

Norfolk Boreas Offshore Wind Farm Applicant's Response to Natural England's REP7-045 and REP7-046 Appendices

Appendices 1-3

Applicant: Norfolk Boreas Limited
Document Reference: ExA.ASR-NE.D8.V1
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Norfolk Boreas Offshore Wind Farm

Appendix 1

East Anglia THREE Statement of
Common Ground with Natural England

Applicant: Norfolk Boreas Limited
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East Anglia THREE
Offshore Windfarm

East Anglia THREE

Statement of Common Ground

Natural England

Document Reference – Deadline 7 SoCG / SoCG /
NE and Applicant

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1 Introduction

1.1 Introduction

1. This Statement of Common Ground (SoCG) has been prepared with Natural England to show where agreement has been reached with East Anglia THREE Limited (EATL) during the pre and post Development Consent Order (DCO) application consultation and in the course of the DCO Examination
2. This SoCG comprises an agreement log which has been structured to reflect topics of interest to Natural England on the East Anglia THREE DCO application (the **Application**). Topic specific matters agreed, not agreed and actions to resolve between Natural England and East Anglia THREE are included.
3. The position with respect to each topic of interest is presented in a tabular form.
4. Throughout this document points of agreement and disagreement between EATL and Natural England are clearly indicated. Points that are not agreed will be the subject of ongoing discussion wherever possible to resolve, or refine, the extent of disagreement between the parties.
5. A Glossary is attached at Appendix 1.

1.2 The Development

6. The Application is for development consent to construct and operate up to 172 wind turbine generators and associated infrastructure, with an installed capacity of up to 1,200 MW (the **Project**).
7. The DCO, if made, would be known as the East Anglia THREE Offshore Wind Farm Order. It will comprise the following elements:
 - Up to 172 offshore wind turbines and associated foundations, with an installed capacity of up to 1,200 MW;
 - Up to two meteorological masts and foundations;
 - Up to twelve buoys;
 - Up to six offshore electrical stations;
 - Up to one offshore platform housing accommodation facilities;
 - Subsea inter-array cables between the wind turbines and offshore electrical stations;
 - Up to four subsea export cables to transmit electricity from the offshore electrical stations to shore;
 - Up to four interconnector cables between the East Anglia ONE and East Anglia THREE Projects;
 - Scour protection around foundations and on inter-array and export cables as required;

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- Landfall at Bawdsey with onshore transition bays to join the offshore and onshore cables;
 - Up to four onshore underground circuits (each containing up to three cables) pulled through existing ducting to be laid by East Anglia ONE or directly laid, running for approximately 37km from landfall to the connection point at Bramford, Suffolk, with jointing pits, to transmit electricity to up to two new onshore substations;
 - Up to two onshore substations at Bramford, Suffolk, to connect the offshore windfarm to the National Grid;
 - The permanent and / or temporary compulsory acquisition (if required) of land and / or rights for the proposed Project;
 - Overriding of easements and other rights over or affecting land for the proposed Project;
 - The application and / or disapplication of legislation relevant to the proposed Project including inter alia legislation relating to compulsory purchase; and
 - Such ancillary, incidental and consequential provisions, permits or consents as are necessary and / or convenient.
8. The Application was submitted to the Planning Inspectorate on 18th November 2015 and accepted for examination on 15th December 2015.

1.3 Consultation with Natural England

9. This section briefly summarises the consultation that EATL has had with Natural England, for further information on the consultation process and the outcome of consultations please see the Consultation Report (document 5.2 of the East Anglia THREE DCO Application).

1.3.1 Pre-Application

10. EATL engaged with Natural England on the Project during the pre-Application process, both in terms of informal non-statutory engagement and formal consultation carried out pursuant to Section 42 of the Planning Act 2008.
11. During formal (Section 42) consultation, Natural England provided comments on the Preliminary Environmental Information Report (**PEIR**) by way of a letter dated 8th July 2014 and on a separate consultation (also conducted under Section 42) regarding changes in project design by email on the 23rd of July 2015 (the **Consultation Responses**).
12. Further to the statutory Section 42 consultation, several meetings were held with Natural England through the Evidence Plan process. Further detail on the Evidence Plan can be found in the relevant Appendices of the Environmental Statement chapter for each of the topics within this SoCG (namely Appendix 7.1 (document 6.3.7 (1)), Appendix 10.1 (document 6.3.10 (1)), Appendix 11.1 (document 6.3.11 (1)), Appendix 12.1 (document 6.3.12 (1)), Appendix 13.1 (document 6.3.13 (1)), and Appendix 23.3 (document 6.3.23 (3)),

1.3.2 Post-Application

13. Natural England made a relevant representation to the Planning Inspectorate on 23rd March 2016 (the **Relevant Representation**). Following a meeting on 24th March and 8th June 2016 and subsequent communication with Natural England (attached at Appendix 2), agreement was reached on certain matters previously raised by Natural England
14. In the Rule 17 request for further information of the 28th October 2016, the Examining Authority requested that this SoCG be updated to reflect the submission of additional information with regard to the Southern North Sea possible Special Area of Conservation and further discussions on offshore ornithology. Amendments have been made in Tables 4 and 5, below.

2 Agreement Log

15. Within the sections and table below the different topics for areas of agreement between Natural England and EATL are set out. []

2.1 Marine Geology, Oceanography and Physical Processes

16. The Project has the potential to impact upon Marine geology, oceanography and physical processes. Chapter 7 of the East Anglia THREE Environmental Statement (ES), Application document 6.1.7, provides an assessment of the significance of these impacts. Table 1 below provides areas of common ground that have been reached regarding the findings reported within that chapter.
17. Marine geology, oceanography and physical processes were discussed at an Evidence Plan meeting hosted by EATL on the 13th September 2013. Representatives of Natural England and the MMO were both present. A method statement detailing EATL's proposed approach to the assessment was produced prior to the meeting. This was subsequently revised based on discussions had during the meeting and was then circulated and agreed by all parties involved.
18. A second meeting was held to discuss the PEIR on 3rd July 2014. Natural England, the MMO and Cefas (as statutory advisor to the MMO) were present. The discussion formed the basis of the Section 42 PEIR consultation response provide by Natural England which were in turn was used to update the impacts assessment for the ES (as recorded in *Table 7.1*, document reference 6.1.7 of the East Anglia THREE DCO Application, of Chapter 7 of the ES).

Table 1. SoCG – Marine Geology, Oceanography and Physical Processes

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
Environmental Impact Assessment			
Existing Environment	Sufficient survey data (extent/duration) has been collected to undertake the assessment	Agreed through the Evidence Plan	It is agreed by both parties that sufficient survey data have been collected to undertake the assessment.
Assessment Methodology	The list of potential physical process effects assessed, as proposed in the Evidence Plan method statement provided October 2013 is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the list of potential impacts assessed in Chapter 7 of the ES is appropriate to the project.
	<p>The impact assessment methodologies used (as proposed in the Evidence Plan method statement provided October 2013) for the EIA provide an appropriate approach to assessing potential impacts of the project. This includes:</p> <ol style="list-style-type: none"> 1. An assessment based on expert judgement using knowledge of sites and available contextual information (in particular Zone and East Anglia ONE studies and modelling); therefore no new modelling (e.g. sediment plumes or deposition) was undertaken. 2. The definitions used of sensitivity and magnitude in the impact assessment are appropriate. 3. The approach to screening in plans and projects for consideration the cumulative impact assessment, and the resulting lists of plans and projects for each receptor. 	Agreed through the Evidence Plan	It is agreed by both parties that the impact assessment methodologies used in the EIA are appropriate.
	The worst case scenario presented in the ES, is appropriate for the project.	Agreed	It is agreed by both parties that the worst case scenario presented in the ES is appropriate for this project.

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
Assessment conclusions	The ES adequately characterises the baseline environment in terms of Marine Geology, Oceanography and Physical Processes (The baseline which was presented in the PEIR is unchanged in the ES).	Agreed	It is agreed by both parties that the ES adequately characterises the baseline environment.
	The assessment of effects for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Marine Geology, Oceanography and Physical Process are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that the impacts presented for construction, operation and decommissioning are appropriate and are likely to be non-significant in EIA terms.
	The changes to physical processes in relation to impacts of the proposed project on the eroding and sensitive East Anglia coastline have been considered and are non-significant in EIA terms.	Agreed	It is agreed by both parties that changes to physical processes in relation to impacts of the proposed project on the eroding and sensitive East Anglia coastline have been considered and are non-significant in EIA terms.
	The assessment of cumulative effects is appropriate and, assuming the inclusion of the embedded mitigation described, cumulative impacts on Marine Geology, Oceanography and Physical Process are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that the cumulative impacts presented are appropriate and are likely to be non-significant in EIA terms.
Habitats Regulations Assessment			
Assessment	The assessment of effects upon designated sites is appropriate and there are no effects which require consideration in HRA.	Agreed	It is agreed by both parties that the assessment of effects upon designated sites is appropriate and that there are no effects which require consideration in HRA.
Mitigation			
	Given the impacts of the project, the conditions provided within the draft DML (and supporting	Agreed	It is agreed by both parties that the conditions provided within the draft

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	certified documents) for the management and monitoring of sediment dynamics, waste and debris are considered appropriate and adequate.		DML (and supporting certified documents) for the management and monitoring of sediment dynamics, waste and debris are considered appropriate and adequate.

2.2 Benthic Ecology

19. The Project has the potential to impact upon benthic ecology. Chapter 10 of the ES (Application document 6.1.10) provides an assessment of the significance of these impacts. Table 2 below provides areas of common ground that have been reached regarding the findings reported within that chapter.
20. Benthic Ecology was discussed at an Evidence Plan meeting on the 10th September 2013. A method statement for the assessment was produced which was revised based on that discussion, circulated and agreed. Natural England and Cefas were present at the 10th September meeting.
21. A second meeting was held to discuss the PEIR on 3rd July 2014. Natural England, the MMO and Cefas were present. The discussion formed the basis of the Section 42 PEIR consultation responses which were in turn used to update the assessment for the ES (as recorded in *Table 10.1* of the Chapter 10 of the ES).

Table 2. SoCG – Benthic Ecology

Issue on which EATL seek agreement	EATLs Position	Natural England’s Position	Final Position
Environmental Impact Assessment			
Existing Environment	Sufficient survey data (extent/duration) has been collected to undertake the assessment.	Agreed through the Evidence Plan	It is agreed by both parties that sufficient survey data have been collected to undertake the assessment.
	The ES adequately characterises the baseline environment in terms of the Benthic Ecology	Agreed	It is agreed by both parties that the ES adequately characterises the baseline environment in terms of the Benthic Ecology.
Assessment Methodology	The list of potential impacts to be assessed, as proposed in the Evidence Plan method statement is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the list of potential impacts assessed in Chapter 7 of the ES are appropriate to the project.
	<p>The impact methodologies used provide an appropriate approach to assessing potential impacts of the proposed project on the Benthic Environment.</p> <p>This includes:</p> <p>Assessments which utilise the Marine Geology, Oceanography and Physical Process assessment which is based on expert judgement</p> <p>The definitions of sensitivity and magnitude used in the impact assessment.</p>	Agreed through the Evidence Plan	It is agreed by both parties that the impact assessment methodologies used in the EIA are appropriate.
	The approach to cumulative impact assessment for each receptor is appropriate and, assuming the inclusion of the embedded mitigation described, cumulative impacts on the Benthic Environment are likely to be non-significant in EIA terms	Agreed through the Evidence Plan	It is agreed by both parties that the cumulative impact assessment methodologies used in the EIA are appropriate.
	Detailed assessment of biogenic reef (<i>Sabellaria</i> or <i>Mytilus</i>) is a matter for pre-construction survey and	Agreed through the Evidence Plan	It is agreed by both parties that detailed assessment of biogenic

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	final routeing.		reef (<i>Sabellaria</i> or <i>Mytilus</i>) is a matter for pre-construction survey and final routeing.
	The worst case scenario presented in the ES is appropriate for this project.	Agreed	It is agreed by both parties that the worst case scenario presented in the ES is appropriate for this project.
Assessment conclusions	The assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on the Benthic Environment are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that the assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on the Benthic Environment are likely to be non-significant in EIA terms.
	Assuming the inclusion of the embedded mitigation described in the ES, cumulative impacts on the Benthic Environment are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that assuming the inclusion of the embedded mitigation described in the ES, cumulative impacts on the Benthic Environment are likely to be non-significant in EIA terms.
Habitats Regulations Assessment			
	It is agreed that the draft assessment of effects upon designated sites is appropriate and there are no effects which require consideration in HRA. All Special Areas of Conservation are screened out of the assessment with regard to Benthic Ecology.	Agreed.	It is agreed by both parties that the draft assessment of effects upon designated sites is appropriate and there are no effects which require consideration in HRA. All Special Areas of Conservation are screened out of the assessment with regard to Benthic Ecology.
Mitigation			
	It is agreed that given the impacts of the project, the conditions provided within the draft DML (and	Agreed.	It is agreed by both parties that given the impacts of the project, the

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	supporting certified documents) for the management and monitoring of impacts on the Benthic Environment are considered appropriate and adequate.		conditions provided within the draft DML (and supporting certified documents) for the management and monitoring of impacts on the Benthic Environment are considered appropriate and adequate.

2.3 Fish and Shellfish Ecology

22. The Project has the potential to impact upon fish and shellfish ecology. Chapter 11 of the ES, Application document 6.1.11, provides an assessment of the significance of these impacts. Table 3 below provides areas of common ground that have been reached regarding the findings reported within that chapter.
23. Fish and shellfish ecology was discussed at an Evidence Plan meeting on the 10th September 2013. A method statement for assessment was produced which was revised based on the discussion, circulated and agreed. Natural England and Cefas were present.
24. A second meeting was held to discuss the PEIR on 3rd July 2014. Natural England, the MMO and Cefas were present. The discussion formed the basis of the Section 42 PEIR consultation responses which were in turn used to update the assessment for the ES (as recorded in *Table 11.1* of the Chapter 11 of the ES).

