Natural England's key to RAG status	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; Natural England feels that issues given Red status are so complex, or require the provision of so much outstanding information, that they are unlikely to be resolved during examination, and respectfully suggests that they be addressed beforehand.	
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 Relevant Representation RR-099	RAG Status Rel Rep	Consultation, actions, progression	RAG status Deadline 1	Consultation, actions, progression	RAG status Deadline 2	Consultation, actions, progression
Offshore Ornithology							
	Summary of Natural England's key concerns:		Applicant has submitted an Offshore Ornithology Update 07.11.2019. NE to provide comment by 28.11.2019. Applicant to submit to ExA at suitable deadline i.e. 2 or 3.		Applicant to submit Updated Ornithology Assessment at Deadline 2		
	· 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);						
	· Additive impacts (collision plus displacement for gannet);						
	· Population modelling (Environmental Impact Assessment, EIA and HRA);						
	· Scale of predicted cumulative and in-combination impacts and requirement for mitigation.						
	· Post-construction monitoring.						
Breeding season apportionment of kittiwake at Flamborough & Filey Coast (FFC) SPA and lesser black-backed gull at the Alde-Ore Estuary SPA							
1	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 former could potentially be up to 100%.						
Calculation of gannet colony baseline mortality in HRA							
2	We advise that the assessment of displacement of gannets at the FFC SPA is conducted using baseline mortality calculations using the adult colony figure and adult mortality rate.						
Consideration of the range of impacts to account for uncertainty/variability in input data							
3	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 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.						
Assessment of displacement impacts							
4	*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 a 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 evidence and justification for this are set out in Appendix 1.						

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	In relation to the HRA, for the installation of the offshore export cable through the Greater Wash SPA, the predicted impacts both alone and in-combination 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 but also effects on the distribution of RTD. We suggest that Boreas consider mitigation options for RTD disturbance from offshore cable route laying, such as avoiding or reducing cable laying activities during the non-breeding season/period of peak RTD numbers.						
5	*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 is not an accurate reflection of our advice. We note that definitive mortality rates associated with displacement for seabirds, including auks are not known. We therefore continue to advise consideration of a range of mortality rates are used in EIA and HRA assessments. Whilst Natural England agrees that the mortality for auks is likely to be at the low end of the range, we do not agree that using 1% mortality with 50% displacement can be considered precautionary. Therefore, our recommendation remains that a range of mortality rates of 1-10% and displacement rates of 30-70% should be considered, with 70% displacement and 10% mortality as the worst case across the site plus 2km buffer for assessment of impacts alone and cumulatively/in-combination. Further details regarding the evidence and justification for this are set out in Appendix 1.						
Collision risk modelling (CRM) and input parameters							
6	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 (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 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.						
Cumulative and in-combination assessments (displacement and CRM)							
7	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 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)						
	Little gull (collision)						
	Razorbill (displacement)						
	Guillemot (displacement)						

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	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 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.						
Additive impacts (collision plus displacement for gannet)							
8	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.						
Population modelling (EIA and HRA)							
9	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:• Been run using a 'matched' pairs/runs approach as advised by Natural England;• Do not present outputs for the Natural England required metrics of counterfactuals of both population size and population growth rate;• Been run over 30 years (the lifespan of the Boreas project) – these models have been run over only 25 years. 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.						
Scale of predicted cumulative and in-combination impacts and requirement for mitigation							
10	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.						
	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.						
Post-construction monitoring							
11	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 displacement, collection of						
Benthic							
	Summary of Natural England's key concerns;		Applicant to submit Clarification Notes at suitable deadline		Applicant submitted number of Docs at Deadline 1.		
	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						
	Favourable condition status of the reef features of the HHW SAC						
	Colonisation of foundations / cable protection / scour protection may affect benthic ecology and biodiversity						
Adverse Effect on Integrity of the Haisborough, Hammond and Winterton SAC							
12	As part of the Vanguard Examination both the Applicant and Natural England have identified several impact pathways that could impact on the Annex I Sandbank and/or Reef features of the HHW SAC, when considered alone and cumulatively.						

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	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 in-combination.						
Consideration of Alternative Cable Routes							
13	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 greater 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 levelling and evidence supporting recovery							
14	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 part 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 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 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, worse 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 levelling.						
Effectiveness of proposed mitigation for Cable installation (incl. non-sandwave levelling ground preparation)							
15	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.						
	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, **Natural England currently has significant doubt regarding the evidence presented to i) support the successful avoidance of reef and ii) the ability of reef to recover if impacted through cable installation.**						

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	a) <u>Mapping</u>: 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) <u>Analysis</u>: 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 at once conflates the confidence issues surrounding ability to identify reef and changes in space and time. Therefore, 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.						
	c) <u>Survey timings</u>: 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 determine the likelihood of reef being present/absent in the future at a given part of the SAC.						
	d) <u>Restore Conservation objective</u>: 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 byelaws 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 'micro-route' 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 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.						
	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.						

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Cable protection within designated sites							
16	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 (WCS) of up to 8km of cable protection within Annex I habitats of the HHW SAC (although clarity around this figure is required). Natural England would advise that an adverse effect on integrity can't be ruled out from the permanent habitat change as a result of the placement of artificial hard substrata within HHW SAC alone and/or in-combination.						
Use of a Site Integrity Plan for benthic issues							
17	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 therefore restrict other development within the SAC. Therefore, Natural England does not support the use of this Grampian style condition within the Boreas DCO.						
	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							
18	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.						
	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							
19	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							
20	It is the view of Natural England that Operations and Maintenance activities should either be excluded from within this designated site (at the consenting 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							
21	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. 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 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.						

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Onshore works							
	Summary of Natural England's Key concerns;				Applicant Provided numbers of documents at Deadline 1.		
	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							
22	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 ES.						
23	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 commitments incorporated within the Boreas OLEMS. Without mitigation it is not possible to rule out an adverse effect on the integrity of these sites.						
24	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 SPA/Ramsar has not been incorporated into Boreas Documents as yet. Without appropriate mitigation as agreed there may be an adverse effect in the integrity of designated sites and species. Commitments to mitigation and post construction monitoring for bats should be included in the OLEMS. Additionally, it is not currently clear where the commitment to provide site specific water crossing plans in consultation with Natural England is incorporated in the DCO.						
25	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 that a commitment to monitoring is also included for other designated habitats and species which will be effected, such as hedgerows used by bats, grasslands, ponds, cereal field margins etc.						
26	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 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							
27	We consider that there is insufficient information to enable us to conclude that the designated site will be safeguarded from impact from HDD during construction. 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*							
28	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 management and the development of scrub/rough grassland margins. The mitigation plan should be in place for 7 years or until the original hedgerow has recovered fully. There should also be a commitment to monitoring to establish that hedgerows identified as of medium to high importance have been re-established to the same or higher quality.						
Consultation on Water Crossing Plans							
29	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 as under the River Wensum SAC/SSSI. It is not clear where this commitment is incorporated within Boreas application. Consultation with Natural England does not appear to be specified within the COCP 20(2) (g) as this refers to Construction Method Statements, rather than site specific water crossing plans. Documents should be updated within mitigation as outlined during the Vanguard examination and submitted as soon as possible in the examination. Natural England looks forward to receiving the detailed scheme and programme of watercourse crossings which will be produced by the Applicant post-consent, which is secured through DCO Schedule 1 requirement 25.						

