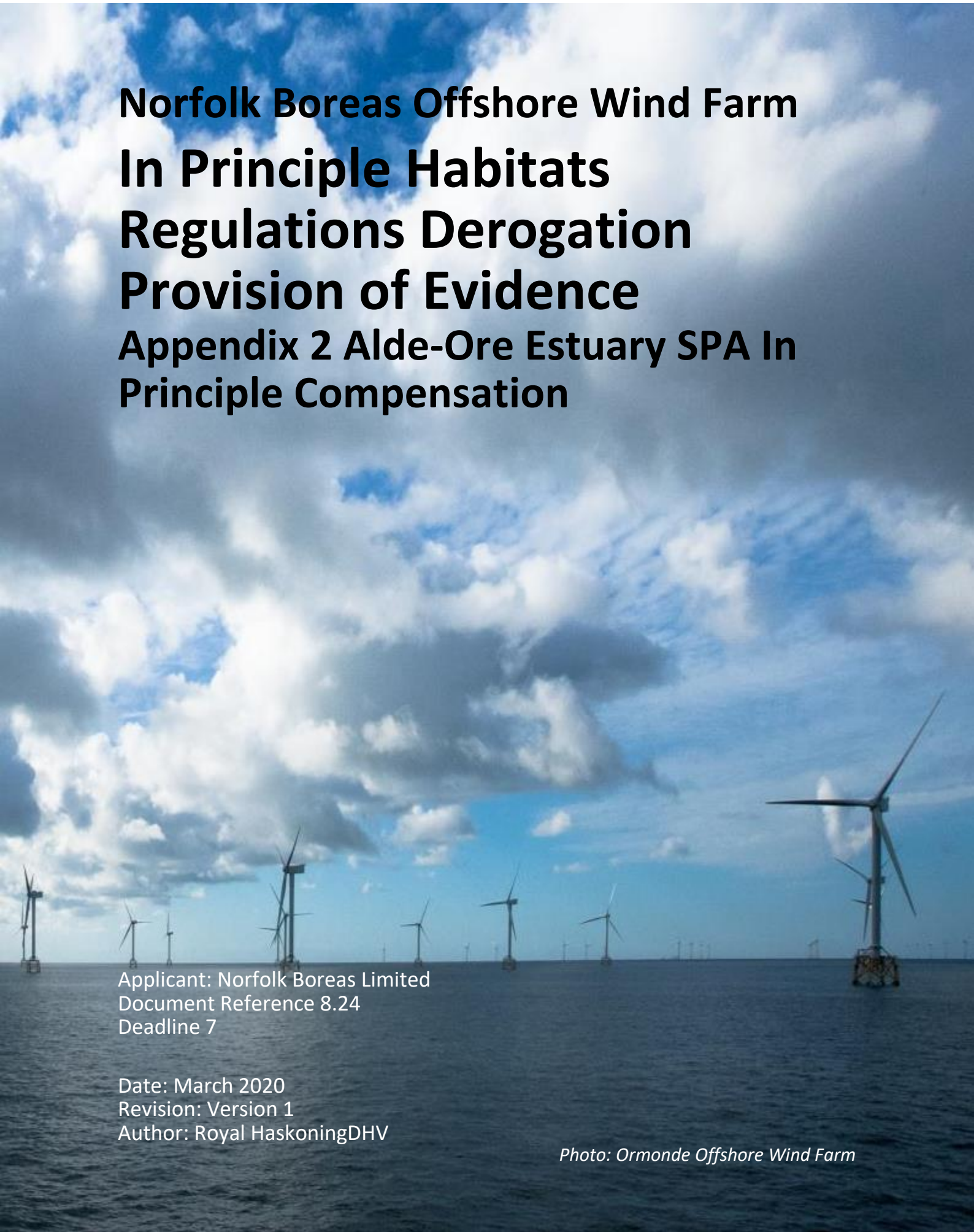
Norfolk Boreas Offshore Wind Farm

In Principle Habitats Regulations Derogation Provision of Evidence

Appendix 2 Alde-Ore Estuary SPA In Principle Compensation



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1 INTRODUCTION

1.1 Background

1. In response to submissions made by Natural England and the Royal Society for the Protection of Birds (RSPB) during the Norfolk Boreas Examination Norfolk Boreas Limited ('the Applicant') has proposed to implement further mitigation measures from those set out in the Norfolk Boreas DCO Application in order to give further confidence that there will not be any adverse effects of Norfolk Boreas Offshore Wind Farm ('the project') on lesser black-backed gull at Alde-Ore Estuary (AOE) Special Protection Area (SPA).

2. This mitigation is detailed in full in the following documents which have been submitted to the Norfolk Boreas examination:

   - Offshore Ornithology Assessment Update [REP2-035];
   - Offshore Ornithology Assessment Update, Project Alone Collision Risk Modelling [REP5-059]; and
   - Offshore Ornithology - Assessment Update Cumulative and In-combination Collision Risk Modelling REP6-024.

3. This additional mitigation results in the collision risk for lesser black-backed gull being reduced by up to 64% compared with those figures presented for the final wind farm design submitted as part of the Application (APP-201). The annual mortality apportioned to the AOE SPA has been reduced from 5.9 in the original application (APP-201) to 2.1 using Natural England's preferred methods, while using the Applicant's preferred parameters, this is reduced from 4.3 in the original application to 1.6 individuals. Compensation is therefore discussed in relation to these very small impact magnitudes and the appropriate level of compensation required.

4. While the Applicant's firm view remains that there is no Adverse Effect on Integrity (AEoI) for this site as a result of the project alone and in-combination with other plans and projects, it is noted that the Examining Authority (ExA) in their further round of written questions [PD-009] made reference to a potential derogation case. The question stated:

5. Question "*Q2.8.6.2 Compensatory Measures (Alde-Ore Estuary SPA, Flamborough and Filey Coast SPA and Greater Wash SPA): Following on from Q2.8.7.1 what compensatory measures could be proposed to ensure that the overall coherence of the network of Natura 2000 sites is protected*?"

