthic issues where a worst case scenario can be determined. In	
	addition they do not enable in-combination assessments with other plans and projects and may therefore restrict other development within the SAC. Please note that unlike with the Southern North Sea SAC where the in-combination assessment is dependent of factors outside the control of the project and there are several options to mitigate the impacts, this is not the case for benthic SACs.	
14	Whilst Natural England is of the view that all issues should be dealt with upfront; the SIP is a good framework for reviewing impacts at all phases of the project. Although please see <b>Appendix 2.1</b> on our advice on small scale impacts.  Whilst the post consent consultation is welcomed. It still doesn't address the adverse effect on integrity which currently can't be ruled out. It is assumed by the flow chart that mitigation can be found, but based on Natural England's recent experience we believe that this will not be possible for the	
	by the flow chart that mitigation can be found, but based on Natural England's recent experience we believe that this will not be possible for the installation of the NB cables and/or cable protection. Please note that future marine licence variation requests, which may or may not be permitted, are not mitigation for the current project.  As set out earlier Sabellaria spinulosa reef has already been found and therefore we do not agree with the Applicant.	
	Please see the published favourable condition assessment for Haisborough, Hammond and Winterton SAC (July 2019). HHW SAC is under pressure from historic and ongoing activities from proposed offshore windfarm cables plus existing oil and gas pipelines and associated pipeline protection, aggregates extraction and fishing activities. This has resulted in the site being in unfavourable condition. Fishing activities are resulting in the implementation of	
Section 2.3	management measures for Annex I reef features in the form of byelaws and closure areas. NE advises that other activities should not hinder any management measures designed to restore site features. Therefore there is conflict between the aspirations of two government departments.  It is not just the installation of the cables that will impact Annex I features. The proposed operation and maintenance (O&M) activities are likely to hinder	er en
	It is not clear to Natural England if sufficient time has been factored in to the timetable to take account of processes required should an adverse effect on integrity be determined. In our experience on other terrestrial projects this has taken 12-24month to agree and secure any compensation i.e. it is not a quick or a straight forward process especially when it is untested in the marine environment and agreement from several interested parties is required.	
38 - 41	quick or a straight forward process especially when it is untested in the marine environment and agreement from several interested parties is required  Whilst Natural England welcomes the commitments made by the Applicant to update the SIP based on best available information there still remains a fundamental project risk of an adverse effect on integrity  Whilst we understand there the Applicant is proposing to reduce the amount of cable protection required in HHW SAC from 10% to 5% this is still not	
42	whilst we understand there the Applicant is proposing to reduce the amount of cable protection required in HHW SAC from 10% to 5% this is still not confirmed. Therefore, we reserve the right to amend our advice once such a proposal is confirmed. However, please note that this reduction whilst welcomed is unlikely to change our advice. As per the advice provide for Vanguard  Natural England requests and notes that no assessment of the disposal location and impacts has been made. We therefore advice that this is undertaken	
1 <sup>st</sup> Bullet Table 3.1 –	during examination  Natural England would argue that the presence of Sabellaria spinulosa is known and whilst the location may change prior to installation the adoption of the fisheries byelaws is more likely to ensure the ongoing presence of reef and the possible expansion.	
Table 3.1 – 3 <sup>rd</sup> Bullet	The impacts to Annex I reef features is considered by the Applicant to be temporary. This is something that the SNCBs are currently seeking to confirm through monitoring, but until this is completed (outside of the examination timeframe for NB) there remains doubt over the severity of the impacts and the recoverability.	
Table 3.1	Please note that there is uncertainty over the recoverability especially from repeated impacts from O&M activities  HHW SAC is under pressure from historic and ongoing activities from proposed offshore windfarm cables plus existing oil and gas pipelines and associated pipeline protection.	d d