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The need for mitigation for impacts on Air Quality							
30	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 Management Plan, CoCP and Schedule of Mitigation to include mitigation to reduce wherever possible impacts to designated sites. If there is likely to be an effect on a designated feature, the OLEMS should include mitigation measures to reduce changes in air quality, e.g. using efficient vehicles, reducing number of vehicles/time on the road, timing of construction to support biodiversity, possible use of barriers etc.						
Impacts on Protected Species							
31	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							
32	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 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.						

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Development Consent Order							
33	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 match those used in the DCO/DML. 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 DML have been excluded from the arbitration provision.						

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1. Breeding season apportionment of impacts for kittiwake and lesser black-backed gull in HRA							
1	The Applicant has apportioned 26.1% of kittiwake collisions in the breeding season to the Flamborough and Filey Coast (FFC) SPA. The figure of 26.1% was calculated by the Vanguard Applicant and was calculated by taking the proportion that the FFC SPA adult kittiwake colony population (89,040 adults at designation) equates to out of a total BDMPS calculated by summing the FFC adult population with the UK North Sea spring migration BDMPS total immature kittiwake population given in Furness (2015) (i.e. a total BDMPS of 89,040 + 252,001 = 341,041; so: (89,040 / 341,041) x 100 = 26.1%). We raised some concerns with this approach during the Vanguard examination process (see our comments by species on the Vanguard Deadline 6 and 6.5 information submitted in our Deadline 7 response at Vanguard, which is available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002878-DL7%20-%20Natural%20England%20-%20Deadline%20Submission.pdf).		Applicant has submitted a draft Offshore Ornithology Update 07.11.2019. NE to provide comment by 28.11.2019. Applicant to submit to ExA at suitable deadline i.e. 2 or 3.		NE has provided comment. Applicant to submit final document at Deadline 2		
	The tracking data up until 2015 suggests low connectivity of the Boreas site with foraging birds from the colony. However, further tagging of kittiwakes from the FFC SPA colony has been undertaken in 2017 and the results of this does indicate that birds from the FFC SPA do forage within the Boreas site (Aitken et al. 2017; Wischnewski et al. 2018).						
	As we advised the Applicant in our comments on the draft Boreas HRA report, we recommend that information is presented on the age classes of the kittiwakes recorded in the Boreas baseline surveys. We also again recommend that a range of apportionment rates for the breeding season are considered in the assessment, which could potentially be up to 100%.						
	In addition, we also recommend that a range of apportionment rates for the breeding season are considered when assessing the likely impacts of the proposal on lesser black-backed gulls (LBBGs) at the Alde-Ore Estuary.						
2. Calculation of gannet colony baseline mortality in HRA							
2	As was advised during the Vanguard examination, given that the outputs of the existing PVAs tend to be on an adult currency and that SPA colony population sizes for breeding seabirds are defined in terms of pairs (adult) or breeding adults and the baseline mortality calculations require a survival rate and typically survival rates for non-adult age classes are not available or are poor. Therefore, we advise that assessments should be done using baseline mortality calculations using the adult colony figures and adult mortality rates.						
	We welcome that the Applicant has followed this advice for the assessments of collision risk to gannet and kittiwake at the FFC SPA and LBBGs at the Alde-Ore Estuary. However, in the assessment of gannet displacement for the FFC SPA, the Applicant has calculated the baseline mortality rates for the FFC SPA colony based on using an all age colony count and all age survival/mortality rates to calculate baseline mortality. This assessment should be updated by the Applicant.						

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3. Lack of consideration of range of predicted impacts due to variability (uncertainty) in assessments							
3	Natural England advise that the variability (uncertainty) in the underlying population estimates is considered in the EIA displacement assessments, through consideration of appropriately calculated upper and lower confidence intervals. Whilst the upper and lower confidence limits around the bird abundance estimates are presented in the tables in Annex 1 of Appendix 13.1, these have not been considered by the Applicant in the impact assessments for construction or operational displacement for Boreas alone within the Environmental Statement Chapter or for the assessment of gannet displacement for the FFC SPA for Boreas alone, with only the mean peak seasonal abundances considered.						
	However, as the confidence intervals are presented in the tables in Annex 1 of Appendix 13.1, Natural England has evaluated these figures as well. We note that for construction displacement at EIA, consideration of the range of impacts predicted by considering the confidence limits does not alter the conclusions made by the Applicant for any species for displacement due to construction. The same is true for assessments of operational displacement at EIA for gannet and razorbill, but for red-throated diver and guillemot the predictions for some seasons and the annual totals exceed 1% of baseline mortality for relevant population scale for the upper 95% confidence intervals of the abundance data at the upper end of the Natural England recommended ranges. For gannet displacement from the FFC SPA for Boreas alone, consideration of the annual prediction for the upper 95% confidence intervals of the abundance data at the upper end of the considered range also exceeds 1% of baseline mortality of the colony. These therefore require further consideration by the Applicant.						
	Additionally, the Applicant has not given consideration to the range of collision impacts accounting for variability/uncertainty in the input parameters in the assessments of LBBG at the Alde-Ore Estuary SPA and little gull at the Greater Wash SPA. These therefore also require consideration by the Applicant.						
4. Assessment of Displacement Impacts							
4.1	***RTD displacement assessment (EIA & HRA)***						
	The Applicant states that: 'Natural England has advised that an unconfirmed 10% mortality rate should be used for birds displaced by cable laying vessels'. This is not an accurate reflection of our advice. The Applicant has considered that for the assessment of disturbance/displacement impacts to RTD from offshore export cable laying that a 1% mortality rate (based on the Vanguard evidence review submitted by the Vanguard Applicant during the examination phase, MacArthur Green 2019a) is precautionary both for EIA and HRA assessments. As was noted during the Vanguard examination (see our Relevant Representations, available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002065-EN010079%20250654%20Natural%20England's%20Norfolk%20Vanguard%20Relevant%20Representations%20&%20Appendices.pdf), as definitive mortality rates for seabirds (including RTDs), are unknown we advise a range of figures for mortality rates of between 1% and 10% are considered for RTD 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. Whilst we accept that a magnitude of displacement beyond the boundary of the array is lower than 100%, there is evidence that the extent of displacement in same cases is significantly greater than 4km. We note that there are studies that have been undertaken that have not been considered by the MacArthur Green (2019a) review. These include studies from Horns Rev I and II reported in Petersen et al. (2014). The work undertaken by Petersen et al. (2014) uses spatially explicit modelling to predict the distribution of red-throated diver pre- and post-construction. This work suggests a maximum displacement extent of 13km (based on the cumulative frequency distribution approach), however the authors suggest that 5-6 km might be a realistic displacement extent and this is supported by the mapped redistribution of RTDs post construction. Webb et al. (2017) reports on the post consent monitoring at Lincs and Lyn and Inner Dowsing (LID) offshore wind farms. This study covered a large area using first visual aerial surveys and then digital video and used spatially explicit modelling (MRSea). The study reported a displacement effect out to 8km (comparing the pre-construction average with the post construction average distribution).						