Table 3. SoCG – Fish and Shellfish Ecology

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
Environmental Impact Assessment			
Existing Environment	Sufficient survey data (extent/duration) has been collected to undertake the Assessment.	Agreed through the Evidence Plan	It is agreed by both parties that sufficient survey data have been collected to undertake the assessment.
	The ES adequately characterises the baseline environment in terms of Fish and Shellfish Ecology.	Agreed	It is agreed by both parties that the ES adequately characterises the baseline environment in terms of Fish and Shellfish Ecology.
Assessment methodology	It is agreed that the list of potential impacts to be assessed, as proposed in the Evidence Plan method statement, is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties on list of potential impacts to be assessed.
	It is agreed that the impact methodologies used provide an appropriate approach to assessing potential impacts of the proposed project on Fish and Shellfish Ecology. The definitions used of sensitivity and magnitude in the impact assessment are appropriate. The key species taken forward for assessment is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the impact methodologies used provide an appropriate approach to assessing potential impacts of the proposed project on Fish and Shellfish Ecology.
	The worst case scenario presented in the ES is appropriate for this project.	Agreed	It is agreed by both parties that the worst case scenario presented in the ES is appropriate for this project.
	The approach to screening in plans, projects and impacts for consideration in the cumulative impact assessment is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the approach to screening in plans, projects and impacts for consideration in the cumulative impact assessment is appropriate.
	The approach to cumulative impact assessment for each receptor is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the approach to cumulative impact assessment for each receptor is

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	Given the inclusion of the embedded mitigation described in the ES, cumulative impacts on Fish and Shellfish Ecology are likely to be non-significant in EIA terms.	Agreed	appropriate It is agreed by both parties that with the inclusion of the embedded mitigation described in the ES, cumulative impacts on Fish and Shellfish Ecology are likely to be non-significant in EIA terms.
Assessment conclusions	The assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Fish and Shellfish Ecology are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that the assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Fish and Shellfish Ecology are likely to be non-significant in EIA terms.
Habitats Regulations Assessment			
	There are no HRA considerations for Fish and Shellfish Ecology (distance from designated sites and diffuse distribution of Annex 1 species) All Special Areas of Conservation are screened out of the assessment with regard to Fish and Shellfish Ecology	Agreed through the Evidence Plan	It is agreed by both parties that there is no HRA considerations for Fish and Shellfish Ecology due to the distance from designated sites and diffuse distribution of Annex 1 species.
Management measures			
	It is agreed that the given the impacts of the project, the conditions provided within the draft DML (and supporting certified documents) for the management and monitoring of impacts on Fish and Shellfish Ecology are considered appropriate and adequate.	Agreed	It is agreed by both parties that given the impacts of the project, the conditions provided within the draft DML (and supporting certified documents) for the management and monitoring of impacts on Fish and Shellfish Ecology are considered appropriate and adequate

2.4 Marine Mammals

25. The Project has the potential to impact upon Marine Mammals. Chapter 12 of the ES and the Report to Inform Habitats Regulations Assessment (document 5.4 of the DCO Application) provide an assessment of the significance of these impacts. Table 4 below provides areas of common ground that have been reached regarding the findings reported within that chapter and identifies areas where agreement is still to be reached.
26. Impacts on Marine Mammals were discussed at Evidence Plan meetings on 13th September and 15th November 2013 and the 2nd April 2014. A method statement for the assessment was produced which was revised based on the discussion at the first meeting, circulated and agreed by Natural England. These meetings allowed for the preparation of the PEIR.
27. A meeting was held to discuss the PEIR on 3rd July 2014. Natural England, the MMO and Cefas were present. The discussion formed the basis of the Section 42 PEIR consultation responses which were in turn used to update the assessment for the ES (as recorded in *Table 12.1* of the Chapter 12 of the ES).
28. A further meeting was held on 6th July 2015 to go over the previously agreed statements and to discuss the shadow Habitats Regulations Assessment report. A method statement was produced for this meeting specifically for the HRA. Further meetings were held on 24th March and 8th June 2016 post-submission of the application.
29. Following discussions undertaken during the Examination, the Examining Authority asked for the SoCG to be revised to reflect the conclusion of all outstanding marine mammal HRA issues.

Table 4. SoCG – Marine Mammals

Issue on which EATL seek agreement	EATLs Position	Natural England’s Position	Final Position
Environmental Impact Assessment			
Existing Environment	The site specific survey methods, duration and data analysis are sufficient to characterise the existing environment.	Agreed through the Evidence Plan	It is agreed by both parties that the site specific survey data collection and analysis are sufficient to characterise the existing environment.
	The ES adequately characterises the baseline (which is unchanged from the PEIR) environment in terms of Marine Mammals.	Agreed through the Evidence Plan	It is agreed by both parties that the baseline environment for marine mammals has been adequately characterised.
	The use of harbour porpoise and unidentified individuals represents a precautionary approach to calculating harbour porpoise density across the Project area.	Agreed through the Evidence Plan	It is agreed by both parties that the use of harbour porpoise and unidentified individuals represents a precautionary approach to calculating harbour porpoise density across the Project area.
	Suitable correction factors have been used to account for marine mammals below the surface during aerial surveys.	Agreed through the Evidence Plan	It is agreed by both parties that suitable correction factors have been used to account for marine mammals below the surface during aerial surveys.
Assessment methodology	Harbour porpoise, grey seal and harbour seal are the only species of marine mammal to be considered in the impact assessment	Agreed through the Evidence Plan	It is agreed by both parties that harbour porpoise, grey seal and harbour seal are the only species of marine mammal to be considered in the impact assessment
	The reference populations as defined in the ES (which are unchanged from the PEIR) are appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the reference populations as defined in the ES are appropriate.
	The definitions used in the ES (which are unchanged from the PEIR) of sensitivity and magnitude in the impact assessment are appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the definitions for sensitivity and magnitude used in the impact assessment are appropriate.
	The potential impacts considered in the assessment are appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the potential impacts considered in the assessment are appropriate
	The approach to assessment of impacts from pile driving noise for marine mammals follows current best practice and is therefore	Agreed through the Evidence Plan	It is agreed by both parties that the approach to assessment of impacts from pile driving noise is appropriate for this assessment.

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	appropriate for this assessment.		
	Underwater noise impacts from pile driving are the only impact where a quantified assessment can be made.	Agreed through the Evidence Plan	It is agreed by both parties that underwater noise impacts from pile driving are the only impact where a quantified assessment can be made.
	The approach to screening in plans and projects for consideration in the cumulative impact assessment, and the resulting lists of plans and projects for each receptor is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the approach to screening in plans and projects for consideration in the cumulative impact assessment, and the resulting lists of plans and projects for each receptor is appropriate.
	The approach to cumulative impact assessment for each receptor is appropriate.	Agreed	It is agreed by both parties that the approach to cumulative impact assessment for each receptor is appropriate.
	The worst case scenario presented in the ES is appropriate for this project. This includes the worst case scenarios for both temporal and spatial underwater noise effects	Agreed	It is agreed by both parties that the worst case scenario presented in the ES is appropriate for this project.
Assessment Conclusions	The assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Marine Mammals are likely to be non-significant in EIA terms for the project.	Agreed	It is agreed by both parties that the assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Marine Mammals are likely to be non-significant in EIA terms for the project.
	The assessment of cumulative impacts for construction, operation and decommissioning presented is appropriate	Agreed	It is agreed by both parties that the assessment of cumulative impacts for construction, operation and decommissioning presented is appropriate
Habitats Regulations Assessment			
	There are no HRA considerations for species other than harbour porpoise, harbour seal and grey seal.	Agreed through the Evidence Plan	It is agreed by both parties that there are no HRA considerations for species other than harbour porpoise, harbour seal and grey seal.
	The list of sites screened in for assessment for each of the species harbour porpoise, harbour	Agreed through the Evidence Plan	It is agreed by both parties that the list of sites screened in for assessment for each of the

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	seal and grey seal is appropriate.		species harbour porpoise, harbour seal and grey seal is appropriate.
	The potential impacts considered in the draft assessment (which are unchanged for the DCO submission) are appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the potential impacts considered are appropriate.
	Based upon the full screening exercise there is no potential for likely significant effect LSE on any site designated for harbour seal	Agreed through the Evidence Plan	It is agreed by both parties that there is no potential for LSE on any site designated for harbour seal.
	Based upon the full screening exercise there is no potential for LSE on any site designated for grey seal	Agreed through the Evidence Plan	It is agreed by both parties that there is no potential for LSE on any site designated for grey seal.
	Based upon the full screening exercise there is no potential for LSE on any site currently designated for harbour porpoise	Agreed through the Evidence Plan	It is agreed by both parties that there is no potential for LSE on any site currently designated for harbour porpoise.
	No LSE could be concluded for all cSACs and SACs and therefore no Appropriate Assessment is required at the time of submission of the Application.	Agreed through the Evidence Plan	It is agreed by both parties that, at the time of submission, no LSE could be concluded for all cSAC and SAC and therefore no Appropriate Assessment is required.
	Due to the overlap with the Southern North Sea pSAC this site is screened in for further assessment (to allow robust assessment in a scenario where this site is taken forward).	Agreed through the Evidence Plan	It is agreed by both parties that the Southern North Sea pSAC should be screened in for further assessment.
	At the time of the submission of the Application there was insufficient information available to undertake a meaningful assessment of the pSAC.	Agreed through the Evidence Plan	It is agreed by both parties that at the time of the submission of the Application there was insufficient information available to undertake a meaningful assessment of the proposed pSACs.
	EATL has undertaken an assessment (provided as the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC) based upon the draft conservation objectives available for the pSAC and worked with Natural England to refine this assessment in line with their latest advice.		It is agreed by both parties that the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC is adequate and robust and that the conclusions are valid. It is agreed by both parties that condition 13(2) in the DMLs (schedules 10 to 13) secures

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	<p>EATL conclude that there is unlikely to be potential for Adverse Effect on Integrity (AEOI) of the pSAC for the project alone, and that for the in-combination effects some scenarios may have potential for AEOI</p> <p>EATL have produced an In-principle Site Integrity Plan (SIP) which, together with new condition 13(2) in the DMLs for the generation and transmission assets (schedules 10 to 13 of the draft DCO), secures mitigation to prevent AEOI.</p>		<p>mitigation to avoid AEOI and that the SIP also provides a framework to secure the development and implementation of specific mitigation measures (if required) to avoid AEOI..</p>
Management measures			
	<p>The assessment predicts impacts are expected to be low for both species of seal and harbour porpoise and that additional mitigation (beyond embedded mitigation) is not necessary. No additional mitigation is necessary for shipping noise No additional mitigation is necessary for other noise induced impacts</p>	<p>Agreed through the Evidence Plan</p>	<p>It is agreed by both parties that no additional mitigation is necessary for shipping noise and no additional mitigation is necessary for other noise inducing impacts.</p>
	<p>An application for the European Protected Species (EPS) licence will be submitted after the DCO is made, prior to the onset of construction, once more detailed design work has been carried out and is available to inform the licence application, and in consultation with the relevant Statutory Nature Conservation Agencies.</p>	<p>Agreed through the Evidence Plan</p> <p>Natural England is not currently aware of any impediments to the granting of an EPS licence.</p>	<p>It is agreed by both parties that the appropriate time to submit an application for the EPS licence will be following the making of the East Anglia THREE Order.</p>
	<p>It is agreed that the draft MMMP will be developed post consent in consultation with the Natural England.</p>	<p>Natural England welcomes the commitment from the Applicant to produce a MMMP and looks forward to working with the Applicant to further develop the draft MMMP that was submitted with the application.</p>	<p>It is agreed by both parties that the draft MMMP will be developed post consent in consultation with Natural England to reflect the most update advice on appropriate mitigation measures.</p>

2.5 Offshore Ornithology

30. The Project has the potential to impact upon Offshore Ornithology. Chapter 13 of the ES, Application document 6.1.13, provides an assessment of the significance of these impacts. Table 5 below provides areas of common ground that have been reached regarding the findings reported within that chapter and identifies areas where agreement is still to be reached.
31. This topic was discussed at Evidence Plan meetings on 30th September and 11th November 2013, 28th March and 2nd July 2014 and 3rd June and 6th July 2015 and at a Project Steering Group meeting on the 4th August 2015. Further meetings were held on 24th March and 8th June 2016.
32. Following discussions undertaken during the Examination, the Examining Authority asked for the SoCG to be revised to reflect the conclusion of all outstanding ornithological issues.

Table 5. SoCG – Offshore Ornithology

ID	Issue on which EATL seek agreement	EATLs Position	Natural England’s Position	Final Position
Data Collection and Description of Baseline Environment				
1ai	The ES (which is unchanged from the PEIR) adequately characterises the baseline relevant to offshore ornithology.	24 months of offshore digital aerial survey data collected for the ‘Site’ and a 4km buffer. Used to characterise bird distributions and estimate populations. This is sufficient for the assessment.	Agreed through the Evidence Plan	It is agreed by both parties that the ES adequately characterises the baseline relevant to offshore ornithology.
1aii		No additional surveys have been conducted of the offshore cable route. It is sufficient to rely on the information provided for the EA ONE application (now consented) and NE’s latest population data on Red-throated Diver in the Outer Thames Estuary SPA.	Agreed through the Evidence Plan	
1bi	The methods and techniques used to analyse offshore ornithological data are appropriate for characterising bird distributions and estimating populations.	Using design based methods to estimate population sizes for the Site and relevant buffers is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the methods and techniques used to analyse offshore ornithological data are appropriate for characterising bird distributions and estimating populations.
1bii		The method used to correct for non-detection of diving auks (the ‘correction factor’ or ‘availability bias’) following that recommended by JNCC (referred to as Method C, based on estimates that 24% of guillemot and 17% razorbill may be underwater when an aerial image is captured) is appropriate.	Agreed on receipt of final application	
1biii		The method used to determine flight heights is appropriate.	Agreed through the Evidence Plan	
1biv		The method used to proportion unidentified birds is appropriate.	Agreed through the Evidence Plan	

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
Impact Assessment Methodology				
2a	The impact assessment methodology – specifically the definitions of sensitivity and magnitude and the use of the impact matrix approach - is adequate and appropriate.	The impact assessment method described in Section 13.4.3 of the ES is appropriate.	Agreed through the Evidence Plan	Agreed by both parties.
2b	The potential impacts assessed during construction, operation and decommissioning are appropriate.	The potential impacts set out in Section 13.6 of the ES are the appropriate ones to be assessed.	Agreed through the Evidence Plan	Agreed by both parties.
2c	Cumulative assessments will include sites operational and built, under construction, consented and submitted for application in tiers 1 to 4.	Approach provided in Section 13.4.5 of the ES is appropriate.	Agreed. NE would advise that future plans or projects should be included where information is available	Final list agreed by both parties.
2d	The use of Furness (2015) BDMPS seasons utilised for the assessment is appropriate.	The biological periods used in the EIA are appropriate.	Agreed through the Evidence Plan	Agreed by both parties.
2e	Collision risk modelling results will be presented for each species using Band Model Options for which species specific avoidance rates have been accepted by the SNCBs.	Band model Option 1 and 2 – all species, Band Model Option 3 – herring gull, lesser black-backed gull and great black-backed gull only, using SNCB guidance on avoidance rates used and presentation of ranges due to avoidance rate and flight height uncertainty.	Agreed through the Evidence Plan	Agreed by both parties.
2f	The offshore ornithology assessment is unaffected by potential phasing of construction (1 or 2).	Differences between Single and Two phased approaches to construction are trivial in terms of ornithology impacts.	Agreed through the Evidence Plan	Agreed by both parties.
2g	Seabirds present in very low numbers whilst on migration will be assessed using the approach used in the Marine Scotland assessment (WWT and MacArthur Green 2014).	This approach is considered the most appropriate for migratory seabirds.	Agreed through the Evidence Plan	Agreed by both parties.