6. The ExA made a follow up request in their third round of written questions [PD-014] which stated (note only those parts of the question relevant to this appendix are included here, however the question was addressed in full by the Applicant in ExA.WQ-3.D7.V1):

7. *Question "3.8.6.1 Derogation: The Applicant submitted an initial Position Paper on Derogation for relevant qualifying features at Flamborough and Filey Coast (FFC) SPA, Alde-Ore Estuary SPA and Haisborough Hammond and Winterton SAC [REP6-025]. While the ExA is aware that compensatory measures have been proposed for Norfolk Vanguard, it reminds the Applicant that compensatory measures for Norfolk Boreas should be specifically for this project.*

8. A Request for Information from the Department for Business, Energy and Industrial Strategy (BEIS) to Norfolk Vanguard Limited on 6 December 2019 also invited Norfolk Vanguard Limited, in relation to in-combination impacts on the qualifying lesser black-backed gull feature of the Alde-Ore Estuary SPA, to provide information on any in-principle compensatory measures proposed to ensure that the overall coherence of the network of Natura 2000 sites is protected, albeit "in addition to/alternatively" to provision of further mitigation measures.

9. This document therefore outlines in-principle compensatory measures that could be developed should the Secretary of State (SoS) conclude AEoI on the qualifying lesser black-backed gull feature of the AOE SPA in relation to the Norfolk Boreas project. Appendix 1 outlines in-principle compensatory measures that could be developed should the Secretary of State (SoS) conclude AEoI on the kittiwake feature of the FFC SPA. Note that WQ2.8.6.2 included a request to consider compensation measures for the Greater Wash SPA, however the Applicant does not consider there is a requirement for such measures since, in agreement with Natura England, there are no risks of an AEoI on the features of this SPA due to Norfolk Boreas alone or in-combination (REP2-035 and REP4-040). Further consideration of this is provided in section 1.2 of the In Principle Habitats Regulations Derogation Provision of Evidence submitted at Deadline 7 (ExA.Dero.D7.V1).

10. Following the considerable reductions in the predicted impacts from the project as a result of additional mitigation, the Applicant firmly maintains the position presented in the original application (APP-201) and subsequent submissions (REP2-035, REP5-059), and updated in this document, that in respect of these designated sites, an AEoI as a result of the project alone and in-combination with other plans and projects can be ruled out beyond reasonable scientific doubt. However, in response to the ExA's request for information, and having due regard to the SoS's request to Norfolk Vanguard Limited, this document provides the Applicant's submission in

relation to in principle compensatory measures for the qualifying lesser black-backed gull feature of the AOE SPA.

1.2 Purpose of this Document

1.2.1 Context

11. The Applicant does not believe that any compensatory measures will need to be progressed due to the delivery of specific mitigation measures committed to by the Applicant which provide certainty that AEoI on the AOE SPA can be avoided. Therefore, the provision of evidence regarding compensation measures is provided 'in-principle', and is made entirely without prejudice to the Applicant's position that there will be no AEoI on the AOE SPA.

12. This document therefore provides a review of a range of potential measures that could be adopted to compensate for the potential effects on collision risk for lesser black-backed gull at the AOE SPA. This range of compensation measures has been discussed with Natural England and the Marine Management Organisation (MMO) (as detailed in section 1.2.2 below and Appendix 4) and their feedback incorporated where appropriate.

13. In addition, the advantages and inherent compensation renewable energy has the potential to provide for the features of the Natura 2000 network should not be forgotten; with climate change representing the key pressure for a wide range of features. The recent EU funded SEANSE project has assessed the impact of climate change on key bird species (Rijkswaterstaat Zee & Delta, 2020) and concluded that changes in prey availability due to climate change is the current pressure which appears to have the largest impact on lesser black-backed gull at the wider North Sea level. This is likely to be responsible for a substantially greater effect than impacts resulting from any the other activities (including collision risk). Hence, the benefits would clearly outweigh any very limited harm, although it is recognised that this is extremely challenging to quantify and, therefore, these benefits are the focus of the Imperative Reasons of Overriding Public Interest (IROPI) case (discussed in Habitats Regulations Derogation Provision of Evidence, document reference ExA.Dero.D7.V1 also submitted at Deadline 7).

1.2.2 Consultation

14. The Applicant has undertaken extensive consultation with Natural England and the MMO in response to the BEIS letter, as outlined in the Consultation Overview and detailed in Appendix 4 (document reference ExA.Dero.D7.V1. App4).

15. As discussed in section 1 Norfolk Vanguard Limited has also been invited to provide a derogation case (albeit in addition to or alternatively to the provision of further mitigation). This was provided to the SoS on 28 February 2020[1]. The Norfolk Boreas and Norfolk Vanguard cases have been developed together following consultation with Natural England, MMO and other stakeholders. Section 1.1 of ExA.Dero.D7.V1 provides further details on the similarities between the Norfolk Boreas and Norfolk Vanguard projects and their associated impacts and why this joint approach is therefore appropriate.

16. In relation to compensatory measures, draft in principle compensatory measures were provided to Natural England and the MMO on 17 January 2020 in order to seek guidance on the effectiveness of the potential compensatory measures identified by the Applicant; in particular whether Natural England and the MMO would consider these to be sufficient to ensure that the overall coherence of the Natura 2000 network is protected (note that the Applicant does not believe that these measures are required due to the very small project impacts and the absence of AEoI).

17. A workshop was held between the Norfolk Vanguard, Norfolk Boreas, Natural England and the MMO on 23 January 2020, which included discussion regarding compensatory measures, in particular:

    - How to compensate for a conclusion of AEoI based on uncertainty and a highly precautionary assessment;
    - Proportionality: the extent to which any compensatory measures would be necessary for impacts alone; and
    - Proposals and timescales for the implementation and establishment of any potential compensation.