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	Hence, as stated in our response to Vanguard at Deadline 3 (in our comments on the RTD displacement appendix submitted at Deadline 3, available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002568-DL3%20-%20Natural%20England%20-%20Deadline%203%20Submission.pdf), Natural England's position remains that there is no compelling evidence to warrant a change to our current advice of 100% displacement within 4km buffer of the wind farm boundary (as advised in the joint SNCB displacement interim advice note, SNCBs 2017) for the purpose of impact assessment. It would seem that while 4km may be an underestimate of the true extent of the displacement, assuming a magnitude of 100% out to 4km is likely to be an over-estimate. Therefore, the use of the two components of our current advice (a conservative estimate of extent and a precautionary estimate of magnitude within that extent) in combination is likely to result in an appropriate estimate, based on our current understanding of the evidence base. Indeed the recent evidence suggests that this approach (100%, 4km) might be closer to the truth, and hence less precautionary than has been previously suggested. As a result we continue to advise that assessments of operational disturbance and displacement for RTD for offshore wind farm assessments are based on a constant displacement rate across the offshore wind farm site and a 4km buffer and suggest that a range of displacement rates up to 100% and a mortality rate of up to 10% are considered. As a result we continue to advise that assessments of operational disturbance and displacement for RTD for offshore wind farm assessments are based on a constant displacement rate across the offshore wind farm site and a 4km buffer and suggest that a range of displacement rates up to 100% and a mortality rate of up to 10% are considered.						
	We also note that the Applicant's preferred rates of 90% displacement and 1% mortality does not follow SNCB guidance (SNCBs 2017) for this species. However, as the Applicant has produced impact figures for a range of rates of 90-100% displacement and 1-10% mortality for both construction and operational RTD displacement, this covers the range recommended by Natural England.						
	We also consider that the Natural England advised range of 100% displacement and 1-10% mortality should be used in the assessment disturbance and displacement to RTD from offshore export cable installation for both EIA and for the HRA assessment for RTD at the Greater Wash SPA. However, we note that consideration of this would not alter the conclusion of minor adverse impact significance at EIA scale made by the Applicant in Section 13.7.3.1.2 of the Environmental Statement Chapter on assessment of offshore cable laying and of the combined impact of construction of Norfolk Boreas.						
	For HRA for the Greater Wash SPA under the worst case scenario of 100% displacement and 10% mortality between 3 and 8.5 birds will die (based on the density ranges of the cable area from the SPA Departmental Brief data), which equates to 0.87-2.46% of baseline mortality. We consider that the use of the upper density figure for the cable route is likely to be appropriate bearing in mind recent surveys of Outer Thames Estuary SPA have identified higher RTD densities when digital aerial surveys have been undertaken although this may well be precautionary. Therefore, at this level, the predicted mortality is not insignificant and may not result in any adverse effect on site integrity. In any event, the assessment should also not only consider any potential mortality as a result of displacement but also effects on the distribution of RTD within the SPA, acknowledging that the mortality rates are a crude means to assess both lethal and sub-lethal effects. We recommend that Boreas consider mitigation options for RTD disturbance from offshore cable route laying, such as avoiding or reducing cable laying activities during the non-breeding season/period of peak RTD numbers.						
	With regard to displacement of RTDs from the Greater Wash SPA and/or the Outer Thames Estuary SPA due to operation and maintenance vessel movements, we welcome the Applicant's commitment in paragraphs 335 and 359 of the Report to Inform HRA to engage with Natural England to agree the terms of these vessel management measures, and that this will be appropriately reflected in the final DCO.						
4.2	***Auk (razorbill and guillemot) displacement assessment (EIA & HRA)T*** he Applicant states that: 'Natural England has advised that an unconfirmed 10% mortality rate should be used for auks displaced from wind farms'. This is not an accurate reflection of our advice. We note that definitive mortality rates associated with displacement for seabirds, including auks are not known and therefore we continue to advise consideration of a range of mortality rates are used in assessments. Whilst Natural England agrees that the mortality for auks is likely to be at the low end of the range, we do not agree that using 1% mortality with 50% displacement can be considered precautionary. Therefore, our recommendation remains that a range of mortality rates of 1-10% and displacement rates of 30-70%, with 70% displacement and 10% mortality as the worst case across the site plus 2km buffer for assessment of impacts alone and cumulatively/in-combination. We recommend that the Examining Authority considers the potential impacts on this basis rather than focus solely on the single values advocated by the Applicant.						

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	As was noted in our Deadline 3 response during the Vanguard examination (in our comments on the auk and gannet displacement appendix submitted at Deadline 3, available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002568-DL3%20-%20Natural%20England%20-%20Deadline%203%20Submission.pdf), we note that while some studies have found a strong displacement effect of guillemots and razorbills from offshore wind farms, other studies have found none. For example displacement of guillemots and razorbills have been reported in the non-breeding season in the southern North Sea of distances from 2 to 4km (Petersen et al. 2004) and Petersen & Fox (2007) demonstrated the exclusion of guillemots out to at least 2km at Horns Rev development site. However, this has not been the case for other studies, e.g. guillemots at Robin Rigg wind farm in Scotland (Vallejo et al. 2017). We note that displacement of auks may be state-specific (breeding or non-breeding) or it may be due to habitat quality and/or availability (e.g. birds could be more likely to be displaced from poorer quality habitat or where habitat is not limiting). We also noted that the evidence review produced by the Vanguard Applicant (in their auk displacement update submitted at Deadline 1 of the examination) did not provide much support to their assertion that a 1% mortality rate is sufficiently precautionary. Therefore, our advice remains as that set out above.						
	However, we note that the Applicant has produced impact figures for alone and cumulative/in-combination that covers the Natural England recommended range of rates.						
5. Collision Risk Modelling (CRM) and input parameters (EIA and HRA)							
5	We welcome that the Applicant has incorporated uncertainty in seabird density, collision avoidance rates, flight heights and nocturnal activity in their collision assessments of Boreas alone. This has been undertaken using the Band (2012) model 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), as presented in Annex 4 of Appendix 13.1 of the submission documents.						
	Whilst we welcome that the Applicant has considered the uncertainty/variability in this way, 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.						
	We welcome that all the required input parameters for the CRM have been provided and Natural England agrees with the outputs for the various scenarios. 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. We agree with the central figures and the ranges presented by the Applicant in Table 13.34 of the Environmental Statement Chapter. We also agree with all the outputs for the various scenarios presented in Tables 1-12 of Annex 4 of Appendix 13.1 of the submission documents, with the exception of the lower range of predictions for the lower 95% CI of the PCH for gannet - we suggest that the Applicant checks the calculation of 0 collisions.						
	With regard to nocturnal activity factors (NAFs), as was noted in our advice at Vanguard and Hornsea Project 3, we currently do not have any agreed 'empirically derived' nocturnal activity factors that can be used with the Band model. We recognise from recent evidence presented e.g. by MacArthur Green (2015) that nocturnal activity levels for some species may be lower than the levels that equate to the nocturnal activity factors currently used in CRM, however we also note that there is uncertainty about the empirical activity levels and uncertainty about how these might translate into nocturnal factors applicable to 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 (in the same way as has been recommended for bird densities, avoidance rates and flight heights). The suggested range of nocturnal flight activities to be considered within the Band model CRM are:						
	· Gannet: 1-2 (equating to 0-25% nocturnal activity)						
	· Kittiwake: 2-3 (equating to 25-50% nocturnal activity)						
	· Large gulls: 2-3 (equating to 25-50% nocturnal activity) (as has been used by the Applicant in the stochastic CRM and that where uncertainty in nocturnal activity has been considered).						
	However, we do note that the Applicant has considered the range of Natural England advised nocturnal activity factors to be used with the Band (2012) and therefore, we will consider the predicted impacts from use of the Natural England recommended rates for all species.						