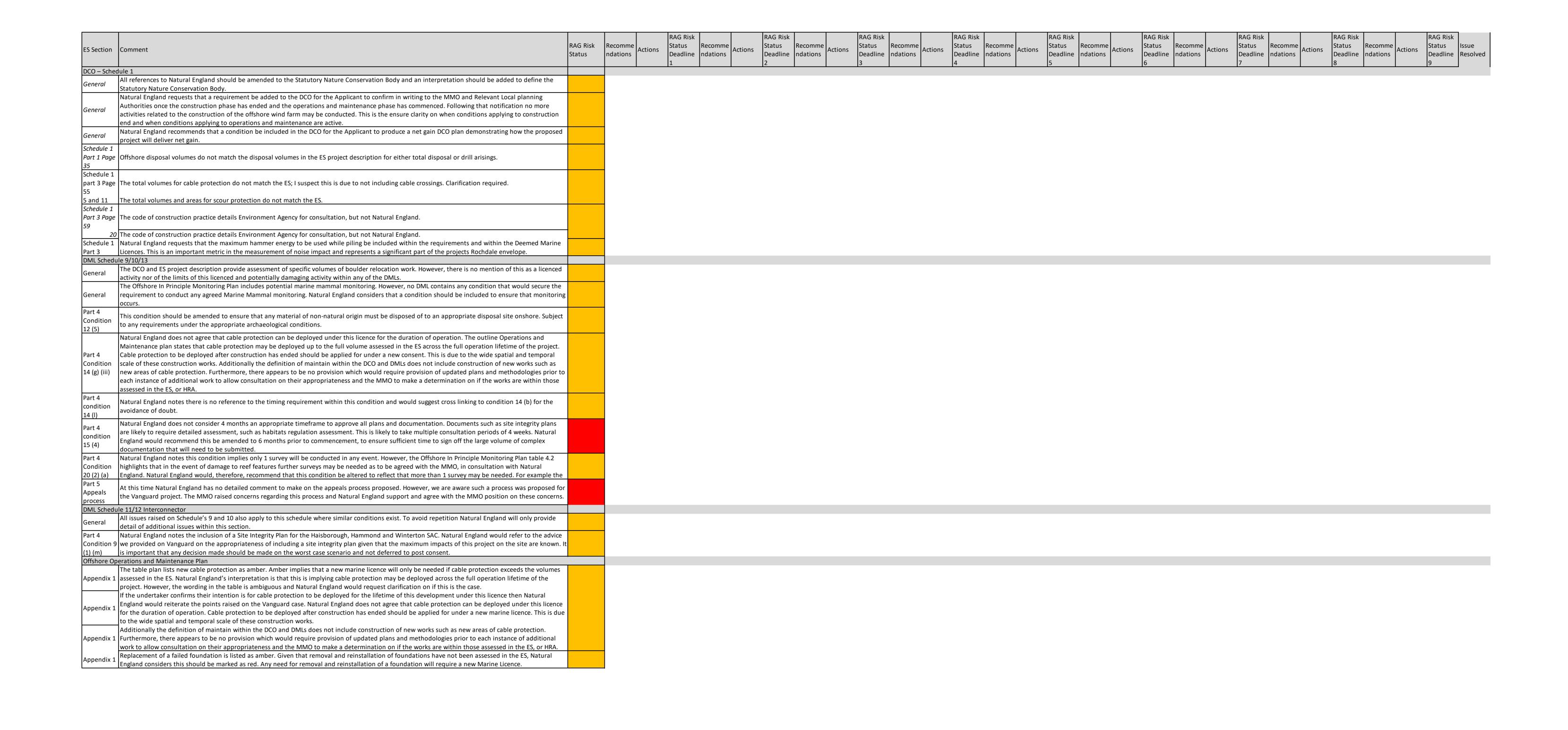
Cable installation in sandbank sites has been shown to be challenging due to impacts associated with cable installation such as sandwave clearance and Table 3.1 use of hard substrate as cable protection. Cabling through this site may be possible if evidence is provided that impacts are short-lived and the feature will recover. Consideration would need to be given as to how sufficient cable burial is achieved without the need for cable protection. Should sandwave clearance be necessary to achieve burial depth and avoid the use of cable protection then, as above, it would need to be demonstrated that impacts are short-lived, the feature can recover, material is retained in the system and can be deposited on material of the same grain size. Permanent loss of Annex I reef hasn't been assessed because the Applicant considered that reef could recolonise artificial structure. However, Natural England doesn't consider this to be Annex I reef - Please see Appendix 2.1 Natural England is concerned that the only form of mitigation for Annex I reef i.e. Micrositing will not be possible due the presence of Annex I reef across the cable corridor. Case example Triton Knoll OWF Whilst Natural England recognises that a Grampian condition is appropriate, the use of the SIP to remove consideration of adverse effect on integrity at consenting isn't. We would argue that there is a risk to achieving a successful CFD. If a CFD is secured then the key milestones are unlikely to be met due to trying to resolve adverse effect on integrity pre construction. It also puts both the MMO and NE under additional and potentially unreasonable pressure to Natural England agrees with the Annex I survey occurring within 12months of construction, but we recognise that the cable procurement process has happened before this. Therefore how will the Applicant guarantee there is sufficient slack to micro site the cables?