18. Written feedback was provided to Norfolk Vanguard Limited from Natural England on 4 February 2020 and this has been taken into account in this document.

19. The Applicant has taken a pro-active approach to consultation and has also engaged with other relevant stakeholders in relation to in principle compensation measures

[1] https://infrastructure.planninginspectorate.gov.uk/projects/eastern/norfolk-vanguard/?ipcsection=docs&stage=6&filter1=Secretary+of+State+Consultation

including the RSPB and National Trust. This consultation is detailed in full in the Consultation Overview.

1.2.3 This document

20. Following this introduction, section 2 of this document provides a description of the AOE SPA. Section 3 quantifies the predicted effect of the project on the AOE SPA.

21. Section 4 considers the guidance on compensation and sets out in principle compensation measures for Norfolk Boreas and the AOE SPA, including how these measures may be secured.

2 ALDE-ORE ESTUARY SPA

2.1 Overview

22. The Alde-Ore Estuary SPA covers 2,417ha and is located on and around the Suffolk coast, 111km from the proposed Norfolk Boreas Offshore Wind Farm at its closest point. The SPA comprises an estuarine complex of the rivers Alde, Butley and Ore. The Alde-Ore Estuary was also listed as a Ramsar site in October 1996 for its internationally important wetland assemblage. The SPA citation was published in January 1996 and the site was classified by the UK Government as an SPA under the provisions of the Birds Directive in August 1998. The site is coincident with the Alde-Ore Estuary Site of Special Scientific Interest (SSSI), which was notified in 1952, with the SSSI boundary being identical to that of the SPA and Ramsar sites. The SPA/Ramsar site also forms part of the Alde-Ore and Butley European Marine Site.

23. There are several important habitats within the Alde-Ore Estuary site, including intertidal mudflats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and semi-intensified grazing marsh. The diversity of wetland habitat types present is of particular significance to the birds occurring on the site, as these provide a range of opportunities for feeding, roosting and nesting within the site complex. At different times of the year, the site supports notable assemblages of wetland birds including seabirds, wildfowl and waders. As well as being an important wintering area for waterbirds, the Alde-Ore Estuary provides important breeding habitat for several species of seabird, wader and birds of prey. During the breeding season, gulls and terns feed substantially outside the SPA (JNCC 2011a). The Suffolk Wildlife Trust, the National Trust and the RSPB have nature reserves within the SPA.

24. The Joint Nature Conservation Committee's (JNCC's) SPA site description (as published in 2001) indicates that the Alde-Ore Estuary qualifies as an SPA under Article 4.1 of the Birds Directive (79/409/EEC) by regularly supporting populations of Annex I species of European importance: breeding populations of little tern, marsh harrier and Sandwich tern, and avocet (both breeding and wintering). The site also qualifies under Article 4.2 of the Birds Directive by supporting two Annex II species - a wintering population of redshanks, and a breeding population of lesser black-backed gulls, the designation of the lesser black-backed gulls being based on 14,074 breeding pairs (4 year mean peak, 1994-1997). At designation, the site regularly supported 59,118 individual seabirds during the breeding season, including: herring gull, black-headed gull, lesser black-backed gull, little tern and Sandwich tern.

25. Following the UK SPA review (Stroud et al. 2001) additional Article 4.2 qualifying features were identified as needing protection: a breeding seabird assemblage of

international importance (at least 20,000 seabirds) and a wintering waterbird assemblage of international importance (at least 20,000 waterbirds).

26. This site does not support any priority habitats or species.

2.2 Conservation Objectives

27. The Conservation Objectives for the site are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features;
- the structure and function of the habitats of the qualifying features;
- the supporting processes on which the habitats of the qualifying features rely;
- the populations of each of the qualifying features; and
- the distribution of the qualifying features within the site.

28. When the site was classified in 1996, breeding lesser black-backed gull were present in internationally important numbers (Natural England, 2014); the 4 year peak mean (1994-1997) was 14,070 breeding pairs (derived from the JNCC Seabird Monitoring Programme database; agreed by Natural England's Chief Scientist in 2012). However, after a peak of 23,400 pairs in 2000, numbers reduced significantly below the target; the 5 year peak mean (2011-2015) was 1,940 breeding pairs (Joint Nature Conservation Committee (JNCC), 2014).

29. Natural England has stated the target is to restore the size of the breeding population to a level which is above 14,074 whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

3 QUANTIFICATION OF EFFECT ON THE AOE SPA

3.1 Summary of Revised Collision Risk Modelling

3.1.1 Norfolk Boreas alone

30. The DCO Application is based on a wind farm design comprising 180 x 10MW turbines with a minimum draught height (the gap between the lower rotor tip and the sea level at Mean High Water Springs, MHWS[2]) of 22m, which was a refinement from the Preliminary Environmental Information Report which was based on 200 x 9MW turbines with a draught height of 22m (from MHWS).

31. Following submission of the Application (June 2019), Norfolk Boreas has undertaken further investigations into the design envelope and has now committed to additional design restrictions in order to further reduce the predicted collision risks. Additional mitigation is proposed in the following documents submitted by the Applicant to the Norfolk Boreas Examination:

- Offshore Ornithology Assessment Update, Project Alone Collision Risk Modelling [REP5-059]; and
- Offshore Ornithology - Assessment Update Cumulative and In-combination Collision Risk Modelling [REP6-024].

32. In summary, this includes the following measures:

- Reduced maximum number of turbines from 180 to 158, by increasing the minimum turbine size from 10MW to 11.55MW; and
- Increased draught height:
    - Minimum draught height increased from 22m to 35m (above MHWS) for turbine models up to and including 14.6MW capacity; and
    - Minimum draught height increased from 22m to 30m (above MHWS) for turbine models of 14.7MW and above.