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	The assessment does 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 GBBG in flight for the site+4km buffer. The %PCHs for these species from the site-specific data are higher than those from the generic data and the resulting CRM predictions 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). Natural England acknowledge the contractors concerns over the aerial survey data flight height figures, noting this was also the case at Thanet Extension, where aerial survey data flight height figures were also significantly higher than the generic flight heights. . However, this dataset emphasises the critical importance of considering potential variability in flight heights when assessing collision risk impacts, rather than assuming the central input value necessarily represents the 'most likely' impact. . Accordingly, we recommend that the Applicant takes a more narrative approach to the assessment, and considers the Option 1 outputs for the above species in the context of the relevant Option 2 95% CIs, as part of a more range-based approach to consideration of CRM impacts.						
	We note that Table 2 of Annex 3 presents the %PCH for each species from the site-specific data for Boreas, however, paragraph 5 of Annex 4 states that Option 1 has been run using aerial survey flight height data collected for East Anglia Two. Clarification is therefore required from the Applicant as to whether the Option 1 figures use site-specific flight height data for Boreas or for East Anglia Two. Additionally, if data from East Anglia Two has been used then clarification is also required from the Applicant as to whether there is confidence in the flight height data collected for East Anglia Two.						
6. Cumulative and In-combination Assessments							
6.1	***Figures used in cumulative and in-combination assessments of displacement and collision risk assessments***						
	General comments applicable to both displacement and collision risk:						
	As was noted by Natural England during the examination process for both Hornsea 3 and Vanguard, there is still considerable uncertainty around the Hornsea 3 cumulative/in-combination contribution due to the lack of a full baseline dataset (see our comments on the Vanguard Applicant's Deadline 7 and 7.5 submissions in relation to offshore ornithology submitted at Deadline 8, available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-003121-DL8%20-%20Natural%20England%20-%20Deadline%20Submission.pdf). Therefore, as the Hornsea 3 project is currently not yet consented, we advise that Boreas present cumulative/in-combination figures with and without Hornsea 3, as was presented during the Norfolk Vanguard examination.						
	We welcome that the Applicant has included figures for the East Anglia One North and East Anglia Two projects in the cumulative/in-combination assessments. We note that the figures included are from the Preliminary Environmental Information Reports (PIErs) for these projects, as these represent the best publically available figures for these projects at the current time. However, we note that the PEIRs for these projects were based on incomplete data sets and the full 24 months of baseline survey data will be included in the submission documents, which are due later in 2019. Furthermore, it is anticipated that Hornsea 4 will consult on a PEIR in 2019 as well. Therefore, the cumulative and in-combination assessments will require updating during the examination process.						

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	Auk cumulative and in-combination assessments:						
	The cumulative/in-combination auk (razorbill and guillemot) operational displacement assessment totals are based on an incomplete data set. The following wind farm projects are missing from the assessments: Beatrice Demonstrator, Gunfleet Sands, Kentish Flats, Kentish Flats Extension, Methil, Rampion and Scroby Sands. Whilst these missing projects are likely to involve low numbers of auks, the missing data would reduce confidence in the assessments and result in an under-estimation of the cumulative/in-combination assessments.						
	As was advised for Vanguard in our Deadline 3 response to the Applicant's auk displacement update note (see comments on the auk and gannet displacement appendix submitted at Deadline 3, available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002568-DL3%20-%20Natural%20England%20-%20Deadline%203%20Submission.pdf), we advise that the figures used for Thanet Extension are those in Annex 3 on range of displacement matrices for seabirds recorded in Thanet Extension (APEM 2018). This document presents separate displacement matrices for each season for each of the Thanet Extension site only and the Thanet Extension 2km buffer only, meaning that for each season the figures from the Thanet Extension site only need to be summed with the figures for the Thanet Extension 2km buffer only to give the total for the Thanet Extension site + 2km buffer, which are the figures required for the cumulative (and hence in-combination) assessments.						
	We note that the figures included in the assessments for Hornsea 3 are those from the project's Environmental Statement. As was noted to Vanguard in our Deadline 7 response (see: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002878-DL7%20-%20Natural%20England%20-%20Deadline%20Submission.pdf), during the examination phase for the Hornsea 3 project discussions were held over the appropriateness of the baseline dataset for the project and hence the abundance estimates generated, there were also discussions regarding the seasonal definitions used. Therefore, we advise Boreas that the abundance estimates used in the auk cumulative (and hence in-combination) displacement assessments for the Hornsea 3 project are those presented for the 'alternative analysis' in Annex C of Appendix 28 of the Deadline 4 submission by the Hornsea Three Applicant (Hornsea Project Three Offshore Wind Farm 2019a) in Table 1.11 for guillemot and Table 1.15 for razorbill. We note that these are the figures used by Natural England in our Hornsea 3 Deadline 7 response for displacement. We again note that Natural England have highlighted throughout our written and oral submissions for Hornsea 3 that the lack of sufficient baseline information for the Hornsea Three 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.						
	There is an error in the razorbill EIA figure presented in the Boreas ES Chapter for Vanguard East for the non-breeding (winter period) – as was noted in our Relevant Representation for Vanguard (see: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002065-EN010079%20250654%20Natural%20England's%20Norfolk%20Vanguard%20Relevant%20Representations%20&%20Appendices.pdf), this figure should be 491 and not 279. However, this error is not repeated in the Boreas HRA report.						
	We would also advise that the figures included in the guillemot cumulative (and hence in-combination) assessment are checked for the following sites: Galloper, Greater Gabbard and the Hornsea projects, as the figures presented by Boreas are significantly different from those presented by Vanguard in their Deadline 8 submission (MacArthur Green 2019b).						
	We note that the cumulative/in-combination displacement tables for razorbill for the non-breeding seasons suggest no birds were recorded during these seasons at the Seagreen sites. We acknowledge that the Environmental Statement (ES) for these projects does not present displacement figures for the non-breeding seasons. However, graphs of monthly abundances of each auk species at each of the project sites across the two survey years are presented in the ES Chapter (Seagreen Wind Energy 2012). These indicate that razorbill were recorded in in all surveys of both Alpha and Bravo during the study period. Therefore, consideration should be given to this in the cumulative/in-combination assessments. We also note that the figures included for these two projects for this species are significantly different from those presented by Vanguard in their Deadline 8 submission (MacArthur Green 2019b).						
	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.						

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	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.						
	Cumulative and in-combination collision assessments:						
	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.						

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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 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.						
6.2	***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, MacArthur 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). .						

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	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.						
6.3	***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 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)							
7	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.						

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8. Population modelling (EIA and HRA)							
8	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-pairs.						
	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 miss-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.						

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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							
10	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) (l) 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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Chapter 8 Marine Geology, Oceanography and Physical Processes							
182	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 condition and assessed as part of the Appropriate Assessment for the site.						
8.7.5, 180	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 and implementing as a specific license condition.						
202	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	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.						
8.7.6.5.1, 270	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 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.						
280	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 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+Hammond+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?						
330	As mentioned previously there is currently no evidence for timescales for recovery of sandwaves from sandwave clearance, or that the sandbank system 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.						
Chapter 10 Benthic and Intertidal Ecology (Ref. 6.1.10)							
General Comment	The magnitude of the impact to Sabellaria spinulosa reef is only low if micro-siting is possible.						
137	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.						
Table 10.2	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 industry. .						
	If the sediment is to be surface released then this needs to be taken account of and release points identified at specific states of the tide that will ensure the resting place of the bulk of the material is a minimum of 50m from *Sabellaria spinulosa* reef identified in pre-construction surveys (noting *Sabellaria spinulosa* is tolerant to a certain amount of smothering, but the volumes being discussed here are large). This needs to be a license condition.						
214	Please note that low reef is still reef.						