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
2h	Terrestrial migrant collision risk to be assessed using Migropath methods.	The results presented in Appendix 13.1, which predict very small risks for all species are accurate and appropriate.	Agreed on receipt of final application	Agreed by both parties.
2i	Red-throated diver displacement method based on monitoring data at existing offshore windfarms.	Evidence based method used in preference to generic displacement matrix. Presented in ES	Assessment of displacement impacts should be considered using generic displacement matrix as there is no East Anglia zone specific evidence	Both methods shown in assessment
2j	Displacement methods (except for red-throated diver, see 2i) are based on standard displacement matrix. Assessments are presented for relevant biological seasons and against agreed BDMPS. Seasonal estimates to be summed using suitable method and assessed against biogeographic populations.	These methods are appropriate.	NE considers the assessment should be summed across the whole annual cycle and include breeding season impacts from other projects..	NE is satisfied that using its preferred method (including summing seasonal displacement totals) for assessing guillemot, razorbill and puffin displacement, no significant impacts were found for both the project alone and cumulatively. Agreed by both parties
EIA				
3a	The screening matrix adequately identifies those species at risk of disturbance and displacement during construction - red-throated diver (for offshore cable corridor only), guillemot, razorbill and puffin.	Information provided in Section 13.7.1.1 of the ES correctly identifies those species at risk of disturbance and displacement.	Agreed through the Evidence Plan	Agreed by both parties.
3b	During construction, displacement impacts due to the project alone on the species identified are not significant under the EIA regulations (i.e. minor adverse or lower).	Section 13.7.1.1 of the ES correctly identifies the significance of the impacts of displacement during construction.	Agreed following discussion on 8 th June 2016	Agreed by both parties.

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
3c	The screening matrix adequately identifies those species at risk of disturbance and displacement during operation – gannet, guillemot, razorbill and puffin. Recognising that there may be future requirements to monitor vessel requirements once port has been identified	Information provided in Section 13.7.2.1 of the ES adequately identifies those species at risk of disturbance and displacement during operation	Agreed on receipt of final application	Agreed by both parties.
3d	During operation, displacement impacts due to the project alone on the species identified are not significant under the EIA regulations (i.e. minor adverse or lower).	Information provided in Section 13.7.2.1 of the ES correctly identifies the significance of the impacts of displacement during operation.	NE disagree with method used for summing seasonal displacement impacts, however using either approach (that preferred by NE or that used by EATL) the project alone impacts are not significant in EIA terms.	Agreed by both parties.
3e	During construction and operation, indirect impacts on habitats and prey due to the project alone are not significant under the EIA regulations (i.e. minor adverse or lower).	Information provided in Section 13.7.1.2 and 13.7.2.2 of the ES correctly identifies that the indirect impacts on habitats and prey due to the project alone are not significant.	Agreed on receipt of final application	Agreed by both parties.
3f	Collision risk impacts have been assessed for fulmar, gannet, kittiwake, lesser black backed gull, herring gull and great black backed gull. When considering the project alone, collision risk impacts are not significant under the EIA regulations (i.e. minor adverse or lower).	Information provided in Section 13.7.2.3 of the ES correctly identifies that collision risk impacts are not significant under the EIA regulations.	Agreed on receipt of final application	Agreed by both parties.

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
3g	The impact significance of the barrier effect due to the project alone for all species assessed is negligible.	Information provided in Section 13.7.2.4 of the ES correctly identifies that impact significance of the barrier effect due to the project alone for all species assessed is negligible.	Agreed on receipt of final application	Agreed by both parties.
3h	No impacts predicted for migrating great skua, Arctic skua, common tern and Arctic tern due to the project alone. No further consideration required for this project.	Information provided in Section 13.7.2.3 should state negligible impacts for these species.	NE agrees that predicted impacts are negligible.	Agreed by both parties..
3i	The impacts on migrating waders and wildfowl, and marsh harrier due to the project alone, are not significant under the EIA regulations (i.e. minor adverse or lower).	Information provided in Section 13.7.2.3 of the ES demonstrates that these impacts will be non-significant.	Agreed on receipt of final application	Agreed by both parties.
3j	No significant impacts are predicted for decommissioning due to the project alone.	Information provided in Section 13.7.3 of the ES demonstrates that no significant impacts should be expected during decommissioning due to the project alone.	Agreed on receipt of final application	Agreed by both parties.
Cumulative Assessment				
4a	The screening matrix adequately identifies potential cumulative impacts of the proposed project (disturbance and displacement: red-throated diver, gannet, guillemot, razorbill and puffin) and collision risk (gannet, kittiwake, herring gull, lesser black-backed gull and great black-backed gull).	Information provided in Sections 13.8.1 of the ES adequately identifies potential cumulative impacts of the proposed project.	Agreed on receipt of final application	Agreed by both parties.
4b	The list of windfarms included in the assessment is complete and the correct tiers have been assigned.	Information provided in Sections 13.8.1.1 of the ES is correct and adequate for the project.	Agreed on receipt of final application	Agreed by both parties.

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
4c	Cumulative displacement impacts are of minor significance at most.	Information provided in Sections 13.8.1.4 of the ES correctly assesses the significance of cumulative displacement impacts.	Not agreed for guillemot, razorbill and puffin. EATL need to provide revised matrices that include all the relevant information (see Written Representations)	<p>Revised matrices provided by EATL.</p> <p>NE is satisfied that using its preferred method (including summing seasonal displacement totals) for assessing guillemot, razorbill and puffin displacement, no significant impacts were found for both the project alone and cumulatively.</p> <p>Agreed by both parties</p>
4d	Cumulative collision impacts for gannet are of minor significance at most.	Information provided in Sections 13.8.1.5 of the ES correctly assesses the significance of cumulative collision impacts.	NE's position is whilst the impacts may not be significant an up to date PVA modelling is required.	<p>NE advises that there is no Adverse Effect on Integrity (AEoI) and no significant effect (EIA) for the project alone. However, it is not possible to rule out significant effects to gannet when considered cumulatively, but NE agrees that due to the revised East Anglia THREE design (i.e. increase in draught height) and the reduction of the contribution to the cumulative total from East Anglia ONE (due to the adoption of the smaller HVAC wind farm), the total cumulative impact is now smaller than the consented position as of the Hornsea 2 consent.</p> <p>Given the above NE has no further concerns.</p>

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
4e	Cumulative collision impacts for kittiwake are of minor significance at most	Information provided in Sections 13.8.1.5 of the ES correctly assesses the significance of cumulative collision impacts.	NE consider there to be a significant cumulative impact. However, while the contribution of East Anglia THREE to the total is not <i>de minimis</i> , it is so small as to not materially alter the significance of the overall cumulative mortality figure.	The updated cumulative totals including East Anglia THREE are not materially different from the most recently consented totals for Hornsea Project 2, therefore NE has no further concerns Agreed by both parties
4f	Cumulative collision impacts for great black-backed gull are of minor significance at most	Information provided in Sections 13.8.1.5 of the ES correctly assesses the significance of cumulative collision impacts.	NE considers that there is potentially a significant cumulative impact, and further (PVA) modelling is required to assess	NE welcomes the Applicant providing PVA modelling to address outstanding matter on greater black-backed gulls The updated cumulative totals including East Anglia THREE are not materially different from the most recently consented totals for Hornsea Project 2, therefore NE has no further concerns Agreed by both parties
4g	Cumulative collision impacts for herring gull are of minor significance at most	Information provided in Sections 13.8.1.5 of the ES correctly assesses the significance of cumulative collision impacts.	Agreed on receipt of final application	Agreed by both parties.
4h	Cumulative collision impacts for lesser black-backed gull are of minor significance at most	Information provided in Sections 13.8.1.5 of the ES correctly assesses the significance of cumulative collision impacts.	Agreed on receipt of final application	Agreed by both parties.
HRA Screening				
5a	The screening report includes all potentially relevant European sites.		Agreed through the Evidence Plan	Agreed by both parties.

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
5b	SPA features identified in the updated screening report are the only ones for which HRA will be required: <ul style="list-style-type: none"> • Deben Estuary SPA (dark-bellied brent goose); • Outer Thames Estuary SPA (red-throated diver); • Alde-Ore Estuary SPA (lesser black-backed gull); • Flamborough and Filey Coast pSPA (gannet, kittiwake). 		Agreed through the Evidence Plan	Agreed by both parties.
HRA Assessment.				
6a	The project alone and in-combination has no adverse effects on the integrity of the Deben Estuary SPA.	The results presented in the HRA are appropriate for the Deben Estuary SPA.	Agreed on receipt of final application, on the basis that winter working restrictions will be secured through the DCO	Agreed by both parties.
6b	The project alone and in-combination has no adverse effects on the integrity of the Alde-Ore Estuary SPA and Ramsar.	The results presented in the HRA are appropriate for the Alde-Ore Estuary SPA and Ramsar.	Agreed on receipt of final application	Agreed by both parties
6c	The project alone and in combination has no adverse effects on the integrity of the Outer Thames Estuary SPA.	The results presented in the HRA are appropriate for the Outer Thames Estuary SPA.	Agreed on receipt of final application although NE notes that this is based on the adoption of best practice vessel operations to minimise disturbance to red-throated diver.	Agreed by both parties,
6d	For all species the project alone has no adverse effects on the integrity of the Flamborough Head and Filey Coast pSPA.	The results presented in the HRA are appropriate for the Flamborough Head and Filey Coast pSPA.	Agreed following discussions on 8 th June 2016	Agreed by both parties

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
6e	The project in combination has no adverse effects on the integrity of the Flamborough Head and Filey Coast pSPA with respect to gannet	The results presented in the HRA are appropriate for the Flamborough Head and Filey Coast pSPA.	Adverse Effect On Integrity (AEoI) for gannet due to in-combination collision mortality uncertain as SOSS PVA model is out of date and ideally an up to date PVA for gannet should be produced	<p>NE advises that there is no Adverse Effect on Integrity (AEoI) and no significant effect (EIA) for the project alone. However, it is not possible to rule out significant effects to gannet when considered cumulatively, but NE agrees that due to the revised East Anglia THREE design (i.e. increase in draught height) and the reduction of the contribution to the cumulative total from East Anglia ONE (due to the adoption of the smaller HVAC wind farm), the total cumulative impact is now smaller than the consented position as of the Hornsea 2 consent.</p> <p>Given the above NE has no further concerns.</p>
6f	The project in combination has no adverse effects on the integrity of the Flamborough Head and Filey Coast pSPA with respect to kittiwake	The results presented in the HRA are appropriate for the Flamborough Head and Filey Coast pSPA.	An adverse effect on kittiwake due to in-combination collision mortality cannot be ruled out. However, the EA3 contribution while not de minimis is so small as to not materially alter the significance or the likelihood of an adverse effect on the integrity of the SPA.	It is agreed by both parties that, the EA3 contribution while not de minimis is so small as to not materially alter the significance or the likelihood of an adverse effect on the integrity of the SPA.

ID	Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
Management measures				
7a	Given the impacts of the project in terms of offshore ornithology, the conditions provided within the deemed marine licence are considered appropriate and adequate.	The conditions provided within the draft deemed marine licence are considered appropriate and adequate.	Not agreed	Agreed
7b	Turbine draught height	<p>EATL has committed to increasing the draught height of 70% of the East Anglia THREE turbines to 24m from MHWS. This will be secured by a new parameter in the Requirements of the DCO as well as in the DMLs for the generation (schedules 10 and 11 of the DCO) as set out below:</p> <p><i>The number of turbines with a draught height of less than 24m from MHWS comprised in the authorised scheme and the authorised scheme in licence 2 (generation) taken together must not exceed 52 turbines</i></p>	Natural England welcomes the proposal to increase the draught height to 24m across 70% of the East Anglia THREE turbines. We accept the principle that raising the draught height will result in a reduction in collision risk.	It is agreed by both parties that the proposed parameter secures the increase in the draught height to 24m across 70% of the total number of East Anglia THREE turbines.

2.6 Terrestrial Ecology

33. The Project has the potential to impact upon Terrestrial Ecology. Chapter 23 of the Provides an assessment of the significance of these impacts. Table 6 below provides areas of common ground that have been reached regarding the findings reported within that chapter and identifies areas where agreement is still to be reached.
34. This topic was discussed at an Evidence Plan meeting on the 5th December 2013. A method statement for the assessment was produced which was revised based on the discussion, circulated and agreed. Natural England and Suffolk County Council (SCC) were present.
35. No further topic specific meetings were held.