33. At these two draught heights (30m and 35m) the worst case turbine options (with respect to collision risk) are the 14.7MW and 11.55MW respectively, and of these

[2] It should be noted that in documents reporting on collision risk modelling submitted for Norfolk Boreas prior to Deadline 5 (REP5-059) rotor draught heights were given in relation to Highest Astronomical Tide (HAT) while subsequent ones are provided were given in relation to Mean High Water Springs (MHWS). As was noted in REP5-059, this was an error in labelling only, with HAT mistakenly used in place of MHWS. The tidal offset used in the collision risk modelling to adjust to Mean Sea Level (MSL) was the same throughout and should have been stated as relating to MHWS from the outset. It is important to state that the draught heights presented for the project through the course of the application, examination and in the current submission (i.e. 22m, 27m, 30m and 35m) have at all times been in relation to MHWS.

two the overall worst case collision predictions are obtained for the 14.7MW turbine model.

34. Using Natural England's preferred CRM parameters (which the Applicant considers to be highly precautionary), the annual lesser black-backed gull mortality apportioned to the Alde-Ore Estuary SPA has reduced from 6 individuals (submitted in the application) to 2.1; this update has been agreed by Natural England). Using the Applicant's preferred parameters the reduction is from 4.3 to 1.6 individuals (the Applicant has derived these parameters from a robust analysis of available evidence).

35. Thus, the 14.7MW turbine at 30m has predicted collision risks which are 64% lower for lesser black-backed gull compared with the estimate submitted in the original application (APP-201) and at Deadline 2 (REP2-035) for the 10MW turbine at a draught height of 22m.

36. Natural England has agreed with the Applicant that impacts for the project alone do not cause any AEoI on any SPA population, and therefore the request for compensation is not with respect to Norfolk Boreas alone.

3.1.2 In combination

37. The in-combination total lesser black-backed gull collisions assigned to the Alde-Ore Estuary SPA from all wind farms predicted to have connectivity are provided in the Applicant's Assessment Update Cumulative and In-combination Collision Risk Modelling [REP6-024].

38. Using the Applicant's estimate for Norfolk Boreas of 1.6, the total in-combination lesser black-backed gull collision risk for the Alde-Ore Estuary SPA population is estimated to be 53.7, which increases to 54.2 if the Natural England estimate of 2.1 is used.

39. Therefore, Norfolk Boreas's contribution to the total, which was already small, has been reduced still further; using Natural England figures it is 3.9% (=2.1/54.2) and using the Applicant's figures it is 3.0% (=1.6/53.7).

40. The Applicant has presented further analysis of the potential impact of the in-combination mortality which clearly concludes there will be no AEoI of the AOE SPA due to in-combination lesser black-backed gull mortality (see Offshore Ornithology Assessment Update [REP2-035] and the Assessment Update Cumulative and In-combination Collision Risk Modelling [REP6-024]). Furthermore, the Galloper offshore wind farm was consented on the basis of project alone collision risk for this population estimated at that time by Natural England to be 119, and in-combination

risk of 270-357, which is clearly considerably higher than either the project alone (2.1) or in-combination (54) for Norfolk Boreas.

41. Following the further project mitigation, the contribution to the in-combination total from Norfolk Boreas, which was already small, is now even smaller and it is appropriate that this is taken into consideration with respect to the scale and timescale for delivery of compensation measures.

4 COMPENSATION

4.1 Guidance

42. Following a conclusion by the Competent Authority that, following Appropriate Assessment, an AEoI on a Natura 2000 site(s) cannot be ruled out, that there are no alternative solutions and that there is IROPI, Article 6(4) of the Habitats and Birds Directive *"requires that all necessary compensatory measures are taken to ensure that the overall coherence of the network of European sites as a whole is protected."*

43. DEFRA (2012) and EC (2012 and 2018) explain that, for SPAs, the overall coherence of the Natura 2000 Network can be maintained by:

- compensation that fulfils the same purposes that motivated the site's designation;
- compensation that fulfils the same function along the same migration path; and,
- the compensation site(s) are accessible with certainty by the birds usually occurring on the site affected by the project.

44. The guidance provides an element of flexibility, recognising that compensation of a 'like for like' habitat and/or in the same designated site may not be practicable.

45. Compensation should not be used to address issues that are causing designated habitats or species to be in an unfavourable condition. This is the responsibility of the UK Government.

46. Ideally, compensation should be functioning before the effect takes place, although it is recognised that this may not always be possible, as stated in the EC (2012) guidance:

"*in principle, the result of implementing compensation has normally to be operational at the time when the damage is effective on the site concerned. Under certain circumstances where this cannot be fully fulfilled, overcompensation would be required for the interim losses.*"

47. In line with the guidance, indicative compensation options for collision risk to lesser black-backed gull at the AOE SPA are summarised in Table 4.1 and could include:

- Prey enhancement;
- Predator control / mortality reduction;
- Productivity improvement; and
- Enhancement of adult survival.

4.2 Review of Potential Compensation Measures – Measures suggested in the DEFRA report

48. In a report to Defra, Furness et al. (2013) suggested possible measures that could improve the conservation status of UK seabird populations. These are summarised for lesser black-backed gull in Table 4.1.

Table 4.1 Measures listed in the Defra report (Furness et al. 2013) to improve conservation status of lesser black-backed gull populations at colonies throughout the UK

Type of measure	Suggested method plus in parentheses comments on suitability in relation to the key SPA population
Prey enhancement	Closure of sandeel and sprat fisheries close to colonies (not likely to be beneficial for Alde-Ore Estuary SPA population).
Predator control / productivity improvement	Exclude foxes (expected to be highly beneficial at Alde-Ore Estuary SPA).
Enhance adult survival	End culling under General Licences (this was put into effect by Defra in 2019).

49. Only some of these measures presented in Table 4.1 would be appropriate for the focal SPA populations of AOE SPA for reasons summarised in comments in Table 4.1 and further expanded on below.