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5.3.7.1 Appendix 7.1 ABPmer Sandwave Study April 2018							
General 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.						
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+Hammond+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 *Sabellaria spinulosa* reef						
P29	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 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 therefore affecting sandwaves is affecting the form and function of sandbanks.						
P30	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 support conclusions						
Section 4.3.1	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?						
P35	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.						
	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 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							
General	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 clearly stated what challenges or limitations each method is attempting to overcome, and why the method selected is preferred.							

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	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 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.						
General	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 relationship between relevant ground truthing and the geophysical data.						
Page 19. Section 2.3	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 the same day at the same sampling station can differ in whether they find reef. *S. spinulosa* 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 to the polygon and so this change overestimates what the point data tells us about a patchy habitat.						
Page 20. Figure 9.	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.						
Page 27. Section 2.7	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 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 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.						

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Appendix 8.16 Scour and Cable Protection Plan							
General Point	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 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.						
General Point	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.						
General	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.						
2	Natural England notes that this only relates to areas outside of Haisborough Hammond and Winterton Special Area of Conservation (HHW SAC). But the 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						
7	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 placement in HHW SAC. Please Appendix 2.2, 2.3 and 2.4.						
34	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?						
Appendix 8.20 HHW SIP							
General Point	**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 Comment	We advise that consideration should be given to alternative methods of protecting cables other than physical protection such as marker buoys						
General Comment	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 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.						
7	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.						

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10	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 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 is secured						
11	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 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 – 1st bullet point	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 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.						
12 - 2nd bullet point	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 of Annex I reef from cable protection within a designated site.						
12 – 3rd Bullet Point	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.						
13	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 **Appendix 2.1** on our advice on small scale impacts.						
15 and Plate 1.1	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 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.						
24	As set out earlier Sabellaria spinulosa reef has already been found and therefore we do not agree with the Applicant.						
30	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 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.						

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Section 2.3	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 the recoverability of any Annex I reef features.						
Table 2.1	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	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.						
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.						
Table 3.1 – 1st Bullet	Natural England requests and notes that no assessment of the disposal location and impacts has been made. We therefore advice that this is undertaken during examination.						
Table 3.1 – 2nd Bullet	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 – 3rd 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.						
Table 3.1	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.						
	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, material is retained in the system and can be deposited on material of the same grain size.						
Table 3.1.	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						
45	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.						
48	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 resolve.						
54	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?						
56	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 minimis.						
58 - 60	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.						

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67	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 5.2.1	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.						
82	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.						
85-90	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 interaction with Annex 1 reef.						
	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 in the ES.						
	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 assessed.						
89	Natural England advises that an in principle sediment disposal strategy should be undertaken and provided as part of the consenting process .						
91-92	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.						

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Chapter 12 Marine Mammal Ecology							
Para 739 & 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.						
5.3 Information to Support Habitats Regulations Assessment							
Para 1194 & Table 8.63	Natural England would welcome further discussion with the Applicant regarding their conclusion of no adverse effect on integrity of the Humber Estuary SAC 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.						
8.12 Offshore 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.						
8.17 In Principle 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 need 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 impacts 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.		Agreed within SoCG 4th November that while the Applicants agree that a mechanism is needed that this has been assigned as a Purple RAG status and needs consideration by ExA				
Table 2.1	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.						

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DCO DOC 6.1.22 Environmental Statement Chapter 22 Onshore Ecology							
	There is currently no policy included regarding net gain either within the Onshore Ecology Chapter or the Planning Statement. The upcoming revisions to the NPSs: The recent government response to the revised NPS consultation in relation to net gain states that "the 2011 Natural Environment white paper set out an ambition to achieve net gain for biodiversity as opposed to net loss. The recently published 25 Year Environment Plan identified actions to both strengthen the commitment to biodiversity net gain and expand the approach over time to natural capital net gain and ultimately wider environmental net gains as appropriate metrics become available. The NPS will establish the need to consider the potential to achieve biodiversity net gain and will set the context for achieving this at a strategic level without analysis of impacts on individual sites. More detailed assessment, for example based on the Defra biodiversity metric, will be undertaken as part of the DCO application". The Government's 25 Year Environment Plan: As already mentioned, net gain is embedded in the Government's recently published 25 Year Environment Plan as a key action for ensuring that land is used and managed sustainably (see pp. 32-34 for general principles). As per the Advice Note 11, Annex C – Natural England and the Planning Inspectorate, "Natural England will seek opportunities for positive environmental outcomes from major infrastructure developments. NSIPs can make a significant contribution to delivering the environmental ambition in the Government's 25 Year Environment Plan (25YEP). This aims to deliver an environmental net gain through development and infrastructure. We can help Applicants and the Examining Authority to better understand and value the benefits derived from the natural environment ('natural capital'). We may advise on opportunities to secure positive environmental benefits from NSIPs. Priorities include…establishing more coherent and resilient ecological networks and providing and enhancing habitats for protected species. We can also advise on approaches and metrics that enable projects to achieve biodiversity net gain, as set out in the National Planning Policy Framework and the recent and developing National Policy Statements, and on approaches to achieving wider natural capital gains". Furthermore, the spring statement from the Chancellor (13th March 2019) also made specific reference to mandating biodiversity net gain, in which he said: "Following consultation, the government will use the forthcoming Environment Bill to mandate biodiversity net gain for development in England, ensuring that the delivery of much-needed infrastructure and housing is not at the expense of vital biodiversity". The recent mandatory biodiversity net gain consultation: The requirement for biodiversity net gain was also the subject of this consultation, for which an associated new metric 2.0 is to be produced imminently. The construction industry research and information association (CIRIA), the Chartered Institute of Ecology and Environmental Management (CIEEM) and the Institute of Environmental Management and Assessment (IEMA) recently launched Biodiversity net gain Best Practice guidance to which Natural England provided input to and further best practice guidance is expected soon. Many major infrastructure projects in the UK have now committed to delivering a biodiversity net gain and some examples of these are included in this guidance. Natural England recommends that in order to future proof the Boreas DCO application that net gain is incorporated into the design at the earliest opportunity.		NE understand through SOCG discussions that the Applicant will include environmental enhancements but will not undertake Net Gain for this development. We continue to recommend to the Applicant that Net Gain is considered in future.				
22.7	Given the recent HDD drilling mud breakouts experienced on a number of other OWFs, Natural England advises that a commitment to use best available techniques and a precautionary methodology be included and that the worst case scenario impacts of potential bentonite breakout are assessed. Given that the Wensum SAC and SSSI are largely in an unfavourable recovering or unfavourable no change we would advise that any effects may constitute an adverse effect on integrity. We advise the Applicant to partner with Environment Agency on the River Wensum Partnership project. The Applicant needs to outline potential impacts of a drilling mud breakout either under, or in the floodplains of, the Wensum, and potential effects on SAC and SSSI features that may be located up or downstream of the breakout. There is currently insufficient information provided in the documents provided on HDD tolerance monitoring, how quickly bentonite release can be stopped, or an assessment of a worst case scenario bentonite breakout considering extent, timings and environmental impacts.		Applicant to provide a HDD Clarification Note at next appropriate deadline		Applicant has submitted Clarification Note Trenchless Crossings and Potential Effects of Breakout on the River Wensum Deadline 1.		
Table 22.8	The Zones of Influence for the study areas should be determined by the designated sites and features of interest and potential impact pathways. We advise the Applicant to refer to Natural England's Impact Risk Zone for SSSI, available on Magic (Link). Setting the scope of the study area as 2km from designated sites is not sufficient to incorporate sites wide ranging mobile species for example, the study area for Paston Great Barn SAC Barbastelle bats should cover foraging areas and supporting habitat, and should consider Functionally Linked Land for swan or geese species for Broadland SPA; as discussed during the Vanguard examination				Area for ongoing discussion.		
Table 22.8	The zones of influence for Ancient Woodland should be clearly stated. From Figure 22.2 would appear that the HDD compound TC3 is in close proximity to Ancient woodland and that Necton Wood may have trenching or development occurring adjacent to two of its edges. Consideration should be given to any edge effects and air quality impacts. We note that the onshore cable route will not encroach within 15m of Ancient Woodland. We refer the applicant to Natural England's standing advice for ancient woodland and the management of buffers (Link) and suggest these are incorporated into the OLEMS.				Area for ongoing discussion.		