Table 6. SoCG – Terrestrial Ecology

Issue on which EATL seek agreement	EATLs Position	Natural England’s Position	Final Position
Environmental Impact Assessment			
Existing Environment	Survey data collected by [East Anglia Offshore Wind (EAOW) for characterisation of the onshore ecology for East Anglia ONE are suitable for the East Anglia THREE assessment (see ETG background paper Appendix 2)	Agreed through the Evidence Plan	It is agreed by both parties that survey data collected by EAOW for characterisation of the onshore ecology are suitable for the assessment
	Further information to supplement data particularly for the new access locations was obtained in 2014. These data are suitable for the East Anglia THREE assessment	Agreed	It is agreed by both parties that further information to supplement data particularly for the new access locations was obtained in 2014. It is agreed by both parties that these data are suitable for the East Anglia THREE assessment
	Data were further updated with the use of Biological Records data	Agreed	
	It is agreed that the ES adequately characterises the baseline environment in terms of Terrestrial Ecology.	Agreed	It is agreed by both parties that the ES adequately characterises the baseline environment in terms of Terrestrial Ecology.
Assessment methodology	The methodology for the EIA is appropriate	Agreed	It is agreed by both parties that the methodology for the EIA is appropriate
	The Terminology used in the EIA is appropriate	Agreed	It is agreed by both parties that the terminology used in the EIA is appropriate
	List of potential impacts considered in the EIA is appropriate	Agreed	It is agreed by both parties that the list of potential impacts considered in the EIA is appropriate
	It is appropriate that the impact assessment considers embedded mitigation as the starting point and East Anglia ONE mitigation is the basis East Anglia THREE	Agreed	It is agreed by both parties that it is appropriate that the impact assessment considers embedded mitigation as the starting point and East Anglia ONE mitigation is the basis for East Anglia THREE
	The worst case scenario presented in the	Agreed	It is agreed by both parties that the worst

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	ES is appropriate for this project.		case scenario presented in the ES is appropriate for this project.
	The assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Terrestrial Ecology are likely to be non-significant in EIA terms for the project.	Agreed	It is agreed by both parties that the assessment of impacts for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Terrestrial Ecology are likely to be non-significant in EIA terms for the project.
	The assessment of cumulative impacts for construction, operation and decommissioning presented is appropriate.	Agreed	It is agreed by both parties that the assessment of cumulative impacts for construction, operation and decommissioning presented is appropriate.
Habitats Regulations Assessment			
	<p>There are no HRA considerations for Terrestrial Ecology.</p> <p>All Special Areas of Conservation are screened out of the assessment with regard to on Terrestrial Ecology.</p>	Agreed	It is agreed by both parties that there are no HRA considerations for Terrestrial Ecology.
Management measures			
	All mitigation measures required are outlined within the Outline Construction Code of Practice and the Outline Landscape and Ecological Management Strategy.	Agreed	It is agreed by both parties that all mitigation measures required are outlined within the Outline Construction Code of Practice and the Outline Landscape and Ecological Management Strategy

2.7 Onshore Ornithology

36. The Project has the potential to impact upon Onshore Ornithology. Chapter 24 of the ES, Application document 6.1.24, provides an assessment of the significance of these impacts. Table 7 below provides areas of common ground that have been reached regarding the findings reported within that chapter.
37. This topic was discussed at Evidence Plan meetings on 30th September and 11th November 2013, 28th March and 2nd July 2014 and 3rd June and 6th July 2015, and at a Project Steering Group meeting on the 4th August 2015.

Table 6. SoCG – Onshore Ornithology


Issue on which EATL seek agreement	EATLs Position	Natural England’s Position	Final Position
Environmental Impact Assessment			
Existing Environment	Survey data collected by EAOW for characterisation of the onshore ecology for East Anglia ONE are suitable for the East Anglia THREE assessment.	Agreed through the Evidence Plan	It is agreed by both parties that the site specific survey data collection and analysis are sufficient to characterise the existing environment.
	Further information to supplement data particularly for the new access locations was obtained in 2014. These data are suitable for the East Anglia THREE assessment.	Agreed	It is agreed by both parties that the site specific survey data collection and analysis are sufficient to characterise the existing environment.
	The ES adequately characterises the baseline environment in terms of Onshore Ornithology (terrestrial and intertidal).	Agreed	It is agreed by both parties that the assessment provided in the ES is sufficient to characterise the existing environment.
Assessment methodology	The list of potential impacts assessed, in the chapter is appropriate.	Agreed through the Evidence Plan	It is agreed by both parties that the list of impacts assessed is appropriate.
	<p>The impact assessment methodologies used provide an appropriate approach to assessing potential impacts of the proposed project.</p> <p>This includes:</p> <p>The definitions used of sensitivity and magnitude in the impact assessment are appropriate.</p> <p>The approach to screening in plans and projects for consideration in the cumulative impact assessment, and the resulting lists of plans and projects for each receptor.</p>	Agreed	It is agreed by both parties that the impact assessment methodologies used provide an appropriate approach to assessing potential impacts of the proposed project.

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	The worst case scenario presented in the assessment is appropriate for this project.	Agreed	It is agreed by both parties that the worst case scenario presented in the assessment is appropriate for this project.
	The assessment of effects for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Onshore Ornithology are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that the assessment of effects for construction, operation and decommissioning presented is appropriate and, assuming the inclusion of the embedded mitigation described, impacts on Onshore Ornithology are likely to be non-significant in EIA terms.
	The assessment of cumulative effects is appropriate and, assuming the inclusion of the embedded mitigation described, cumulative impacts on Onshore Ornithology are likely to be non-significant in EIA terms.	Agreed	It is agreed by both parties that the assessment of cumulative effects is appropriate and, assuming the inclusion of the embedded mitigation described, cumulative impacts on Onshore Ornithology are likely to be non-significant in EIA terms.
Habitats Regulations Assessment			
	The screening method for identifying potential impacts on interest features of European designated sites is adequate and appropriate.	Agreed	It is agreed by both parties that the screening method for identifying potential impacts on interest features of European designated sites is adequate and appropriate.
	The assessment of effects presented in the Report to Inform the Habitats Regulations Assessment on the interest features of designated sites identified through the screening process is appropriate.	Agreed	It is agreed by both parties that the assessment of effects presented in the Report to Inform the Habitats Regulations Assessment on the interest features of designated sites identified through the screening process is appropriate.
	The conclusion of the HRA is correct: there	Agreed	It is agreed by both parties that the

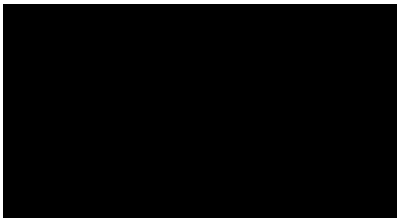
Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	will be no adverse effects on the integrity of European designated sites due to the project alone and in-combination with other plans and projects.		conclusion of the HRA is correct: there will be no adverse effects on the integrity of European designated sites due to the project alone and in-combination with other plans and projects.
Management Measures			
	<p>Adequate mitigation can be secured for Schedule 1 breeding birds and waterbirds (including brent goose) of the Deben Estuary SSSI, Ramsar and SPA through the implementation of the proposals in the Outline Landscape and Ecological Management Strategy (OLEMS). This will be secured via the DCO.</p> <p>Requirement 21 of the draft DCO will be amended to include a signpost to this particular element of the OLEMS</p>	Restriction agreed through the Evidence Plan	It is agreed by both parties that the OLEMS provide adequate mitigation for Schedule 1 breeding birds and waterbirds of the Deben Estuary. The draft DCO will be amended to secure this restriction.
	<p>With regard to brent geese the following restriction is proposed:</p> <p>During periods of construction works, from the 1st November to 28/29th February the only activities to be undertaken at the east side of the Deben Estuary (i.e. between Ferry Road and the Deben Estuary) would be:</p> <ul style="list-style-type: none"> • Walk-over site investigation or survey works; or • Any inspections required to assess the integrity, safety and security of [EATL] assets; or • Any response required for the purposes of 	Agreed through the Evidence Plan	It is agreed by both parties that the proposed mitigation measures for limiting impacts to wintering birds are suitable for the project.

Issue on which EATL seek agreement	EATLs Position	Natural England's Position	Final Position
	<p>ensuring the health, safety and security of employees, contractors and the general public, unless otherwise agreed with Natural England.</p> <p>Access by vehicle would be from either Access B or Access C (but not from both simultaneously to ensure that any disturbance is localised).</p> <p>For the same period, during times of severe weather (prolonged cold conditions), access will only be taken for the purposes of health, safety and security unless otherwise agreed with Natural England. The definition of 'severe weather' will be the same as that used to implement the Statutory Suspension of Wildfowl Shooting in Severe Winter Weather measure under the Wildlife and Countryside Act. The severe weather condition will come into force at 00h01 following the day when the relevant Secretary of State signs the necessary Statutory Instrument to bring the requirement into force. The suspension will end after a maximum period of 14 days unless otherwise extended by the Secretary of State through the signing of a further Statutory Instrument. After the end of the shooting season and up until the end of February, the same weather criteria shall apply, albeit without a signed order from the Secretary of State: EATL shall be responsible for monitoring local temperatures for this purpose.</p>		

Signing box: The undersigned agreed to the provisions within this SoCG – Natural England

Signed	
Printed Name	K. Louise Burton
Position	Marine Senior Adviser and Team Leader
On behalf of	Natural England
Date	6 th December 2016

Signing box: The undersigned agreed to the provisions within this SoCG – EATL

Signed	
Printed Name	Keith Morrison
Position	East Anglia THREE Senior Project Manager
On behalf of	East Anglia THREE Limited (EATL)
Date	6 th December 2016

Appendix 1 Glossary

AEOI	Adverse Effect On Integrity
cSAC	Candidate Special Area of Conservation
DCO	Development Consent Order
EA3	East Anglia THREE
EAOW	East Anglia Offshore Wind
EATL	East Anglia THREE Limited
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
HRA	Habitats Regulations Assessment
MMMP	Marine Mammal Mitigation Plan
NE	Natural England
OLEMS	Ecological Management Strategy
pSAC	Potential Special Area Conservation
PVA	Population Viability Analysis
REIS	Report on the Implications for European Sites
SAC	Special Area of Conservation
SCC	Suffolk County Council
SoCG	Statement of Common Ground
SOSS	Strategic Ornithological Support Services
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

Appendix 2 Relevant Representation and EATL Response



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Winchester
SO23 7BT

FREEPOST RSTC-EJEY-RKRX
1 Atlantic Quay,
45 Robertson Street,
4th Floor,
Glasgow, G2 8JB

2016-05-31

Dear Alex,

Planning Act 2008

East Anglia THREE Limited

The Proposed East Anglia THREE Offshore Wind Farm Order

Relevant Representation reply letter (Appendix 1 of the SoCG)

East Anglia THREE Limited (EATL) would like to thank you for taking the time to provide a relevant representation to the development consent order application made by EATL for the East Anglia THREE offshore wind farm.

In this letter we provide a reply to all the comments you have made in your relevant representation. In order to do this in a clear and transparent manner this is in the form of a tabulated reply.

This letter will form Appendix 1 of the final Statement of Common Ground (SoCG). In addition to the comments below, where more detailed responses are required these have been attached in Annex 1.

Relevant Representation Comment	EATLs response
Natural England does not advocate the use of PBR modelling when PVA modelling is available. Natural England has previously considered PBR outputs for assessing population impacts in cases where up to date PVA models have not been available at an appropriate population scale. However, the use of PBR on its own, as the means of assessing population impacts on seabird populations presents a number of issues. Therefore, Natural England advises that wherever possible, the population-level impacts of predicted mortality from developments should be assessed using PVA models as these allow the effects of factors such as population trends and varying demographic parameters to be explicitly investigated in terms of their effect on the	We accept and broadly agree with Natural England's position with regards the relative merits of PBR and PVA, however we consider that PBR remains a useful preliminary tool to act as a filter for identifying the population impacts for which more detailed modelling (e.g. PVA) will be informative and those for which the relative scale of impact to population size is such that PVA is unwarranted.

Relevant Representation Comment	EATLs response
<p>population trajectory. PVA models also allow relative comparisons of population level effects with and without the additional mortality to be considered in a way that is not possible with PBR.</p>	
<p>Natural England does not agree with the Applicant's method of assessing displacement impacts. We advise that the Applicant assess the cumulative impact across the whole annual cycle, where seasonal impacts are summed. The cumulative total should then be assessed against the appropriate population scale</p>	<p>EATL consider that Natural England's approach of summing seasonal displacement generates overly precautionary predictions on top of the high level of precaution already inherent in the worst case scenarios of 70% displacement & 10% mortality advocated. Notwithstanding this, we present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p>
<p>Natural England welcomes the Applicant's approach to use Population Viability Analysis (PVA) modelling to assess EIA impacts on kittiwake. However, we advise further consideration of a number of issues. These include whether it is appropriate to rely on density dependent outputs, and identifying the appropriate population scale at which to assess impacts.</p>	<p>EATL welcomes Natural England's broad acceptance of the kittiwake population model, however we disagree with regards to Natural England's views on density dependence and the appropriate scale at which to model impacts. All populations are subject to limits on their growth due to competition for resources. Furthermore, contrary to Natural England's assertion that there is a lack of evidence in support of density dependence for this species there is strong evidence of compensatory density dependence which we summarise in Annex 1. There is also good evidence in support of modelling the North Sea population as a whole as has been presented in our response.</p>
<p>There appears to be little clear evidence to suggest compensatory density dependence is operating on the kittiwake population at a North Sea scale, therefore Natural England advise that the assessment should focus on outputs from the density independent models.</p>	<p>See above.</p>

Relevant Representation Comment	EATLs response
<p>Natural England advise that the Applicant further consider whether the kittiwake PVA model has been constructed at the appropriate population scale for assessing EIA impacts. We appreciate that the Applicant has carried out at a North Sea BDMPS scale assessment which is the scale that we initially accepted impacts should be measured against. However, further consideration is required as to whether it is biologically meaningful and therefore appropriate to construct a PVA model at this scale. Using the North Sea BDMPS is appropriate for HRA because impacts are apportioned back to individual SPA colonies, but for EIA if the North Sea BDMPS scale is used it does not consider a biologically discrete population.</p>	<p>See above.</p>
<p>The total cumulative effects on great black-backed gulls from collision mortality equates to 16.4% of baseline mortality for the largest BDMPS (non-breeding in Furness (2015)) and 6.38% of baseline mortality for the biogeographic population. Therefore, Natural England advises further consideration through population modelling. We note that the outputs of PBR modelling from Rampion are presented. However, Natural England advise the use of PVA modelling (see above).</p>	<p>EATL acknowledge this point regarding impacts on GBBG, however we question the requirement to undertake population modelling in this case. In Natural England's written submission for deadline 6 of the Hornsea Project 2 examination a method for assessing EIA level collision risk impacts which included GBBG was presented which concluded no significant cumulative effects. EATL have applied the same approach for the current assessment; with the inclusion of EA3 (see Annex 1).</p>
<p>Therefore, Natural England advises that the Applicant undertakes PVA modelling to assess EIA impacts on great black-backed gulls. We suggest using either a UK North Sea colony scale or UK colony scale population model and apportion the predicted project impacts back to the respective scale.</p>	<p>See above.</p>
<p>Natural England considers that the impacts from the project alone will not have an adverse effect on the integrity of Flamborough and Filey Coast pSPA. Natural England considers that the level of in-combination mortality, when considered with other plans and projects is such that an adverse effect on integrity of the Flamborough and Filey Coast pSPA cannot be ruled out. However, the effect of the additional predicted mortality from the project alone while not de minimis, is so small as to not materially alter the significance of the overall in-combination mortality figure or the likelihood of an adverse effect on the integrity of the pSPA arising from</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>