50. In addition, knowledge of seabird ecology has advanced in the six years since publication of the Defra report, as has policy in relation to General Licences, so the suitability of these measures requires further consideration in relation to new evidence.

51. Furthermore, following consultation with the RSPB and National Trust, who manage nature reserves within the AOE SPA, it is apparent that while predator control is expected to be the most beneficial measure for this population, a review of evidence and pilot study would be appropriate in the first instance to confirm the most appropriate and effective measures to take.

4.3 Prey enhancement - Closure of sandeel fisheries close to the AOE SPA

4.3.1 Overview

52. Numbers and breeding success of lesser black-backed gulls may be influenced by the abundance of sandeels in the local sandeel stock. However, although lesser black-backed gulls certainly do feed to some extent on sandeels while breeding, studies of diet, and tracking of breeding adults, suggest that this is not an important component of their diet. For that reason, changes to sandeel fishery management

are unlikely to represent a strong measure for compensation in relation to lesser black-backed gull.

4.3.2 Delivery Mechanism

4.3.2.1 Define a closed area for sandeel fishing

53. The primary North Sea sandeel fishery areas are not within foraging range of lesser black-backed gulls from the Alde-Ore Estuary SPA, therefore benefits to this population of such an action would be negligible.

4.3.3 Spatial Scale

54. Lesser black-backed gulls from the Alde-Ore Estuary SPA do not forage on the Dogger Bank, which is the focus of the North Sea sandeel fishery, therefore measures to enhance sandeel prey would not be beneficial for this population.

4.3.4 Feasibility

55. Since this compensatory measure would not be expected to deliver any benefits for the population the Applicant is not proposing to progress this option.

4.4 Predator control / Productivity improvement - Establish an area within Alde-Ore Estuary SPA that is protected by predator-proof fencing for lesser black-backed gulls to nest

4.4.1 Overview

56. Lesser black-backed gulls can be adversely affected by rats, although there seems to be little evidence relating to the role of rats as predators at the Alde-Ore Estuary SPA lesser black-backed gull colonies. Numbers of lesser black-backed gulls breeding at the Alde-Ore Estuary SPA have declined dramatically since 2000. A part of that decline could be related to reductions in the availability of fisheries discards (Sherley et al. 2020). However, the decline has been attributed primarily to impacts of predation by foxes in the colony. At Orford Ness, in 2000, 75% of nests (in a colony of 23,000 pairs), failed due to fox predation (Mavor et al. 2001). Breeding numbers at Orford Ness fell from 24,000 pairs in 2001 to 6,500 pairs in 2002 due to fox activity at the colony because fox control was not carried out there in 2002 (Mavor et al. 2003). Numbers of lesser black-backed gulls breeding at Orford Ness have now declined to a few tens of pairs, all of which have nested on the rooftops of buildings there, which further supports the hypothesis that this species is now unwilling to nest on the ground at Orford Ness because of the impact of mammal predators (notably foxes) on breeding success.

57. In the UK, some examples of using electric fences to exclude foxes from colonies have been partially successful, but electric fences are not fully effective in excluding predators and require frequent maintenance. A more expensive but much more effective alternative is the use of predator-proof fences, such as deployed in Hawaii at Ka'ena Point Natural Area Reserve (Young et al. 2012). These 2m tall fences were set up in November 2010 to February 2011 around 20 ha of coastal habitat within Ka'ena Point to prevent predators (including rats and mice) from entering the protected area. Predators (in their case dogs, cats, mongoose, rats and mice) were eradicated within the enclosed 20ha. This was the first predator proof fence constructed in the United States at the time of its completion (Young et al. 2012). Such completely predator-proof fencing would be particularly appropriate for colonies subject to predation by rats or American mink as well as by foxes. Similar predator-proof fences have been established at many sites around the world with very high success in protecting birds from mammal predators (VanderWerf et al. 2014, Ruykys and Carter 2019).

58. By 2006, in total, around 109 km of predator-proof fencing had been erected in various areas of mainland New Zealand to exclude predators from sites with important populations of native animals and birds (Scofield et al. 2011, Innes et al. 2012, Scofield and Cullen 2012, https://predatorfreenz.org/sums-best-predator-control-options).

59. There are several examples of the use of predator-proof fences to protect seabirds from mammals (https://www.acap.aq/index.php/news/latest-news/1359). A predator-proof fence completed in 2007 stretches 10.6 km across the neck of the peninsula from coast to coast at Cape Kidnappers Peninsula, North Island, New Zealand. This fence protects a privately owned and financed seabird restoration project where grey-faced petrels and Cook's petrels are being re-introduced (Furness et al. 2013). Another good example of successful deployment of a predator-proof fence to protect a seabird colony is one erected in 2001 to protect 36-ha on Pitt Island (Chatham Islands, New Zealand) from feral cats and pigs. Between 2002 and 2005, 200 endangered Chatham petrel chicks from the only known breeding site on South East Island (Chatham Islands) were moved into the fenced reserve. In 2012, 17 pairs from these translocated birds returned to breed (Furness et al. 2013). In Europe, predator-proof fencing has been used very successfully to protect breeding seabirds from alien invasive mammal predators in Azores (Portugal), funded by EU LIFE+ (https://www.xcluder.com).

4.4.2 Delivery Mechanism

60. The same compensation measures were proposed by Norfolk Vanguard. If Norfolk Vanguard is not required to deliver this compensation, then the proposed measures could be taken forward by Norfolk Boreas. Alternatively, if both projects are required to provide compensation then this could be delivered jointly by the two projects since:

    1. The magnitude of compensation which this would provide far outweighs both the individual and combined effects of the two projects; and
    2. The two projects are 'sister-projects' being developed jointly within the Vattenfall Wind Power Ltd group.