Table 22.10	Does not include a number of designated sites where potential impact pathways have been identified such as Broads SAC or Broadland SPA and Ramsar. We do note however the updated 5.3.5.3 Information to support HRA, see comments below.				5.3.6.1 Norfolk Boreas Updated Habitats Regulations Assessment Integrity Matrices (Version 3) (Tracked Changes) submitted Deadline 1.		
22.6.3.13.1	Arable Land- there is no discussion on any Countryside Stewardship or Environmental Stewardship schemes agreements in place along the route. The Applicant must consult the Rural Payments Agency at the earliest opportunity to discuss the impacts to schemes.						
22.6.3.13.1	We are also pleased to see that the project will take account of any agri-environment schemes and their land management objectives by negotiation with individual agreement holders. During the Vanguard examination the applicant reassessed (Eratta document 9.4) all Grade 3 land as best and most versatile agricultural land and the effects to BMV were reassessed as minor adverse The applicant should confirm that they have incorporated this methodology into the Boreas assessment.						
22.6.5.5	Great Crested Newt draft Licence application has been received (25.07.2019) and Natural England are currently considering a Letter of No Impediment.		GCN Letter of No Impediment Issued 09.09.19				
Table 22.13	Identifies core commuting/foraging areas, are these presented on a Figure? Maps of the main commuting/foraging areas for Barbastelle, as provided as Clarification Notes for Vanguard do not seem to have been incorporated within Boreas application Documents. The Examination process is supposed to be front loaded so please provide this evidence as soon as possible.		Applicant to submit Clarification Note at suitable deadline				
Table 22.21	Embedded mitigation could include that where gaps in hedgerows of medium to high importance for bats are open for 2 year duct installation and then 2 year duct pulling to include temporary planting. We advise this is included within the OLEMS and Hedgerow Mitigation Plan.				Applicant has confirmed that it will not be possible to install temporary planting in gaps in hedgerows. Natural England are content with mitigation as provided for Barbastelle bats.		
22.7.5.17 Para 680	Fish- There is currently insufficient information provided for Natural England to comment on the potential impact of water crossings on fish we would expect any impacts to fish to be considered in the site species water crossing plans. Please confirm where the commitment to produce site specific water crossing plans is incorporated in the Boreas application.				Area for ongoing discussion.		
DCO DOC 5.3 Information to Support Habitats Regulation Assessment							
5.4.1	Direct impacts on the River Wensum SAC have been ruled out given the use of HDD. However given the number of HDD drilling mud breakouts that have occurred recently on other OWF projects, we advise that this is a regular enough occurrence to be considered a likely impact. We therefore advise that direct effects of HDD breakouts on the Wensum SAC designated features are scoped in and impacts assessed against a worst case scenario considering, scale, duration and timing. The conservation objectives require supporting processes (on which the features rely) are maintained. The target for water quality is to achieve at least good chemical and biological status. The potential impacts of HDD breakout and bentonite breakout and chemicals used to stop and clear up breakouts should be assessed against water quality guidelines.		Applicant to submit Clarification Notes at suitable deadline		Applicant has submitted Clarification Note Trenchless Crossings and Potential Effects of Breakout on the River Wensum Deadline 1.		

5.4.1	Natural levels of coarse sediment supply are critical to the maintenance of high quality spawning habitat for lamprey species, maintaining bed substrates in optimal condition for egg-laying and juvenile and adult cover. Excessive delivery of fine sediment, can cause siltation of egg-laying sites and juvenile and adult refugia (conservation objectives Supplementary Advice (2019). The potential impact of a HDD breakout on features of interest and their supporting habitats should be assessed.						
5.4.1	The restoration of the HDD compound on the flood plain of the river Wensum should be restored in accordance with the River Wensum Restoration Strategy and the River Wensum SAC conservation objectives Supplementary Advice. Where possible restore appropriate soil/ground moisture conditions so that water levels are continuously at or just above the ground surface throughout the year.						
5.4.2	Direct impacts on the Paston Great Barn SAC have been ruled out. There is currently no consideration of indirect effects on the SAC in accordance with the conservation objectives. The onshore cable route will pass through a number of medium to high important feeding and foraging hedgerow corridors, which link core foraging areas to the south of the cable route (Satellite Tracking data). Without appropriate mitigation this could have a LSE on the Barbastelle bat population. Suggest the Applicant refer to the OLEMS for Vanguard (Deadline 9) and incorporate similar commitment within Boreas DCO.		Applicant to submit Clarification Notes as for Vanguard at suitable deadline		Applicant has submitted 8.7 Outline Landscape and Ecological Management Strategy (Version 2)		
DCO DOC 2.11 Important Hedgerows Plan							
	There are a number of important hedgerows for bats that will be permanently affected or lost in proximity to the substation site. Natural England recommend that the Applicant adopt a net gain approach to hedgerow habitat and connectivity to provide a legacy of more intact, medium to high quality and connected hedgerow features around the proposed site. Currently the loss of hedgerows would appear to equate to a net loss.				Applicant has confirmed they will not adopt Net Gain, but will include environmental enhancements where possible.		
	We advise that a commitment is included that were hedgerow gaps will be open for a period of years the temporary planting is put in place so as to minimise disruption to foraging and commuting corridors.				Applicant has confirmed that it will not be possible to install temporary planting in gaps in hedgerows. Natural England are content with mitigation as provided for Barbastelle bats.		
DCO DOC 6.6 Schedule of Mitigation							
	During the Vanguard OWF examination process the Applicant committed to producing site specific water crossing plans on which Natural England would be consulted on, where is this commitment incorporated within Boreas application? Consultation with Natural England does not appear to be specified within the COCP 20(2) (g) as this refers to Construction Method Statements, rather than site specific water crossing plans.				Area for ongoing discussion		
	The cable route may cross a number of Countryside Stewardship or Environmental Stewardship agreements. Natural England advises the Applicant to contact the Rural Payments Agency and the landowners at the earliest opportunity to discuss changes and financial implications of changes to schemes. This does currently not appear to be stipulated in the mitigation document.				Area for ongoing discussion		
	General- There is the potential for the Applicant to deliver net gain. For example 129 states that at trenchless crossings that they will reinstate the channel at preconstruction depth, however this could include an aspiration to improve the condition of the watercourse where possible. We note that 132 states that localised improvements to geomorphology and in channel habitats will be considered. Ideally we would like to water crossing improvement where possible, as an objective of the reinstatement and the Applicant to work collaboratively where river restoration projects have already taken place or been proposed.				Applicant has confirmed they will not adopt Net Gain, but will include environmental enhancements where possible.		
	During the Vanguard OWF examination there was a commitment within Appendix 2 Water Dependant sites to produce site specific water crossing plans prior to construction. the Applicant has committed to develop a scheme and programme for each watercourse crossing, diversion and reinstatement, which will include site specific details regarding sediment management and pollution prevention measures. This scheme will be submitted to and approved by the relevant planning authority in consultation with Natural England. This commitment is secured through Requirement 25 (Watercourse Crossings) of the draft DCO. Due to the current uncertainty of ground conditions and sites for HDD and trenchless crossings it is not currently possible for Natural England to comment on potential environmental impacts pre application and detailed comments will be provided post construction. This commitment does not appear to have been included in either the Schedule of Mitigation or the Outline Code of Construction Practice. Please confirm where this commitment has been incorporated within the Boreas OWF application.				Area for ongoing discussion		