Relevant Representation Comment	EATLs response
such an in-combination level of mortality.	
<p>The Applicant provided a table of designated sites (Table 13.10 of the Environmental Statement Report) and their ornithological features: we assume this table only lists ornithological features of the sites that may have connectivity with the East Anglia Three Offshore Wind Farm (EA3) site, as the breeding tern qualifying features of several of the Special Protection Areas (SPAs) (e.g. Hamford Water, Chichester & Langstone Harbours and Solent & Southampton Water SPAs) are not mentioned.</p>	<p>This is correct - we have only included those features which could be affected by the proposed development.</p>
<p>The Applicant has provided a summary of the nature conservation value of bird species which were recorded during surveys and which are considered to be at potential risk either due to their abundance, potential sensitivity to windfarm impacts or due to biological characteristics. Please note that kittiwake and puffin are now red listed and red-throated diver is now green listed on Birds of Conservation Concern 4 (2015).</p>	<p>EATL thanks NE for confirming the updated status of these species and notes that this does not materially affect the assessment as presented.</p>
<p>Table 13:15: We advise that there is an error in Table 13.15 of the Environmental Statement Report which should refer only to a non-breeding season for guillemot in Furness (2015) and not separate migration periods. This table should also include migration periods and a winter period for razorbill in Furness (2015) rather than a single non-breeding period.</p>	<p>EATL acknowledges this comment however, this refers only to the screening table. The full assessment includes the appropriate seasons as defined by Furness (2015).</p>
<p>Red Throated Diver Displacement: When assessing the displacement and disturbance of red-throated diver, Natural England notes that Furness & Wade (2012) is for species occurring in Scottish Waters only. Therefore we advise that Bradbury et al. (2014) is used instead as this expanded coverage to species occurring in English Waters, although we recognise that Bradbury et al. (2014) use the same scoring system as Furness & Wade (2012).</p>	<p>EATL thanks NE for pointing out this referencing point and notes that this does not materially affect the assessment as presented.</p>
<p>The Applicant assumes that red-throated diver displaced by the cable laying vessel will return to their previous position following passage of the vessel. Natural England finds it unclear what the justification is for the assumption that birds return to their previous position straight away as soon as the vessel leaves the area. We advise that a more precautionary approach is adopted.</p>	<p>EATL consider this approach to be justified on the basis that the cable laying vessel will be moving much more slowly than the tidal flow. Therefore, since from the bird's perspective the vessel will essentially be stationary it is appropriate to assume that the exclusion zone around the vessel will be the same as that around a static structure (2km). Consequently the current assessment is</p>

Relevant Representation Comment	EATLs response
	considered precautionary and robust.
<p>Construction Worst Case Scenario (WCS): Paragraph 77 of the Environmental Statement Report states: ‘However, construction will not occur across the whole of the proposed wind turbine array area simultaneously or every day, but will be phased, with no more than one foundation expected to be installed at any time.’ This is not consistent with the worst case scenario – Table 13.2 says construction spatial worst case scenario for Impact 2 for monopiles is two concurrent piling events. Also paragraphs 85 on razorbill and 97 on puffin both state a maximum of two foundations are expected to be installed simultaneously.</p>	<p>EATL acknowledges that the description in paragraph 77 incorrectly stated that there would be a maximum of one piling event at a time while the WCS describes up to two simultaneous piling events. However, paragraph 78 clearly states that birds could be excluded for up to 2 vessels, therefore construction impacts were estimated correctly and the assessment remains unchanged.</p>
<p>Biologically Defined Minimum Population Scales (BDMPS): The Applicant uses non-breeding season Biologically Defined Minimum Population Scales (BDMPS) proportion of immature birds to calculate breeding season populations for guillemot, razorbill and puffin. It is not clear why the Applicant has used this technique when Furness (2015) gives a population total for immatures in each BDMPS. We do not think this approach is valid (notwithstanding the validity of the calculations) as it cannot be assumed that the distribution and origin of immature birds is the same in the breeding season compared to the non-breeding season. We do not advise that the non-breeding season populations in Furness (2015) are in any way applicable to the breeding season – either for adults or immatures. We advise that the Applicant determines their own breeding season population scales and sizes for species.</p>	<p>EA3 is beyond the foraging range of any auk breeding colonies, therefore auks observed during the breeding season will not be actively breeding adults. Hence it was assumed that auks present in the breeding season will comprise immature birds and nonbreeding adults. As the size of the population from which such birds could be drawn is not well understood, however it seems very likely that both of these categories of bird are drawn from the BDMPS populations. Indeed, given what is known about the movements of immature birds (that they disperse to similar areas as adults and gradually make their way back towards their natal colonies as they approach maturity) this seems a much more plausible assumption than assuming there is no connection between the wintering populations and the summer distribution of immatures as NE suggest. Therefore we are content that this approach provides a robust means to estimate reference populations in the summer. The above notwithstanding, we present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p>
<p>Construction displacement for all auk species: Natural England’s position is that the individual seasons should be summed to give an annual mortality figure. However, we recognise that even the summed numbers would be so small against the BDMPS (or biogeographical) populations that it would not significantly alter overall conclusions.</p>	<p>EATL consider that Natural England’s approach of summing seasonal displacement generates overly precautionary predictions on top of the high level of precaution already inherent in the worst case scenarios of 70% displacement & 10% mortality advocated. Notwithstanding this, we present additional assessment (see Annex 1) using the methods adopted by NE in their</p>

Relevant Representation Comment	EATLs response
	written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.
<p>Red Throated Diver displacement: There are no displacement matrix tables provided for the red-throated diver operational displacement assessments. Natural England advises that these should be included (as done for gannet and auks) for at least the EA3 site and 4km buffer with no gradient.</p>	<p>In order to clarify the displacement assessment for this species, rather than present a matrix with a range of displacement values, we have used values derived from a study conducted over several years for a wind farm site near to the proposed development. Consequently the displacement percentages for Red Throated Diver (RTD) used in the assessment are grounded in evidence and are therefore considered to be robust and reliable. This contrasts with the situation for the auks and gannet, for which displacement percentages are less well estimated. Therefore, using a wide range is appropriate for auks/gannet but for RTD we have used a more realistic evidence based approach.</p>
<p>Displacement mortalities: Natural England advises that the displacement mortalities for each season be summed to give an annual total. We acknowledge that this is precautionary as it is in theory, possible that the same bird may be assessed more than once using this approach. However, assessing against different populations for each season will reduce this possibility since a large proportion of the birds present in the non-breeding seasons are predicted to be different individuals from those present in the breeding season. For red-throated diver for the EA3 site plus 4km buffer with no gradient, the annual total predicted mortality is 29 birds, which using the largest BDMPS (13,277 for spring/autumn migration in Furness (2015)) and the 0.228 mortality rate provided, equates to 0.96% of baseline mortality. Given this is close to 1%, we would consider the impact to be minor adverse.</p>	<p>EATL consider that Natural England's approach of summing seasonal displacement generates overly precautionary predictions on top of the high level of precaution already inherent in the worst case scenarios of 70% displacement & 10% mortality advocated. Notwithstanding this, we present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p> <p>In addition, EATL notes that Natural England's conclusion is the same as the estimate of significance presented in the ES.</p>
<p>Average Peak Density: It would be useful if the Applicant could provide a table of monthly estimates of average peak density of gannets within the EA3 site plus a 2km buffer. This would assist us in assessing if we agree with the seasonal mean peak data used in the displacement matrices.</p>	<p>EATL acknowledge Natural England's request for additional assessment, however to obtain density estimates for the site plus 2km buffer would require re-analysis of the raw data. Given the very low level of impact predicted for gannet displacement and the already precautionary basis adopted (using the higher density estimate from the site plus 4km buffer) we question the justification for undertaking additional assessment since it will have no material effect on the conclusions reached.</p>

Relevant Representation Comment	EATLs response
<p>Mortality Rates: In regards to gannet mortality rate in the winter season, the Applicant assumes a 1% mortality rate. We recommend that given the uncertainty of predicting a mortality rate for gannet, a range of mortality rates are used.</p>	<p>We draw Natural England's attention to the fact that the assessment already includes a range of mortality rates which can be reviewed for context. However, as noted in the assessment, gannets are regarded as highly flexible in their foraging habits (a major contributory factor in their ongoing population increases) so assuming more than a very low level of displacement mortality is unduly precautionary. Moreover, gannets are predominantly passing through the region on migration when recorded in EA3, with the consequence that displacement from the site will be expected to have a minimal effect, with even a 1% mortality likely to be highly precautionary.</p>
<p>Impacts on Gannets: Paragraph 131 of the Environmental Statement Report gives the combined autumn and spring migration mortalities as 5 individuals. However, if you combine the spring migration number of 3 with the autumn migration number of 7, the total is 10 not 5. However, this error does not alter the overall conclusion that effects on gannets will be negligible.</p>	<p>We agree with NE that if seasonal impacts are summed this equates to 10 individuals, however the assessment applied a mean impact across seasons, giving a value of 5. Therefore 5 was consistent with the approach for assessing displacement used in the ES. NE have applied their method (summing individual displacement values) to obtain the figure of 10. Nonetheless, the key factor is that irrespective of the method used the conclusion remains the same and there is therefore no material difference to the conclusion in the ES.</p>
<p>Seasonal Displacement of Auks: Natural England does not agree with the proposed alternative method of summing seasonal displacement impacts on auks to give an annual total. We recommend simply summing the seasonal totals. We understand the rationale for assessing that the annual effects against the biogeographic populations, but there needs to be clarity over how the impacts are apportioned to UK colonies.</p>	<p>EATL consider that Natural England's approach of summing seasonal displacement generates overly precautionary predictions on top of the high level of precaution already inherent in the worst case scenarios of 70% displacement & 10% mortality advocated. Notwithstanding this, we present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p>

Relevant Representation Comment	EATLs response
<p>Use of immature auks: The Applicant has used proportions of immature auks (paragraph 140 of the Environmental Statement) in the non-breeding BDMPSs (Furness 2015) to calculate breeding season proportions. As stated above (paragraph 9), we do not agree that this method is appropriate.</p>	<p>East Anglia THREE is beyond the foraging range of any auk breeding colonies, therefore auks observed during the breeding season will not be actively breeding adults. Hence it was assumed that auks present in the breeding season will comprise immature birds and nonbreeding adults. As the size of the population from which such birds could be drawn is not well understood, however it seems very likely that both of these categories of bird are drawn from the BDMPS populations. Indeed, given what is known about the movements of immature birds (that they disperse to similar areas as adults and gradually make their way back towards their natal colonies as they approach maturity) this seems a much more plausible assumption than assuming there is no connection between the wintering populations and the summer distribution of immatures as NE suggest. Therefore we are content that this approach provides a robust means to estimate reference populations in the summer. In addition we present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p>
<p>Guillemot mean peak: We consider the mean peak breeding season estimate for guillemot to be between 5 and 122. The addition of a maximum of 122 (rather than 117) equates to 0.13% (rather than 0.12%) of baseline mortality, but will still result in a low magnitude of impact.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Due to the error in calculating the guillemot breeding period seasonal mean peak (see above), the summed total using the Applicants method of dividing each seasonal mortality by the number of seasons (in the case of guillemot by 2) before summing should be:</p> <p>Non-breeding total of $200/2 = 100$ Breeding total of $122/2 = 61$ (rather 58)</p> <p>Giving an annual total mortality of $100 + 61 = 161$ (rather than 158) for our advised worst case scenario of 70% displacement and 10% mortality. This equates to 0.028% (rather than 0.027%) of baseline mortality, so would still result in a low magnitude of impact.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>

Relevant Representation Comment	EATLs response
<p>Seasonal displacement guillemot: Natural England's preferred method for summing seasonal displacement mortalities to give an annual total is to simply sum the seasonal mortalities. Using this method the total annual guillemot mortality from operational displacement is calculated as 322 birds at the worst case scenario of 70% displacement and 10% mortality. This equates to 0.14% of baseline mortality of the largest BDMPS (non-breeding season in Furness 2015) and 0.06% of baseline mortality of the biogeographic population. Therefore, this does not alter the overall negligible conclusion provided by the Applicant.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>The breeding season mean peak guillemot abundance from Table 13.20 of the Environmental Statement Report should be 1,744 (April) rather than the 1,699 given stated by the Applicant (which is the March figure). However, the result is still only a low magnitude of impact.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Seasonal displacement razorbill: As stated above, Natural England's preferred method for summing seasonal displacement mortalities to give an annual total is to simply sum the seasonal mortalities. Using this method the total annual razorbill mortality from operational displacement is calculated as 417 birds at the worst case scenario of 70% displacement and 10% mortality. This equates to 0.40% of baseline mortality of the largest BDMPS (migration periods in Furness (2015)) and 0.14% of baseline mortality of the biogeographic population. As this is a low impact on a species with low to medium sensitivity we would advise that this is a minor impact.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>