61. It seems very likely that provision of a nesting area from which mammal predators are excluded would be a highly effective conservation measure for this population. However, it would be important to collate the available evidence at the site in order to ensure that other options which could offer alternative effective solutions are not overlooked, and to confirm that the current poor breeding success is related primarily to mammalian predation rather than other possible contributory factors.

62. To this end the Applicant proposes to fund a coordinator whose role would be to facilitate the organisation of a stakeholder working group tasked with overseeing a review of the population's health, factors which have contributed to the decline and proposals for conservation measures. Depending on the outcomes of this review it may also be appropriate to undertake a trial to test options, before a final measure (or suite of measures) is taken forward for implementation.

63. The above notwithstanding, it is apparent that part of Orford Ness would be suitable for lesser black-backed gulls to nest if an area was made fox-proof. Establishing a protected area for lesser black-backed gulls at Orford Ness would also reduce the conflict between recovering gull breeding numbers and protecting avocets and other ground nesting birds from gull predation at Havergate Island. It has been demonstrated not only that seabird breeding success can be very much higher in areas within predator-proof fences, but also that seabird breeding numbers tend to recover rapidly when given such protection. This method would be much more effective than attempting to reduce fox numbers by shooting foxes, as there will always be movement of foxes into the area from the surrounding wider countryside where fox numbers are high. In addition, predator proof fences exclude rats and American mink as well as other mammal predators such as feral cats, so provide a very much more effective protection than any attempts simply to control fox numbers in the area.

4.4.3 Spatial Scale

64. The spatial scale would be determined by the results of the review and pilot study. However, as an illustration the following sections consider the scale of predator exclusion fencing that would be appropriate.

65. Predator-proof fencing is expensive, costing around £100 per m to construct, and around £1 per m per year to maintain, with a life-span in New Zealand of around 25 years, so a considerable rate of depreciation (Scofield et al. 2011). However, maintenance costs and life span will depend very much on the environment where the fencing is set up. In New Zealand, where much of the fencing is in forested habitat, trees falling onto the fence can cause expensive damage, as can cyclones (Scofield et al. 2011). In the predominantly open habitat of UK seabird colonies such fencing would be under less risk of damage, although corrosion from salt spray would be a consideration. There are several companies providing predator-proof fencing.

66. Enclosing an area of four hectares (i.e. a square with 200m long sides) would require a minimum of 800m at £100/m construction, so £80,000 with annual maintenance costs of approximately £800. It is probably not appropriate to enclose an area much smaller than this in order to minimise the risk that the birds do not use the enclosed space (and careful siting would be important). However, this scale of enclosure would provide for orders of magnitude of more successful nesting pairs than necessary to compensate for the potential loss of 2.1 birds at Norfolk Boreas. For example, lesser black-backed gull nest density at the SPA probably averages less than 1 pair per square metre, therefore within an enclosure of 40,000m^2 the target restored population of 14,000 could be contained, even allowing for the fact that not all the habitat within the enclosure would be expected to be suitable.

67. Key to this process is recognition of the small number (2.1 birds per year) for which compensation may be appropriate, in the context of the massive decline in breeding numbers of lesser black-backed gulls at Alde-Ore Estuary SPA from tens of thousands of pairs at site designation to a few hundred pairs at present. Recovery of that population requires much stronger management action than has been taken up to now, and Norfolk Boreas is willing to contribute in a proportionate way to that important conservation action. For example, at Galloper Wind Farm 22 lesser black-backed gull collisions were predicted for birds from the SPA (on the basis of equivalent modelling methods to those used at Norfolk Boreas), which represents more than a third of the in-combination total of 54. A proportionate contribution from Norfolk Boreas might therefore be around 20% of the level of contribution made by Galloper, and the Applicant considers that the above outline (funding a

coordinator, evidence review, pilot study and illustrative fencing proposal) is in line with this level of contribution.

68. As noted above, the same compensation measures were proposed by Norfolk Vanguard. If Norfolk Vanguard is not required to deliver this compensation, then the proposed measures could be taken forward by Norfolk Boreas. Alternatively, if both projects are required to provide compensation then this could be delivered jointly by the two projects since:

    1. The magnitude of compensation which this would provide far outweighs both the individual and combined effects of the two projects; and

    2. The two projects are 'sister-projects' being developed jointly within the Vattenfall Wind Power Ltd group..

4.4.4 Timescale

69. If the above outline proposal is undertaken, then in its entirety it would be considered a long term compensation measure, and it may not be achievable to complete all of the steps outlined above prior to wind farm operation. However, the Applicant would begin the process (appointment of the coordinator, organisation of stakeholders and collation of evidence) prior to operation. Until the results of the initial phases (review and pilot study) are available it would not be possible to guarantee completion of all remaining stages prior to operation. However, this is considered appropriate given the small magnitude of the contribution to the in-combination impact from Norfolk Boreas, which is less than 5% (or less than 9% for Norfolk Boreas and Norfolk Vanguard combined). Hence, an appropriate timescale for implementing the various measures, based on the small scale of impact from the project and the predicted large magnitude of success, would be agreed with the Secretary of State in consultation with Natural England as part of the approval of the agreed strategy. This approach is considered appropriate given the large degree of over-compensation (even if this is required for both Norfolk Vanguard and Norfolk Boreas) that is anticipated from this proposal and is in line with the EC (2012) guidance.

70. As an alternative longer term option, a strategic fund could be set-up and administered by an appropriate body, such as the local planning authority, in consultation with Natural England and the land owners responsible for managing the Alde-Ore Estuary SPA. This could set out the level of contribution payable by a project (determined by reference to impact) and how those contributions would be used to compensate for impacts on the SPA population.

4.4.5 Monitoring

71. Success would be determined through annual monitoring of breeding numbers and success within the SPA using standardised methods. An increase in the number of pairs, and/or breeding success of the same size, or greater than, Norfolk Boreas's predicted impact (or that for Norfolk Boreas and Norfolk Vanguard combined) would be considered successful compensation.