DCO DOC 8.1 Outline Code of Construction Practice							
10	There are currently no air quality control measures for air quality impact to designated sites on the traffic route.				Applicant to include designated sites in Traffic Management plans.		
11.1.6	Given the number of bentonite or drilling mud breakouts experienced recently with other wind farms during their construction phase HDD we would expect more detail on the methods to be used for drilling, incorporating lessons learnt from previous breakouts. This will be particularly important in proximity to designated sites. The Wensum is a chalk river with a complicated hydrogeology. The methods should demonstrate that the potential of a break out has been reduced as far as practicably possible; moreover that the effect of a breakout on water quality should be assessed as part of a worst case scenario. How would breakouts below the Wensum be identified and managed?		Applicant to submit Clarification Note at suitable deadline		Applicant has submitted Clarification Note Trenchless Crossings and Potential Effects of Breakout on the River Wensum Deadline 1.		
13	Environmental incident response and contingency. There is no clarification of how environmental incidents will be responded to and reported on. Natural England would expect to be consulted within 24 hours if the incident occurs within proximity to a designated site. In particular with regards a bentonite break out clear up we would expect to be consulted immediately and prior to clear up operations beginning as clean-up operations may cause more damage to surrounding features of interest.						
DCO DOC 8.7 Outline Landscape and Ecological Management Strategy							
	General- There is currently no onshore post construction survey or monitoring proposed to ensure protected habitats and species have been successfully reinstated post construction.				updated OLEMS submitted NE to respond Deadline 3		
	General- There is currently no commitment to net gain within the OLEMS. We recommend that net gain be included and incorporated with the project design at the earliest opportunity. Natural England recommends that net gain be detailed for features (habitats and species) within a DCO net gain document.				Net Gain is not to be incorporated across the red line boundary		
9.7.3.3	Hedgerow crossings. Where hedgerow crossings of high importance for bats are removed and are going to be open for extended periods, possibly four years. Natural England advised during Vanguard that these could be filled with temporary planting or similar, we advise commitments are made within the OLEMS such as: temporary planting across hedgerows must comprise either a line of potted shrubs/trees, willow woven fencing, or wooden or close board fencing (or a combination of these);· the existing flight path must remain in existence for as long as possible and only removed when it is essential to facilitate construction;· the flight paths must connect to existing/retained flight paths without gaps which prevent or reduce shelter or potential use by bat species confirmed or likely to use the flight path;· the features should be at least two metres high and, where involving vegetation,· the features should be left in situ for as long as is practicably possible, until such time that other mitigation (e.g. reinstatement of other flight path features) has been implemented, where required. This should be included in OLEMS post construction section 9.7.3.3.				Applicant has confirmed that it will not be possible to install temporary planting in gaps in hedgerows. Natural England are content with mitigation as provided for Barbastelle bats.		
	In our response to the Vanguard Bat Clarification Note Natural England advised that, *as a requirement of the development, that prior to removal of hedgerows, an OLEM/EMP is developed in consultation 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 management and the development of scrub/rough grassland margins. The mitigation plan should be in place for 7 years or until the original hedgerow has recovered fully. Consideration could be given within the OLEM/EMP to the planting of more mature hedge plants, that could reduce the time required for these hedgerows to return to their original state/or better.*				updated OLEMS submitted		
	Natural England recommends that the developer incorporate net gain for bats within the final design. Natural England recommends it could be useful to consult the Norfolk Barbastelle Study Group/ Norwich Bat Group as they will be the best placed to recommend local enhancement for the species.				Net Gain is not to be incorporated across the red line boundary		
	Natural England welcome that some of these have been incorporated but notice that the planting of more mature plants in order to reduce recovery time has not been included, nor has a commitment to net gain. Moreover that there is currently no Post construction monitoring of hedgerows specified. Natural England advises that this is included as a specification for assessing whether the habitat management and hedgerow planting has been successful or whether further management is required. We would expect all hedgerows replanted to provide species rich good quality and provide at the least the equivalent importance to bats for foraging and commuting as pre construction and preferably demonstrate a net gain legacy.				Area for ongoing discussion		
7.2.3 9.2.3	A detailed Hedgerow Mitigation Plan has not yet been developed (DCO Requirement 24). The Mitigation Plan should be developed and be included in the OPEMP. It was agreed during the Vanguard examination that post construction monitoring of hedgerows used for commuting and foraging bats associated with Paston Great Barn SAC will be undertaken for seven years, or until the original hedgerow has recovered fully, and a commitment was included within the OLEMS. We advise this commitment also be included within Boreas OLEMS to ensure severed hedgerows have returned to good or high importance for bats.				updated OLEMS submitted		
7.3, 7.5	Water dependant designated sites. Natural England look forward to receiving the site specific water crossing plans for areas of HDD and open cut trenching and will comment on the Environmental Impacts when these are provided.				Area for ongoing discussion		

9.3	There is currently no post construction monitoring proposed to ensure that grassland identified as UKHPI and Norfolk LBAP priority habitat at preconstruction has been reinstated through natural regeneration. We advise that monitoring is included with trigger points established for habitat management if grassland has not restored naturally,				to be included		
9.6.3.2 and 9.7.3.1.2	General- Natural England cannot comment on whether a licence may be required to disturb protected species until the route has been surveyed and mitigation measures proposed. We advise the Applicant submit a draft application and seek a Letter of No Impediment where appropriate.				GCN LONI issued		
10	Birds- Mitigation for Broadland SPA species, as specified within the Clarification Note provided during the Vanguard examination does not appear to be included in the Boreas OLEMS.				Updated OLEMS submitted		
DCO DOC 8.14 Outline Project Environmental Management Plan							
	Within the OLEMS the Ecological Management Plan (EcoMP) document is identified as providing information and detail on a number of terrestrial issues including detail on PMoW, Hedgerow Mitigation Plan, timing of mitigation, details on licences to be sought, monitoring proposed, however this document does not appear to have been provided as part of the DCO application. Could this document be signposted or provided. Natural England cannot provide comment on the EcoMP.						
7	Environmental Incident and response contingency. Whilst this states that any environmental incidents will be reported this appears to be mainly marine focused. We advise that as a condition of the licence terrestrial incidents are also reported to Natural England in a timely manner, and in the case of bentonite breakouts within designated sites within 24 hours and before clean-up operations begin.						
DCO DOC Appendix 5.3 screening matrices Version 2							
	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 sit habitats. The Applicant committed to providing mitigation. This is not reflected within Appendix 5.3 Screening Matrices and the tables should be updated accordingly.		Applicant to submit Clarification Note at suitable deadline		Updated docs submitted Deadline 1		
	Marsh Harrier is also on the Broadland SPA citation.				Updated docs submitted Deadline 1		
	The River Wensum SAC -The matrices presents that The use of trenchless crossing techniques will ensure no direct effects upon any of the qualifying features of the SAC. However, given the number of HDD drilling mud breakouts experienced by other wind farms recently Natural England feel that trenchless crossing does not ensure that there will be no direct effects, and further information on the HDD methodology and potential effects need to be provided.		Applicant to submit Clarification Note at suitable deadline		Updated docs submitted Deadline 1		
DCO DOC Appendix 6.1 Habitat Regulations Assessment Integrity Matrices							
	Broadland SPA/Ramsar- There is the potential for the proposed onshore development to cause displacement and disturbance of SPA/Ramsar features using Functionally Linked Land ex situ of the site during the construction phase. Mitigation was agreed as part of the Vanguard examination process and should be included in the Boreas OLEMS accordingly. Displacement/Disturbance is currently assessed as N/A for construction.		Applicant to submit Clarification Note at suitable deadline		Updated docs submitted Deadline 1		