Relevant Representation Comment	EATLs response
<p>Seasonal displacement puffins: It has not been possible to check the puffin assessment figures used in the assessment as no table of data is provided in Appendix 13.2 (Baseline Technical Report) for the EA3 site plus 2km buffer. However, data provided in Annex C, Table C3.21 for the EA3 site plus 4km buffer. If these data are used instead (a precautionary approach) then the following is obtained:</p> <p>Breeding season – number of puffins predicted to die is between 1 (30% displacement and 1% mortality) and 18 (70% displacement and 30% mortality). This equates to 0.10% of baseline mortality of the breeding season BDMPS. So, using the precautionary figure of the EA3 site plus 4km does not alter the negligible conclusion of the Applicant</p> <p>· Non-breeding season – number of puffins predicted to die is between 1 (30% displacement and 1% mortality) and 23 (70% displacement and 30% mortality). This equates to 0.06% of baseline mortality of the non-breeding season BDMPS. Using the precautionary figure of the EA3 site plus 4km does not alter the negligible conclusion of the Applicant.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES. However, there are two points to raise on this comment: (1) In the ES the approach presented was virtually identical to this, using the density estimated across the site plus 4km buffer, however the abundance was calculated for the area of the site plus 2km buffer, ensuring appropriate numbers were used. (2) The NE approach reports an upper mortality derived using 10% mortality, but the description erroneously describes this as being 30% mortality.</p>
<p>In the case of puffin (as stated for guillemot and razorbill), our preferred method for summing seasonal displacement mortalities to give an annual total is to sum the seasonal mortalities. Using this method the total annual puffin mortality from operational displacement is calculated, using the figures presented in the Environmental Statement Report for the EA3 site plus 2km buffer is 34 birds at the worst case scenario of 70% displacement and 10% mortality. This equates to 0.09% of baseline mortality of the largest BDMPS (non-breeding period in Furness (2015)) and 0.002% of baseline mortality of the biogeographic population. Therefore, this does not alter the overall negligible conclusion stated by the Applicant. The more precautionary figure (the EA3 site plus 4km buffer) is 41 birds for the worst case scenario of 70% displacement and 10% mortality. This equates to 0.11% of baseline mortality of the largest BDMPS (non-breeding period in Furness (2015)) and 0.002% of baseline mortality of the biogeographic</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>

Relevant Representation Comment	EATLs response
<p>population. Therefore, this still represents a low magnitude of impact.</p>	
<p>When considering the cumulative nonbreeding displacement figure for puffin, we advise the Applicant to use a wider range of mortality than just 1%.</p>	<p>We note this comment, however the assessment already includes a range of mortality rates and given the very large BDMPS puffin population, this would have no material effect on the outcomes of the assessment.</p>
<p>We agree that impacts on birds from indirect impacts through effects on habitats and prey are either negligible or minor.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Use of generic flight height curves: Natural England considers it inappropriate to use the Johnston et al. (2014) generic flight height curves for boat-based data with site-specific densities from aerial surveys in Collision Risk Modelling (CRM) assessments using the Band model. We therefore advise that the focus, wherever possible should be on the CRM Band Option 1 outputs.</p>	<p>EATL acknowledges this comment however, the mortality estimates derived using the other models are included for completeness, with the assessment itself based on the outputs from Band option 1 as previously agreed with Natural England.</p>
<p>Gannet Avoidance Rate: Natural England acknowledges the findings in APEM (2014) that use of the 98.9% avoidance rate for the basic Band model may overestimate collision predictions. At present our advice regarding gannet avoidance is as per the joint Statutory Nature Conservation Bodies response to the Marine Scotland review of avoidance rates report by Cook et al. (2014), i.e. 98.9% avoidance rate for gannet with the basic Band model. As this study is based on just 8 gannets entering the offshore wind farm, there is not enough evidence to robustly determine the avoidance rate. However, we welcome future monitoring along the lines of the APEM (2014) study to determine an appropriate avoidance rate for gannet.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Non seabird migrants: The Applicant uses the Migropath model to assess collision risk for non-seabird migrants. However, paragraph 55 of the Environmental Statement Report suggests that the SOSS-05 model (SOSS-MAT) was used. Whilst we recognise that these two models are similar and we do not have a preference for which is used; it would be good to be clear about which has been used.</p>	<p>The non-seabird migrant assessment was conducted using Migropath.</p>

Relevant Representation Comment	EATLs response
<p>When assessing collision impacts for individual seasons for all bird species, it is important that the Applicant include breeding season impacts, even if they are small.</p>	<p>The breeding season collisions were reported and included in the annual assessment.</p>
<p>Flight Heights: We agree that site specific estimates of flight height are appropriate if the sample size is large. However we consider it appropriate to present a range of flight heights.</p>	<p>We acknowledge Natural England's agreement that the appropriate height data have been used in the gannet collision modelling. As requested we have provided a histogram of gannet flight heights in our response (see Annex 1).</p>
<p>Nocturnal Flights: We note that the MacArthur Green review (contained within Appendix 13.1 of the Environmental Statement Report) presents a reasonable amount of evidence of nocturnal flight activity of gannet and kittiwake. But much less is presented for lesser black-backed gulls and none for herring gulls or great black-backed gulls. Therefore, Natural England does not consider there to be sufficient evidence to accept changing the nocturnal factor used for large gulls. However, there may be sufficient evidence for stating that the nocturnal activity assumed for gannet and kittiwake in the CRM can be considered a precautionary approach.</p>	<p>We welcome Natural England's support for the nocturnal activity review presented in the assessment and the conclusions reached. We will continue to review the available data with a view to further refinement to the estimated nocturnal activity if possible.</p>
<p>Increases in mortality: Table 13.34 of the Environmental Statement Report would be much clearer in terms of understanding how the increases in mortality have been calculated if the seasonal CRM figures were also presented here, rather than having to go back to Table 13.31 where these figures are available.</p>	<p>EATL acknowledges this comment. We have provided an updated table in Annex 1.</p>
<p>Additive impacts: Natural England considers the two impacts of collision and displacement as additive and advises that they should be summed. 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</p>	<p>This only applies to gannet. We have provided the combined assessment in Annex 1, although the individual impacts were very small for this species therefore there will be no material change to the assessment.</p>

Relevant Representation Comment	EATLs response
<p>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.</p>	
<p>Percentage of migrant seabirds at rotor height: We recommend that Table 13.35 of the Environmental Statement Report be updated with the percentage of migrant seabird species at rotor height data from Johnston et al. (2014) and should be calculated for the EA3 worst case scenario turbine specifications.</p>	<p>We acknowledge this comment, however as noted by NE in the following comment, given the distance of EA3 from the coast this update will have no change on the assessed impact.</p>
<p>In regard to migrant sea birds, while we cannot say with certainty that there will be no impact, we do agree with the Applicant that given the distance EA3 is offshore, any impacts will be negligible.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Guillemot: Whilst Natural England agrees that the mortality is likely to be at the low end of the range, we do not agree that using 1% mortality for the cumulative assessment (with 70% displacement) can be considered the worst case scenario. Our recommendation is a range from 30% displacement and 1% mortality up to 70% displacement and 10% mortality, with 70% displacement and 10% mortality as the worst case. We also recommend that the Applicant use this same worst case scenario (70% displacement and 10% mortality) for assessment of the project alone.</p>	<p>We note Natural England's comments with respect to estimating displacement impacts and draw attention to the fact that we have presented the full range of predicted impacts as suggested by NE. However, we disagree with Natural England's assertion that up to 10% of displaced guillemots could die as a consequence of displacement. We provided a summary of evidence on wintering movements to support this (since guillemots are predominantly present outside the breeding season) and consider this provided robust justification for the mortality figures used in the assessment.</p>
<p>Guillemot: Using our recommended worst case scenario of 70% displacement and 10% mortality, the predicted mortality is 4,618 birds for the wintering season (assumed non-breeding season in the BDMPS report). This equates to 2.04% of baseline mortality, which would not be a negligible impact.</p>	<p>See above.</p>
<p>Guillemot: There does not appear to be any displacement impacts in the breeding season from other North Sea projects added to the overall cumulative assessment of displacement impacts.</p>	<p>The assessment focussed on the nonbreeding season on the basis that very few guillemot were present during the breeding seasons with the consequence that this was the period when East Anglia THREE would be predicted to contribute to the cumulative impact.</p>

Relevant Representation Comment	EATLs response
<p>Guillemot: Natural England advises that the applicate undertakes a further assessment that incorporates the cumulative impact across the whole annual cycle, where seasonal impacts are summed. The cumulative total should then be assessed against the appropriate scale.</p>	<p>In the assessment the annual cumulative figure presented for Dogger Bank Teesside A & B was provided (75,144) and was considered alongside that presented for the cumulative nonbreeding season in the Hornsea Project Two assessment (63,111). As discussed above, since very few guillemots were observed during the breeding season the cumulative assessment focussed on the nonbreeding season and therefore the latter was used as the basis for cumulative assessment (with the addition of EA3). We can provide additional assessment based on the higher annual figure (75,144). This additional assessment notwithstanding, we note that in Natural England's written submission for deadline 6 of the Hornsea Project 2 examination a method for assessing EIA level displacement impacts was presented which concluded no significant cumulative effects. EATL have applied the same approach for the current assessment, with the inclusion of EA3 (see Annex 1).</p>
<p>Razorbill: As with guillemot, Natural England advises that for the cumulative assessment of impacts the Applicant use a range from 30% displacement and 1% mortality up to 70% displacement and 10% mortality the worst case. We also recommend that the Applicant use this same worst case (70% displacement and 10% mortality) for assessment of the project alone.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Razorbill: Using our recommended worst case scenario of 70% displacement and 10% mortality, the predicted mortality for autumn is 1,925 birds. This equates to 1.87% of baseline mortality, which would not be a negligible impact.</p>	<p>We acknowledge this comment and have applied the same update as described for guillemot (see Annex 1)</p>
<p>Razorbill:As with guillemot, there does not appear to be any displacement impacts in the breeding season from other North Sea projects added to the overall cumulative assessment of displacement impacts.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Razorbill:Natural England advises that the Applicant undertakes a further assessment that incorporates the cumulative impact across the whole annual cycle, where seasonal impacts are summed. The cumulative total should then be assessed against the appropriate scale.</p>	<p>We acknowledge this comment (see Annex 1)</p>

Relevant Representation Comment	EATLs response
<p>Razorbill: Using our recommended worst case scenario of 70% displacement and 10% mortality, the predicted mortality for the winter season is 1,016 birds. This equates to 2.67% of baseline mortality, which would not be a negligible impact.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Razorbill: Using our worst case scenario of 70% displacement and 10% mortality, the predicted mortality for spring is 1,527 birds. This equates to 1.48% of baseline mortality, which wouldn't be a negligible impact.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Razorbill: As set out above, Natural England's preferred method for summing seasonal displacement mortalities to give an annual total is to simply sum the seasonal mortalities. If this approach is taken, the displacement combined across the three non-breeding seasons gives a cumulative total of 63,814 (27,497 + 14,509 + 21,808 autumn, mid-winter and spring respectively) razorbill at risk of displacement (compared to 21,270 calculated by the Applicant). Based on this, the estimated number of razorbills subject to potential mortality during the non-breeding season is between 191 and 4,467 individuals (from 30% displaced and 1% mortality to 70% displaced and 10% mortality) compared to 64-1,489 using the Applicant's proposed method.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Razorbill: We note that if the seasonal mortalities are simply summed then the predicted cumulative mortality for razorbill in the non-breeding season for the Applicant's chosen scenario of 70% displacement and 1% mortality would be 447 birds per year. If our advised worst case scenario of 70% displacement and 10% mortality is used and the approach of simply summing the seasonal mortalities is taken, the predicted cumulative mortality for the non-breeding periods is 4,467 birds. This equates to 1.5% of baseline mortality of the biogeographic population, which would not be a negligible impact.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Puffin: As with guillemot and razorbill, Natural England advises that a range from 30% displacement and 1% mortality up to 70% displacement and 10% mortality, with 70% displacement and 10% mortality as the worst case is provided. We note that the worst case 70% displacement and 10% mortality has been used for their assessments of the project alone.</p>	<p>We acknowledge this comment and will apply the same update as described for guillemot (see Annex 1)</p>

Relevant Representation Comment	EATLs response
<p>Puffin: Using our advised worst case scenario of 70% displacement and 10% mortality, the predicted mortality for the non-breeding period is 940 birds. This equates to 2.43% of baseline mortality, which would not be a negligible impact.</p>	<p>We acknowledge this comment (see Annex 1)</p>
<p>Gannet: The cumulative CRM annual total presented in the application is 3,071 birds, which equates to 3.5% of baseline mortality for the largest BDMPS (autumn migration in Furness (2015)) and 1.36% of baseline mortality for the biogeographic population. Therefore we advise that this requires further consideration through population modelling. We note the use of the SOSS gannet Population Viability Analysis (PVA) model outputs (WWT 2012). We also note that at Dogger Bank the PVA was scaled to a North Sea scale and calculated a threshold of 2852 as potentially significant. Therefore we would welcome further discussions around the implications of the cumulative effect.</p>	<p>We do not consider it appropriate to assess the annual mortality against the autumn BDMPS as this would be inconsistent. Instead we consider that the autumn total mortality should be assessed against the autumn BDMPS population. The autumn cumulative mortality was 764, which increases the baseline mortality of the autumn BDMPS population by 0.88% (i.e. less than 1%) and therefore is below the level at which further assessment would typically be required. With regards the annual mortality, this has been modelled using the existing PVA for the British population, as would be expected for an impact which exceeded this precautionary 1% increase in mortality threshold. In order for this to be robust the cumulative mortality included wind farms other than those in the North Sea (e.g. Irish Sea) and this thereby avoided underestimating collisions and ensured the assessment of mortality was conducted at the appropriate population scale. This assessment demonstrated that the cumulative total for ALL UK wind farms is below the level at which the modelling found even 5% of simulated populations decline, and that this conclusion was based on what is acknowledged to be a worst case total mortality, including the fact (acknowledged by NE) that gannet nocturnal activity has been overestimated to date in collision assessments by at least 7%. Furthermore the gannet population has continued to increase since this model was developed: the model was based on a British and Irish population of 261,000 pairs (2004), which is now estimated to be over 400,000 (i.e. 50% larger), and this will considerably reduce the level of predicted impacts. EATL are therefore content that the gannet cumulative assessment is robust and demonstrates that cumulative impacts are below the level at which population consequences would be of concern.</p>