4.4.6 Feasibility

72. The Applicant considers that predator control to improve the breeding success of lesser black-backed gull at AOE SPA is a feasible measure and further details are provided in section 4.6.

4.5 Enhance adult survival - End culling under General Licences

4.5.1 Overview

73. Gull breeding numbers may also have been influenced by human disturbance of nesting gulls, and control of gulls under General Licence. There has been considerable discussion of the species of birds that should be listed on General Licences. Although lesser black-backed gull is a feature of the Alde-Ore Estuary SPA, it had previously been legal for lesser black-backed gulls to be killed under General Licences throughout England. Numbers of birds killed under General Licences have not been monitored fully, but it is known that many thousands of lesser black-backed gulls have been killed under licences issued in England. For example, around 29,000 gulls, almost all lesser black-backed gulls, were killed under licence between 1999 and 2002 at Tarnbrook Fell alone (Mitchell et al. 2004).

74. Since April 2019, there has been a change in Defra policy, and lesser black-backed gull is no longer listed on Defra's General Licences for England, which may help to allow recovery of the population of this species https://www.gov.uk/government/publications/gulls-licence-to-control-them-to-conserve-other-birds.

75. Any changes in adult survival that would result from a reduction in culling might be expected to result in an increase in breeding populations and subsequent breeding success. However, without more information on the existing management regimes (throughout the UK), which are largely unavailable as record keeping was not a requirement, it is difficult to predict how long such effects may take to become apparent.

4.5.2 Monitoring

76. The most appropriate method for monitoring survival rates is through large scale marking programmes (e.g. fitting colour leg rings) with sustained re-sighting effort carried out across a range of sites and over several years (at least 10 for robust estimates). Such monitoring would need to be conducted at a scale which included populations which have been culled and which no longer will be. It is understood that the SPA population is not subject to culling itself (although it is unclear if this has always been the case) therefore ringing and re-sighting at this site would be unlikely to be sensitive enough to detect responses occurring more widely. It would also be very difficult to ascribe cause to any changes in survival observed.

4.5.3 Feasibility

77. There is no question that, if the AOE SPA population of lesser black-backed gulls had been subject to culling before April 2019, then cessation of this would compensate for the 2.1 losses predicted at Norfolk Boreas. However, since this population is no longer culled, it is much less clear how reduced culling elsewhere (in the region or nationally) could be considered as compensation for the SPA. Furthermore, the Applicant has no control over such measures and it is therefore highly uncertain if or how this could be delivered. Therefore, the Applicant is not proposing to progress this option.

4.6 Proposed Approach to Delivery of Compensation (if required)

78. If compensation is deemed to be required following the Appropriate Assessment, the Applicant proposes that delivery of measures to improve breeding success of lesser black-backed gull at AOE SPA (likely through predation control) would be the most appropriate measure to deliver compensation (either alone or jointly with Norfolk Vanguard if that project is required to deliver compensation). The timetable for delivery of the measures would be approved by the Secretary of State in consultation with Natural England, with the aim that this would be initiated well in advance of operation of Norfolk Boreas. If this was required for both Norfolk Boreas and Norfolk Vanguard this would be approached strategically, with the aim of obtaining approval on a joint basis, and therefore initiated well in advance of the operation of both projects.

79. A phased approach is proposed and the measures which would be undertaken by the Applicant (either alone or jointly with Norfolk Vanguard as appropriate) in order to improve breeding success are as follows:

- A delivery co-ordinator will be appointed to set up and administer a stakeholder working group. The working group is likely to consist of the

Applicant (and Norfolk Vanguard if also required for this project), Natural England, the local planning authority, and the RSPB and National Trust (as landowners). The working group will discuss and agree the most appropriate measures to be taken forward, which will be informed by the scoping study referred to below. The cost of the delivery co-ordinator will be met by the Applicant, or the role may be provided by the Applicant (either alone or jointly with Norfolk Vanguard as appropriate);

- A scoping study will be undertaken to confirm what delivery measures should be taken forward to improve breeding success. The nature of the scoping study will be discussed and agreed by the working group and the cost of the scoping study will be met by the Applicant (either alone or jointly with Norfolk Vanguard as appropriate); and

- Delivery measures will be implemented, based on the outcomes of the scoping study. As set out above, it is considered that breeding success is likely to be dependent on implementing predation control measures, but implementation of other delivery measures proportionate to the impact on lesser black-backed gull as a result of the project will be considered. The cost of implementing the delivery measures will be met by the Applicant (either alone or jointly with Norfolk Vanguard as appropriate). Although it may not be possible to have the complete package of measures in place prior to operation, since the proposed degree of compensation (improved nesting for thousands of pairs) far outweighs the contribution to losses from Norfolk Boreas alone (2.1 birds per year), or that with Norfolk Vanguard (2.6 birds per year; a total of 4.7 if this project is also required to provide compensation), it is considered that a short delay in achieving compensation would not materially affect the long-term outcome. In such circumstances, delayed 'overcompensation' is recognised as appropriate (EC 2012).

80. This compensation will be secured through the approval of a strategy by the Secretary of State, in consultation with Natural England. Given the delivery measures are proposed to an onshore SPA, it is not proposed to consult the MMO on this strategy. The strategy will need to be submitted to the Secretary of State no later than 12 months prior to commencement of any offshore works, and approved by the Secretary of State prior to commencement of any offshore works. Thereafter the strategy must be carried out in accordance with the timescales approved as part of the strategy. If this is required for both Norfolk Boreas and Norfolk Vanguard then in the first instance approval would be sought for this to be undertaken jointly as a single scheme, with timescales being driven by the first project to be delivered.

81. The strategy would include timescales for delivery of measures as well as proposals for monitoring (and reporting on) the effectiveness of the measures. Monitoring results will be required to be submitted to the Secretary of State and Natural England, together with any proposals to address effectiveness, which would thereafter need to be implemented as approved by the Secretary of State.