Issue Number	Natural England's Relevant Representation RR-099	RAG Status Rel Rep	Consultation, actions, progression	RAG status Deadline 1	Consultation, actions, progression	RAG Risk Status Deadline 2	Consultation, actions, progression
DCO – Schedule 1							
General	All references to Natural England should be amended to the Statutory Nature Conservation Body and an interpretation should be added to define the Statutory Nature Conservation Body.						to be updated
General	Natural England requests that a requirement be added to the DCO for the Applicant to confirm in writing to the MMO and Relevant Local planning Authorities once the construction phase has ended and the operations and maintenance phase has commenced. Following that notification no more activities related to the construction of the offshore wind farm may be conducted. This is the ensure clarity on when conditions applying to construction end and when conditions applying to operations and maintenance are active.						Ongoing discussion
General	Natural England recommends that a condition be included in the DCO for the Applicant to produce a net gain DCO plan demonstrating how the proposed project will deliver net gain.						Ongoing discussion
Schedule 1 Part 1 Page 35	Offshore disposal volumes do not match the disposal volumes in the ES project description for either total disposal or drill arisings.						Ongoing discussion
Schedule 1 part 3 Page 55	The total volumes for cable protection do not match the ES; I suspect this is due to not including cable crossings. Clarification required.						Ongoing discussion
5 and 11	The total volumes and areas for scour protection do not match the ES.						Ongoing discussion
Schedule 1 Part 3 Page 59	The code of construction practice details Environment Agency for consultation, but not Natural England.						Ongoing discussion
20	The code of construction practice details Environment Agency for consultation, but not Natural England.						to be updated
Schedule 1 Part 3	Natural England requests that the maximum hammer energy to be used while piling be included within the requirements and within the Deemed Marine Licences. This is an important metric in the measurement of noise impact and represents a significant part of the projects Rochdale envelope.						Ongoing discussion
DML Schedule 9/10/13							
General	The DCO and ES project description provide assessment of specific volumes of boulder relocation work. However, there is no mention of this as a licenced activity nor of the limits of this licenced and potentially damaging activity within any of the DMLs.						Ongoing discussion
General	The Offshore In Principle Monitoring Plan includes potential marine mammal monitoring. However, no DML contains any condition that would secure the requirement to conduct any agreed Marine Mammal monitoring. Natural England considers that a condition should be included to ensure that monitoring occurs.						Ongoing discussion
Part 4Condition 12 (5)	This condition should be amended to ensure that any material of non-natural origin must be disposed of to an appropriate disposal site onshore. Subject to any requirements under the appropriate archaeological conditions.						Ongoing discussion
Part 4 Condition 14 (g) (iii)	Natural England does not agree that cable protection can be deployed under this licence for the duration of operation. The outline Operations and Maintenance plan states that cable protection may be deployed up to the full volume assessed in the ES across the full operation lifetime of the project. Cable protection to be deployed after construction has ended should be applied for under a new consent. This is due to the wide spatial and temporal scale of these construction works. Additionally the definition of maintain within the DCO and DMLs does not include construction of new works such as new areas of cable protection. Furthermore, there appears to be no provision which would require provision of updated plans and methodologies prior to each instance of additional work to allow consultation on their appropriateness and the MMO to make a determination on if the works are within those assessed in the ES, or HRA.						Ongoing discussion
Part 4 condition 14 (l)	Natural England notes there is no reference to the timing requirement within this condition and would suggest cross linking to condition 14 (b) for the avoidance of doubt.						Ongoing discussion
Part 4 condition 15 (4)	Natural England does not consider 4 months an appropriate timeframe to approve all plans and documentation. Documents such as site integrity plans are likely to require detailed assessment, such as habitats regulation assessment. This is likely to take multiple consultation periods of 4 weeks. Natural England would recommend this be amended to 6 months prior to commencement, to ensure sufficient time to sign off the large volume of complex documentation that will need to be submitted.						Ongoing discussion

Issue Number	Natural England's Relevant Representation RR-099	RAG Status Rel Rep	Consultation, actions, progression	RAG status Deadline 1	Consultation, actions, progression	RAG Risk Status Deadline 2	Consultation, actions, progression
Part 4	Natural England notes this condition implies only 1 survey will be conducted in any event. However, the Offshore In Principle Monitoring Plan table 4.2 highlights that in the event of damage to reef features further surveys may be needed as to be agreed with the MMO, in consultation with Natural England. Natural England would, therefore, recommend that this condition be altered to reflect that more than 1 survey may be needed. For example the use of the term appropriate surveys as used in condition 18 (2) (a).						Ongoing discussion
Condition 20 (2) (a)							Ongoing discussion
Part 5 Appeals process	At this time Natural England has no detailed comment to make on the appeals process proposed. However, we are aware such a process was proposed for the Vanguard project. The MMO raised concerns regarding this process and Natural England support and agree with the MMO position on these concerns.						Ongoing discussion
DML Schedule 11/12 Interconnector							
General	All issues raised on Schedule's 9 and 10 also apply to this schedule where similar conditions exist. To avoid repetition Natural England will only provide detail of additional issues within this section.						Ongoing discussion
Part 4 Condition 9 (1) (m)	Natural England notes the inclusion of a Site Integrity Plan for the Haisborough, Hammond and Winterton SAC. Natural England would refer to the advice we provided on Vanguard on the appropriateness of including a site integrity plan given that the maximum impacts of this project on the site are known. It is important that any decision made should be made on the worst case scenario and not deferred to post consent.						Ongoing discussion
Offshore Operations and Maintenance Plan							Ongoing discussion
Appendix 1	The table plan lists new cable protection as amber. Amber implies that a new marine licence will only be needed if cable protection exceeds the volumes assessed in the ES. Natural England's interpretation is that this is implying cable protection may be deployed across the full operation lifetime of the project. However, the wording in the table is ambiguous and Natural England would request clarification on if this is the case.						OOOMP
Appendix 1	If the undertaker confirms their intention is for cable protection to be deployed for the lifetime of this development under this licence then Natural England would reiterate the points raised on the Vanguard case. Natural England does not agree that cable protection can be deployed under this licence for the duration of operation. Cable protection to be deployed after construction has ended should be applied for under a new marine licence. This is due to the wide spatial and temporal scale of these construction works.						Ongoing discussion
Appendix 1	Additionally the definition of maintain within the DCO and DMLs does not include construction of new works such as new areas of cable protection. Furthermore, there appears to be no provision which would require provision of updated plans and methodologies prior to each instance of additional work to allow consultation on their appropriateness and the MMO to make a determination on if the works are within those assessed in the ES, or HRA.						Ongoing discussion
Appendix 1	Replacement of a failed foundation is listed as amber. Given that removal and reinstallation of foundations have not been assessed in the ES, Natural England considers this should be marked as red. Any need for removal and reinstallation of a foundation will require a new Marine Licence.						OOOMP to be updated