Relevant Representation Comment	EATLs response
<p>Kittiwake: The total cumulative kittiwake CRM total presented in the Environmental Statement is 4,003 collisions per annum, which equates to 3.09% of baseline mortality for the largest BDMPS (autumn migration in Furness (2015)) and 0.5% of baseline mortality for the biogeographic population. Therefore we advise that this requires further consideration through population modelling.</p>	<p>We do not consider it appropriate to assess the annual mortality against the autumn BDMPS, but rather the autumn total mortality should be assessed against the autumn BDMPS population. The autumn cumulative mortality was 1533, which increases the baseline mortality of the autumn BDMPS population by 1.18%. The spring assessment similarly generated an increase in baseline mortality above the 1% threshold (1.35%). As these were above the level at which further assessment would typically be required (and at Natural England's request), a population model was developed and presented in the original assessment to further explore the potential impacts. The conclusions of this assessment were that the cumulative impacts were not off concern. NE have questioned some of the assumptions made in the population modelling (in particular regarding density dependence and relevant population scales), and these will be addressed in our response to NE. Furthermore, we note that in Natural England's written submission for deadline 6 of the Hornsea Project 2 examination a method for assessing EIA level collision risk impacts for kittiwake was presented which concluded no significant cumulative effects. EATL have applied the same approach for the current assessment, with the inclusion of EA3 to further support the original conclusion of no significant impacts (see Annex 1).</p>
<p>Kittiwake: Natural England does not advocate the use of PBR modelling when PVA modelling is available. Therefore our consideration will focus only on the PVA outputs. Although Natural England has previously considered PBR outputs for assessing population impacts in cases where up to date PVA models have not been available at an appropriate population scale². However, the use of PBR on its own, as the means of assessing population impacts on seabird populations presents a number of issues. Therefore, Natural England advises that wherever possible the population level impacts of predicted mortality from developments should be assessed using PVA models as these allow the effects of factors such as density dependence, population trends and varying demographic parameters to be explicitly investigated in terms of their effect on the population trajectory. PVA models also allow relative comparisons of population level effects with and without the additional</p>	<p>We accept and broadly agree with Natural England's position with regards the relative merits of PBR and PVA, however we consider that PBR remains a useful preliminary tool to act as a filter for identifying the population impacts for which more detailed modelling (e.g. PVA) will be informative and those for which the relative scale of impact to population size is such that PVA is unwarranted.</p>

Relevant Representation Comment	EATLs response
<p>mortality to be considered in a way that is not possible with PBR.</p>	
<p>Kittiwake: A significant cumulative impact at an Environmental Impact Assessment (EIA) scale is predicted, and EA3 contributes nearly 4% to the in-combination total. We are concerned to note that using the density dependent model, a cumulative mortality of 4,000 individuals was predicted which resulted in the population (after 25 years) being 3.3% to 4.5% smaller than that predicted to result in a population decline in the absence of additional mortality. Natural England's view is that the density independent model should be used to predict impacts, as there is no evidence that density dependence is operating on this population. Appendix 13.4 includes the predictions from density independent models which predicted that the population would be 10% lower than the un-impacted scenario. The outputs of the PVA model will need to be carefully considered before we advise on the cumulative collision total effects on the population. Further consideration is also required to determine the appropriate scale for the PVA model.</p>	<p>EATL welcomes Natural England's broad acceptance of the kittiwake population model, however we disagree with regards to Natural England's views on density dependence and the appropriate scale at which to model impacts. All populations are subject to limits on their growth due to competition for resources. Furthermore, we believe that there is strong evidence of compensatory density dependence which is summarised in our response (see Annex 1). There is also good evidence in support of modelling the North Sea population as a whole as has also been presented.</p>
<p>Kittiwake: Further consideration is required regarding whether the PVA model has been constructed at the appropriate population scale for assessing EIA impacts. We appreciate that the Applicant has conducted a PVA model at a North Sea BDMPS scale (which is the scale that we are advised impacts should be measured at, because this is the scale that we have a reasonable understanding of the cumulative project impacts at, and also a reasonable understanding of the origins and numbers of birds). However, there has not been sufficient consideration given as to whether or not it is biologically meaningful and therefore appropriate to construct a PVA model at this scale. Using the North Sea BDMPS works for HRA because impacts are apportioned back to individual SPA colonies, but for EIA if we use the North Sea BDMPS scale, a biologically discrete population is not being considered. The North Sea BDMPS for kittiwake contains only about 40% of the UK Kittiwake population and only about 50% of the kittiwake from North Sea colonies i.e. 50-60% of UK kittiwake will be distributed elsewhere in the non-breeding season and therefore subject to impacts elsewhere. Around 40-50% of the North Sea BDMPS comprises overseas kittiwakes,</p>	<p>There is good evidence in support of modelling the North Sea population as a whole as has been presented (see Annex 1).</p>

Relevant Representation Comment	EATLs response
<p>but these overseas birds only represent less than 10% of the birds from these overseas colonies i.e.90% of the birds from these overseas colonies are predicted to be in other areas in the non-breeding season.</p>	
<p>Kittiwake: As the North Sea BDMPS is not a discrete or closed population unit, the key question is then from an EIA perspective how to assess the impact. It seems practical to only consider cumulative impacts occurring in the North Sea UK waters as it would be difficult to get data on impacts at a wider scale (although it should be attempted to at least get information for the whole of the North Sea – not just UK waters). Therefore, we believe that there are three options for constructing population models:</p>	<p>We disagree on this point. There is evidence to indicate that the entire North Sea population should be treated as one meta-population (see Annex 1)</p>
<p>Kittiwake: Construct a PVA for all UK or alternatively North Sea kittiwake colonies and then apportion the cumulative North Sea impacts to this population scale – i.e. 50-60% of the impacts could be assumed to fall on the UK/North Sea kittiwake colony populations as 50-60% of the North Sea BDMPS birds are predicted to be from UK colonies. Additionally this is saying that the impact from the North Sea OWFs is only acting on some of the UK population as only about 40-50% of UK birds are predicted to be in the North Sea in winter. However, in the breeding season we would assume that 100% birds in the North Sea are UK birds. The disadvantage to this approach is that the 50% of cumulative impacts in the North Sea in the winter which would fall on the overseas colony birds would be ignored. Additionally this approach would ignore impacts on the 50% of UK birds that are not in the North Sea UK waters in the non-breeding season and will be subject to impacts outside UK waters. But we acknowledge that it is unlikely that a cumulative assessment across the whole wintering range is possible, so perhaps it is appropriate to focus on a practical North Sea level where we can quantify impacts from OWFs.</p>	<p>See above.</p>

Relevant Representation Comment	EATLs response
<p>Kittiwake: Construct a PVA model for the whole biogeographic population – this would be 5-8 million birds here of which less than 2 million have any colony connectivity with the North Sea and only ~800,000 of these are predicted to be in North Sea waters in the non-breeding season. Therefore, this approach does not appear to be very practical or useful. It will not be possible to calculate cumulative impacts across the whole biogeographic range so this approach will be applying an impact occurring in North Sea UK waters to a very large population some of which never occur in the North Sea.</p>	<p>See above.</p>
<p>Kittiwake: Construct a PVA model based on a “population” defined as those birds present in UK North Sea waters in the non-breeding season. This is what the Applicant has done, using an initial “population” size as the BDMPS population – but this is not a population and it is certainly not a closed population. Also the demographic parameters in these models relate to UK colonies, so there is an issue about applicability to birds from overseas colonies. It needs to be considered if the model is providing any understanding of the impact of the cumulative North Sea mortality on the 800,000 birds that are predicted to be present in the North Sea in the winter. Natural England would suggest that it does not, because any mortality occurring in the breeding season is likely to impact on UK North Sea colony birds only – there are about 840,000 of these. In the winter about 400,000 of these birds are predicted to be in the North Sea, but about 400,000 are predicted to come from overseas. Therefore, this equates to 1,240,000 birds in the North Sea across both the breeding season and non-breeding season.</p>	<p>See above.</p>
<p>Kittiwake: As there does not appear to be a good argument for Option 3 (the approach taken by the Applicant), Natural England’s advises that option 1 (i.e. using a UK North Sea colony or perhaps UK colony scale PVA model) and apportioning impacts to the UK population is more meaningful. We therefore suggest that the PVA model is re-run on this basis and the results presented alongside the PVA presented in Appendix 13.4.</p>	<p>See above.</p>

Relevant Representation Comment	EATLs response
<p>Kittiwake: Due to the point made above regarding the appropriate scale, the kittiwake PVA model (Appendix 13.4 of the Environmental Statement) will need further consideration. Natural England's focus for assessing impacts will be on the outputs of density independent models. The density dependent model makes assumptions that the population is close to carrying capacity, which may be inappropriate and there appears to be little evidence to suggest density dependence was operating. Therefore, we advise that the assessment only focuses on density independent models.</p>	<p>We present evidence in support of both density dependent modelling and the North Sea population scale in our response (see Annex 1) which supports the PVA work as presented. We also note that in Natural England's written submission for deadline 6 of the Hornsea Project 2 examination a method for assessing EIA level collision risk impacts was presented for kittiwake which concluded no significant cumulative effects. We present an updated assessment (see Annex 1) following this approach with the inclusion of EA3 which further demonstrates that the worst case predicted impacts on this species are within acceptable limits.</p>
<p>Kittiwake: The Applicant states that: 'The models used a matrix formulation and simulated an annual post-breeding census over a period of 25 annual time steps with one year age classes up to adults, which is a multi-age class for all individuals four years old and older. The initial population size was defined as either the spring or autumn BDMPS, against which relevant cumulative collision risks could be assessed. Annual collisions were assessed against the larger autumn population (as agreed with M. Kershaw, pers. comm.)' Dr Kershaw has not discussed anything with the EA3 project team in relation to assessing impacts from PVA models, and this reference should be removed. We advise that the Applicant provides a rationale for using the autumn BDMPS population.</p>	<p>EATL acknowledge this comment however, Dr Kershaw has provided detailed technical advice in relation to several North Sea offshore wind farms and therefore her advice on this matter was considered to be robust and reliable.</p>
<p>Kittiwake: We note that a review of nocturnal activity has indicated that the value of 50% used in CRM is likely to be an over estimate. However, we note that there has been no proposal/evidence collected validating assumptions about nocturnal activity. This could be something that the regulators and industry consider as part of any monitoring conditions within marine licences.</p>	<p>We welcome Natural England's agreement on this point and agree that further study would help to refine the estimates of nocturnal activity in seabirds. However, we also believe the existing evidence already makes a sufficiently compelling case in favour of reducing the nocturnal activity factor for kittiwake that this should be adopted and applied retrospectively to existing wind farms included in the cumulative assessment.</p>
<p>Kittiwake: Natural England considers that the resulting collision impacts have a moderate adverse impact. Whilst the impacts of the EA3 site (alone) on kittiwake makes a relatively small contribution to the in-combination total, we would welcome any proposals of best practice that seeks to reduce the in-combination collision total, for example by raising the height of the lower rotor tip of the turbines.</p>	<p>We welcome Natural England's acknowledgement that EA3 makes a small contribution to the in-combination total and EATL will continue to explore options to further reduce impacts and will discuss these with NE as plans progress.</p>

Relevant Representation Comment	EATLs response
<p>Lesser black-backed gull: The total cumulative lesser black-backed gull CRM total is 522 collisions per annum, which equates to 1.98% of baseline mortality for the largest BDMPS (autumn migration in Furness (2015)) and 0.48% of baseline mortality for the biogeographic population. Natural England advises that further consideration is required as to the appropriate scale for assessing impacts. But as EA3's contribution to the total is small (11 of the 522 birds, which equates to 2.1% of cumulative total), then we agree with the Applicant's conclusion of minor adverse effects.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Herring gull: The total cumulative herring gull CRM total is 726 collisions per annum, which equates to 0.90% of baseline mortality for the largest BDMPS (non-breeding in Furness (2015)) and 0.38% of baseline mortality for the biogeographic population. If the biogeographic population is the most appropriate population to use for annual assessments at an EIA scale then Natural England agrees that there is no need for further population modelling. As EA3's contribution to the total is small (26 of the 726 birds, which equates to 3.6% of cumulative total), Natural England agrees with the Applicant's conclusion of minor adverse effects.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Great black-backed gull: The total cumulative great black-backed gull CRM total is 1,049 collisions per annum, which equates to 16.4% of baseline mortality for the largest BDMPS (non-breeding in Furness (2015)) and 6.38% of baseline mortality for the biogeographic population. Therefore, Natural England advises that this does require further consideration through population modelling. We note that the outputs of PBR from Rampion are presented. However, as stated previously Natural England no longer accepts the use of PBR, and advises that a PVA model at the appropriate scale should be provided by the Applicant.</p>	<p>We consider that the reduction in predicted collisions (due to the increases in avoidance rate) from over 3,000 (up to and inc. Triton Knoll) to the current estimate of just over 1,000, coupled with the previous acceptance of the higher total in wind farm consent decisions (e.g. Rampion) indicates that the cumulative impact on this species remains below a threshold of concern. We also note that in Natural England's written submission for deadline 6 of the Hornsea Project 2 examination a method for assessing EIA level collision risk impacts was presented for great black-backed gull which concluded no significant cumulative effects. EATL present an updated assessment following this approach with the inclusion of EA3 (see Annex 1) which further demonstrates that the worst case predicted impacts on this species are within acceptable limits. We therefore question Natural England's advice with respect to the provision of PVA modelling, since the impacts are sufficiently small that they are very unlikely to give rise to a significant impact.</p>

Relevant Representation Comment	EATLs response
<p>Dark-bellied brent geese: Natural England agrees with the Applicant's conclusion that with mitigation measures in place to avoid winter working there will be no adverse effect on integrity of dark-bellied brent geese on the Deben Estuary SPA.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Red-throated diver: Natural England agrees with the Applicant's approach of estimating the magnitude of during construction disturbance to red-throated divers on a 'worst case' basis assuming that there would be 100% displacement of birds in a 2km buffer surrounding the cable laying vessel(s). However, 10% mortality is very precautionary, therefore we conclude that even using these precautionary assumptions the additional mortality is likely to be less than 1%.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Red-throated diver: Natural England advises that consideration should be given in the HRA to operational and maintenance activities that may cause disturbance of red-throated diver from transiting to the site from the operational port. However, if best practice vessel operations are adopted then any LSE can be removed.</p>	<p>We will discuss appropriate measures with NE for inclusion in the SoCG.</p>
<p>Red-throated diver: Therefore, if best practice is adopted then Natural England agrees with the Applicant that there are no adverse effects on the integrity of the Outer Thames Estuary SPA and the Greater Wash SPA alone and in combination.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Lesser black-backed gull: Natural England agrees that it is reasonable to conclude that there will be no adverse effects on Alde Ore Estuary SPA from collisions at EA3 alone. Similarly Natural England also agrees that EA3's contribution to the in-combination total is so small as to not materially alter the overall in-combination effects.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Gannet: Natural England recognises that due to changes in avoidance rate the current in-combination mortality is below the levels assessed for the nearby East Anglia ONE offshore wind farm. We agree that there is likely to be no adverse effect on integrity the Flamborough and Filey Coast pSPA due to the EA3 project alone. However, before concluding there is no impacts in-combination we require the Applicant to present outputs from the amended PVA model.</p>	<p>We welcome Natural England's conclusion that EA3 alone will not cause an LSE for the Flamborough and Filey Coast pSPA. However we question the requirement to undertake further population modelling for this population, given that such modelling was presented in relation to the Hornsea Project Two assessment and the additional mortality from EA3 attributable to this population (9 individuals) will not affect the conclusions of that modelling work and therefore does not merit</p>