82. Notwithstanding the Applicant's primary position that AEoI can be ruled out for the project alone and in-combination with other plans and projects, in-principle compensatory measures have been identified and will be proposed as part of the Applicant's derogation case, as requested by the Examining Authority.

83. As set out in section 4.6.1.1 below, although in-principle, these compensatory measures can be adequately secured through the dDCO and would be enforceable by the Secretary of State.

4.6.1.1 DCO Condition

84. Schedule 19 of the draft DCO would be updated to include the following proposed condition to deliver measures to improve breeding success of lesser black-backed gull at the AOE SPA if the Secretary of State is minded to conclude an AEoI on the FFC SPA.

PART 2

Alde-Ore Estuary Special Protection Area: Delivery of measures to improve breeding success

***2** (1). No later than 12 months prior to the commencement of any offshore works, a strategy for the delivery of measures to improve breeding success at the Alde-Ore Estuary Special Protection Area and proposals for monitoring and reporting on their effectiveness must be submitted to the Secretary of State for approval, in consultation with the relevant statutory nature conservation body.*

(2) The strategy must accord with the principles contained in Section 4 of the Alde-Ore Estuary Special Protection Area (SPA) - In principle Compensation Measures for lesser black-backed gull, and must be approved in writing by the Secretary of State prior to the commencement of any offshore works.

(3) The strategy must include timescales for the measures to be delivered and must be carried out as approved, unless otherwise agreed in writing by the Secretary of State.

(4) Results from the monitoring scheme required under sub-paragraph (1) including any proposals to address the effectiveness of the measures to improve breeding success at the Alde-Ore Estuary Special Protection Area must be submitted to the

Secretary of State and the relevant statutory nature conservation body, and any proposals to address effectiveness must thereafter be implemented by the undertaker as approved in writing by the Secretary of State.

4.7 Summary

85. Table 4.1 provides a summary of the compensatory measures that have been reviewed by the Applicant in consultation with Natural England.

86. Whilst there are a range of potential measures to compensate mortality to lesser black-backed gull, only some of these measures would be appropriate for the focal SPA populations of AOE SPA for reasons outlined above. The Applicant therefore proposes that measures to improve the breeding success, likely through predator control, are the most effective and deliverable within the timescales required for Norfolk Boreas.

87. It is noted that compensation would only be required should the Secretary of State conclude that an AEoI on lesser black-backed gull at the AOE SPA cannot be ruled out and there is agreement on the Assessment of Alternative Solutions and IROPI case presented in the Applicant's Habitats Regulations Derogation Provision of Evidence (document reference ExA;Dero.D7.V1).

88. However, it is the Applicant's firm conclusion that there is no AEoI for AOE SPA as a result of the project alone and in-combination with other plans and projects.

Table 4.1 Summary of In Principle Compensation Measures

Indicative Measure	Benefits	Delivery mechanism	Spatial scale	Timescale	Potential feasibility	Measure taken forward as compensation for Norfolk Boreas
Prey enhancement	Partial or complete closure of sandeel fishery in UK North Sea waters would improve fish stocks. However, sandeels are not important in lesser black-backed gull diet during breeding and relevant fishery areas do not overlap with foraging ranges of lesser black-backed gull at AOE SPA .	✓ Define a closed area for sandeel fishery.	✓ For practical reasons this would need to be an area much in excess of that required to compensate for the loss of 2.1 lesser black-backed gull. However, closure of fishery outside this population's foraging range would be of limited benefit.	✓ Long-term, probably requiring >5 years for effects to become apparent at the colony. But uncertain if any effect would result.	? Currently no authority has the jurisdiction to deliver fisheries management areas for the purposes of compensation. The feasibility of this measure therefore requires government intervention.	x Due to the limited benefit to the AOE SPA population and uncertainty in deliverability of this compensatory measure in the timescales required for the project, the Applicant would not propose to progress this option.
Predator control	Lesser black-backed gull at AOE SPA are thought to be subject to high levels of egg and chick predation by mammals (especially foxes). Prevention of this predation would greatly enhance productivity and could more than compensate for the loss	✓ A phased approach is proposed. The Applicant (jointly with Norfolk Vanguard if appropriate) would appoint (or provide) a coordinator to convene a stakeholder working group. The group would oversee production of an evidence review (on current impacts on the population), agree approaches to be taken forward	✓ If it is assumed that fencing to exclude predators is the agreed final mechanism to take forward, this would require enclosure of a suggested area of around 4ha, although this would be subject to	✓ The initial phases of appointing a coordinator, convening the stakeholder working group and undertaking the evidence review could be completed prior to operation of the turbines. However, undertaking the pilot study, reviewing the outcomes and implementing the agreed full	✓ This option is considered to be entirely feasible and straightforward to monitor using surveys of the breeding population and reproductive success.	✓

Indicative Measure	Benefits	Delivery mechanism	Spatial scale	Timescale	Potential feasibility	Measure taken forward as compensation for Norfolk Boreas
	of 2.1 adults at Norfolk Boreas.	through a pilot study, review outcomes of the pilot and agree final measures which the Applicant (jointly with Norfolk Vanguard if appropriate) would then implement. All the costs would be met by the Applicant (jointly with Norfolk Vanguard if appropriate).	discussion and agreement by the stakeholder group (and landowner(s)).	measures may overlap with the beginning of wind farm operation. Notwithstanding this, given the long-term gains and the large degree of over-compensation this measure is expected to deliver, a short delay of this nature is considered acceptable and in accordance with EU Guidance.		
Enhance adult survival	Reduced culling of lesser black-backed gull under Defra's General Licences for England would assist in recovery of the population at a national scale.	N/A	N/A	N/A	x Defra's General Licences for England no longer lists lesser black-backed gull as a species which can be killed (since April 2019). This is likely to greatly reduce the number of this species culled.	x Not considered feasible for Norfolk Boreas.

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