Natural England would welcome further consideration on the significance of small scale impacts to the site and potential (more robust) mitigation measures. As set out previously it is not possible to assess the parameters of 'where possible' under the Habitat Regulations. The Annex I reef mitigation is designed to ensure the complete avoidance of an Annex I reef (define within a specific area/boundary. Therefore the current SIP is contradictory in places as it is identified that not all impacts will be avoided/fully mitigated. Please note that Natural England is of the view that the project impacts are not de Natural England would argue that it is not just about the maintaining the extent of the feature, but also the form and function. The favourable condition status of the feature will also need to be used to provide the context for any decision making process, both at the consenting and pre construction phase. The Applicant has committed to having have the 'least effect' on priority areas managed as reef, but there is nothing provided to demonstrated how this will be achieved and to what extent 71 and Please see previous comment of the ability to microsite. Natural England notes in Annex 1 of the SIP Annex I reef is shown to straddle the length of the cable corridor. Therefore in this scenario mitigation in the form of micrositing will not be possible. Please note that Vanguard has the same issue as NB therefore unlikely to learn from sister project. Table 5.1 Natural England Welcomes commitment but it doesn't alter our advice that an adverse effect on integrity can't be ruled out Where will the disposal areas be? How can it be guaranteed that the sediment will remain in the system and that the dredge material will be >95% similar in particle size to disposal locations? Natural England suggest that the SIP should contain criteria that the disposal locations within the SAC should meet to ensure that any sediment will remain within the system, to ensure that the dredge material will be >95% similar in particle size to disposal locations whilst ensure that there is no Natural England continue to suggest that the disposal volumes should be split according to type of material, for example drill arisings, boulders, sand and mud. This is important because different materials have different impacts and those impacts have been assessed based on maximum volumes as provided Also the maximum volumes taken within the Haisborough, Hammond and Winterton SAC should be detailed separately to ensure the impacts to the designated site remain within the impacts assessed. The wording should also limit the area of impact from removal of substances for disposal to the area Natural England advises that an in principle sediment disposal strategy should be undertaken and provided as part of the consenting process Natural England advises that this needs to be updated as there is no qualification as to what is essential and the impacts thereof. It is our view that an

adverse effect on integrity can't be ruled out for cable protection at both 5% and 10% of the length within the HHW SAC

Section	Comment	RAG Risk Re Status no	ecomme dations	RAG R Status Deadli 1	Recomme	Sta	G Risk itus Recom adline ndation	me Actions	RAG Risk Status Ro Deadline no 3	ecomme dations	RAG Ris Status Deadlin	Recomme	St.	AG Risk atus Recom eadline ndatio	RAG Risk Status Record Deadline Indati		RAG Risk Status Re Deadline no	comme ations	RAG Risk Status Re Deadline no	ecomme dations	RAG Risk Status Issue Deadline Resolve
Chapter 12	Marine Mammal Ecology	-				<del></del>	· ·		-	-	<u> </u>	,,			 · · · · ·	· ·					
742	Natural England is broadly in agreement that the implementation of the SIP will reduce impacts to Grey seal to minor adverse; however we would welcome further discussion around this to better understand how the Applicant envisages this will work. Natural England also notes that the reference populations that have been used for grey seals appear to be lower than expected.	e																			
5.3 Informat	ition to Support Habitats Regulations Assessment																				
	Natural England would welcome further discussion with the Applicant regarding their conclusion of no adverse effect on integrity of the Humber Estuary SA considering up to 37% of the grey seal population of the SAC could potentially be impacted from Norfolk Boreas and all other projects and plans.	AC																			
3.12 Offshor	re In Principle Monitoring Plan																				
General	Natural England considers it is not sufficient to just commit to undertaking strategic marine mammal monitoring. Marine mammal monitoring should seek to answer questions or validate assumptions made in the environmental assessment and it is those questions and issues that should be included in the monitoring plan. Natural England acknowledges that marine mammal assessment issues are likely to be very similar across projects and it may be that monitoring is best undertaken at or between several projects to address these issues and find answers to the original questions. How this is devised and undertaken is for discussion and agreement between the Applicant and other developers and Natural England will be happy to work with them to achieve this.																				
3.17 In Princ	ciple SNS SAC Site Integrity Plan (SIP)																				
General	As per Natural England's advice on other recent NSIP applications, a mechanism needs to be developed by the regulators to ensure continuing adherence to the SNCB thresholds over time. Multiple SIPs will be developed, piling can take place over several years, and new projects can come online during this time. Should potential exceedance of the thresholds occur, a process for dealing with this issue needs to be in place – the affected developers / industries will net to work together with the regulator and SNCBs to prevent adverse effect on the Southern North Sea SAC.Until the mechanism by which the SIPs will be managed, monitored and reviewed is developed, Natural England are unable to advise that this approach is sufficient to address the in-combination impact and therefore the risk of adverse effect on integrity on the Southern North Sea SAC cannot be fully ruled out. This is not an issue unique to the project and work will need to be undertaken to reduce the noise levels of multiple wind farms potentially constructing at the same time.	wi Sc No er wh ap ag ag ag ag ag ag ag ag ag ag ag ag ag	ithin oCG 4th ovemeb that hile the oplicants gree that echanis is eded nat this as been ssigned s a urple AG satus nd eeds onsidera on by cA																		
	Natural England welcomes the commitment from the Applicant to periodically review the SIP as the project develops, however Natural England considers that 4 months prior to piling commencement is not much time to agree the final SIP so it will be imperative that as much information and review as possible is undertaken as soon as possible, particularly after the final project design has been decided.	e																			





Yes No