Relevant Representation Comment	EATLs response
	additional analysis.
<p>Kittiwake: Natural England agrees with the Applicant that the EA3 project alone would not have an adverse effect on integrity of the Flamborough and Filey Coast pSPA.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Kittiwake: Natural England considers that the level of in-combination mortality under consideration here is such that an adverse effect on integrity of the Flamborough and Filey Coast pSPA cannot be ruled out. However, the effect of the additional predicted mortality from EA3 alone while not de minimis, is so small as to not materially alter the significance of the overall in-combination mortality figure or the likelihood of an adverse effect on the integrity of the pSPA arising from such an in-combination level of mortality.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>Natural England does not agree with the Applicant's method of assessing displacement impacts. We advise that the Applicant assess the predicted impacts of displacement across the whole annual cycle (for both the site alone and cumulatively with other North Sea projects), by summing seasonal impacts. This annual total should then be assessed against the appropriate population scale. Natural England recommends that any displacement in the breeding season from other North Sea projects are included in the overall cumulative assessment of displacement.</p>	<p>EATL consider that Natural England's approach of summing seasonal displacement generates overly precautionary predictions on top of the high level of precaution already inherent in the worst case scenarios of 70% displacement & 10% mortality advocated. This disagreement notwithstanding, EATL present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p>

Relevant Representation Comment	EATLs response
<p>Natural England advises that the Applicant use a different approach to that used in the Environmental Statement to define an appropriate population scale to use for assessing impacts on birds present in the project area during the breeding season months. The Applicant currently uses estimates of the proportion of immature birds predicted to be in a typical population applied to the number of birds in the non-breeding season Biologically Defined Minimum Population Scales (BDMPS) to calculate a breeding season population size for immature birds relevant to the project area. We do not consider that the non-breeding season populations in Furness (2015) are applicable to the breeding season, either for adult or immature birds. We therefore advise that the Applicant produce their own breeding season population scales and sizes for species.</p>	<p>East Anglia THREE is beyond the foraging range of any auk breeding colonies, therefore auks observed during the breeding season will not be actively breeding adults. Hence it was assumed that auks present in the breeding season will comprise immature birds and nonbreeding adults. As the size of the population from which such birds could be drawn is not well understood, however it seems very likely that both of these categories of bird are drawn from the BDMPS populations. Indeed, given what is known about the movements of immature birds (that they disperse to similar areas as adults and gradually make their way back towards their natal colonies as they approach maturity) this seems a much more plausible assumption than assuming there is no connection between the wintering populations and the summer distribution of immatures as NE suggest. Therefore we are content that this approach provides a robust means to estimate reference populations in the summer. Nevertheless, we present additional assessment (see Annex 1) using the methods adopted by NE in their written submission for deadline 6 of the Hornsea Project 2 examination on the basis that this approach will be accepted by NE.</p>
<p>Natural England recommends that for the cumulative assessment of displacement impacts from other North Sea projects, the Applicant uses a range from 30% displacement and 1% mortality up to 70% displacement and 10% mortality as the worst case. We also recommend that the Applicant use this same worst case (70% displacement and 10% mortality) for assessment of the project alone.</p>	<p>EATL acknowledges this point, however we would also draw Natural England's attention to the fact that the range of displacement figures recommended by NE is already presented in the assessment. We consider Natural England's worst case combination (70% displacement and 10% mortality) to be overly precautionary.</p>
<p>Natural England welcomes the Applicant's approach to use Population Viability Analysis (PVA) modelling to assess EIA impacts on kittiwake. However, we advise further consideration of a number of issues. These include whether it is appropriate to rely on density dependent outputs, and identifying the appropriate population scale at which to assess impacts.</p>	<p>All populations are subject to limits on their growth due to competition for resources. Furthermore, contrary to Natural England's assertion that there is a lack of evidence in support of density dependence for this species there is strong evidence of compensatory density dependence (we will provide this in our response). There is also good evidence in support of modelling the North Sea population as a whole as has been presented (we will provide this in our response).</p>

Relevant Representation Comment	EATLs response
<p>There appears to be little clear evidence to suggest compensatory density dependence is operating on the kittiwake population at a North Sea scale, therefore Natural England advises that the assessment should focus on outputs from the density independent models.</p>	<p>See above.</p>
<p>Natural England advises that the Applicant further considers whether the kittiwake PVA model has been constructed at the appropriate population scale for assessing EIA impacts. We appreciate that the Applicant has carried out at a North Sea BDMPS scale assessment which is the scale that we initially accepted impacts should be measured against. However, further consideration is required as to whether it is biologically meaningful and therefore appropriate to construct a PVA model at this scale. Using the North Sea BDMPS is appropriate for HRA because impacts are apportioned back to individual SPA colonies, but for EIA if the North Sea BDMPS scale is used it does not consider a biologically discrete population.</p>	<p>See above.</p>
<p>The total cumulative effects on great black-backed gulls from collision mortality equates to 16.4% of baseline mortality for the largest BDMPS (non-breeding in Furness (2015)) and 6.38% of baseline mortality for the biogeographic population. Therefore, Natural England advises further consideration through population modelling. We note that the outputs of PBR modelling from Rampion are presented. However, Natural England advises the use of PVA modelling (see row 2 above).</p> <p>Therefore, Natural England advises that the Applicant undertakes PVA modelling to assess EIA impacts on great black-backed gulls. We suggest using either a UK North Sea colony scale or UK colony scale population model and apportion the predicted project impacts back to the respective scale.</p>	<p>We consider that the reduction in predicted collisions (due to the increases in avoidance rate) from over 3,000 (up to and inc. Triton Knoll) to the current estimate of just over 1,000, coupled with the previous acceptance of the higher total in wind farm consent decisions (e.g. Rampion) indicates that the cumulative impact on this species remains below a threshold of concern. We also note that in Natural England's written submission for deadline 6 of the Hornsea Project 2 examination a method for assessing EIA level collision risk impacts was presented for great black-backed gull which concluded no significant cumulative effects. EATL present an updated assessment (see Annex 1) following this approach with the inclusion of EA3 which further demonstrates that the worst case predicted impacts on this species are within acceptable limits. We therefore question Natural England's advice with respect to the provision of PVA modelling, since the impacts are sufficiently small that they are very unlikely to give rise to a significant impact.</p>

Relevant Representation Comment	EATLs response
<p>Natural England considers that the impacts from the project alone will not have an adverse effect on the integrity of Flamborough and Filey Coast pSPA.</p> <p>Natural England considers that the level of in-combination mortality, when considered with other plans and projects is such that an adverse effect on integrity of the Flamborough and Filey Coast pSPA kittiwake population cannot be ruled out. However, the effect of the additional predicted mortality from the project alone while not de minimis, is so small as to not materially alter the significance of the overall in-combination mortality figure or the likelihood of an adverse effect on the integrity of the pSPA arising from such an in-combination level of mortality.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>SmartWind Relevant Representation on Ornithology</p>	
<p>Smart Wind - have informed EATL that the numbers for cumulative assessment for Hornsea 2 are now outdated.</p>	<p>EATL note that at the time of submission the numbers within our assessment were correct. Updated collision tables are provided and incorporated into Annex 1</p>
<p>Marine mammals</p>	
<p>Now that the consultation has begun, the pSACs become a material consideration for projects such as East Anglia THREE. Therefore further work is likely to be required by the Applicant during the Examination process to assess the impacts of the project on the sites, particularly the harbour porpoise feature of the Southern North Sea pSAC.</p>	<p>As agreed in the SoCG with Natural England, EATL will complete further assessment once management measures for the pSAC have been formally adopted. Natural England will be consulted regarding this assessment.</p>
<p>Natural England welcomes the commitment from the Applicant to produce a marine mammal mitigation plan (MMMP) and we look forward to working with the Applicant to further develop the draft MMMP that was submitted with this application.</p>	<p>Work to complete the MMMP will begin once a consenting decision has been made.</p>

Relevant Representation Comment	EATLs response
<p>The PCoD project is due to complete at the start of April 2016 and should enable an assessment of whether multiple pile driving operations in the English part of the North Sea are likely to have a population level effect on the harbour porpoise population in the wider North Sea. Should a population level effect be a possibility, relevant developers would need to review and assess their construction methodology and mitigation options to ensure there is a reduction in underwater noise.</p>	<p>It is noted that no further action is required at the current time.</p>
<p>Noise reduction at source is the best mitigation to protect marine mammals from injury and disturbance. Due to the scale on which noise is measured, a small decrease in sound pressure (6dB) is a halving of the sound level. While Natural England agrees that certain methods (e.g. bubble curtains) are currently not feasible for this project, there may be other methods available that could be used. New technology is being developed (e.g. hydro sound dampeners) as a result of noise thresholds being enforced in German waters. Such technology includes alternative piling methods (e.g. vibro-piling) which can reduce sound levels at source. Recognising the evolving nature of this area Natural England is content that consideration of noise reduction measures can take place prior to construction, specifically within the Marine Mammal Mitigation Protocol (MMMP) which is required by Part 2, Condition 13(f) of the project's draft deemed marine licences. In pre-application discussions the Applicant has committed to exploring up to date noise reduction techniques and other mitigation technologies available at that time, including the reasons why it will, or will not be used within the MMMP when it is submitted.</p>	<p>It is noted that no further action is required at the current time.</p>
<p>The DEPONS (Disturbance Effects on the Harbour Porpoise Population in the North Sea) project is also due to report in the next few months and should provide further evidence of whether multiple piling operations in the North Sea are likely to have a population level effect on harbour porpoise in the North Sea.</p>	<p>It is noted that no further action is required at the current time.</p>
<p>Natural England will look to discuss any further developments of the issue of Corkscrew injuries to seals post consent, during future development of the MMMP as required by Part 2, Condition 13(f) of the project's draft deemed Marine Licences.</p>	<p>The latest information regarding the potential for any corkscrew injuries will be reviewed and any further advice taken into account in the MMMP.</p>

Relevant Representation Comment	EATLs response
Onshore ornithology	
<p>Natural England's main concern for onshore ornithology involved wintering dark bellied Brent geese at the Deben Estuary SPA. However, the Applicant's commitment to seasonal construction restrictions has addressed our concerns.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
<p>There are many areas along the cable route that support breeding birds, including breeding marsh harrier and Cetti's warbler. However, the mitigation proposed by the Applicant, including siting the cable to avoid environmentally sensitive areas, completing targeted breeding bird surveys and targeted habitat management measures for species likely to be affected should ensure that none of the species listed suffer more than a minor impact due to disturbance or habitat loss.</p>	<p>We welcome Natural England's conclusion on this issue which is in agreement with that in the ES.</p>
Physical processes, benthic ecology and sediment quality	
<p>The Applicant states that the export cable, where possible, will be buried to a target depth of 0.5m to 5m. Natural England advises burial depths of greater than 1m wherever possible so as to avoid potential scour effects and future exposure of the export cable</p>	<p>Noted</p>
<p>Natural England considers that, in the first instance, best efforts should be made to use drop-down photography because this is the best method to inform patchiness and avoids damage to the reef. Mitigation could include waiting for visibility to clear during periods of slack water or, if available, use of a freshwater lens. However, it is recognised that a single grab combined with the drop-down video survey can help inform elevation and abundance.</p>	<p>The final survey methodology would be agreed with Natural England at least 4 months prior to the survey works which could be completed up to 18 months prior to construction. The mitigation measures will be based on the methods and technology available at the time of survey and the mitigation suggested by Natural England will be considered in the survey design.</p>
<p>Gravity Based foundations: By committing to not placing gravity based structures in areas where sandwaves are greater than 5m, the applicant is reducing the potential for habitat impact. Natural England would welcome further discussion with the Applicant on how this commitment can be included within the draft DCO.</p>	<p>EATL propose to amend the draft DCO to include the following condition in the draft DML, which is the same approach taken by EA1: <i>"No gravity base foundations may be installed in any area of the seabed with mobile sand waves of 5 metres or more, as identified by the swath-bathymetry survey carried out under condition 17(2)(b), unless otherwise agreed in writing by the MMO."</i></p>

Relevant Representation Comment	EATLs response
<p>Elevated levels of arsenic: Natural England notes that elevated levels of arsenic were found to be present at sample station 30, which is within the offshore cable corridor. Should dredging be required in the vicinity of station 30, arsenic levels should be monitored in order to inform disposal. Natural England welcomes a commitment by the applicant to undertake this monitoring if required, but we consider that a proposed monitoring method should be included in the In Principle Monitoring Plan (IPMP). We would welcome further discussion with the Applicant on this matter.</p>	<p>If dredging is required at or around site 30, EATL has committed to further survey work to determine the extent of any contamination and inform the appropriate disposal method. EATL will work with Natural England and the MMO, post consent, once detailed design information is available. We do not believe that there is any requirement for a monitoring programme rather a survey to determine the nature of any contamination.</p>
<p>Orford Inshore recommended Marine Conservation Zone (rMCZ) overlaps with the proposed export cable route. Recommended MCZs are a material consideration in the marine licencing process, but, weight given to the consideration is less than that given to proposed MCZs (pMCZs) as pMCZs have been put out for consultation. The site remains an rMCZ and it may be put forward for consultation in the future. Orford Inshore rMCZ contains a feature (subtidal mixed sediment) that may be affected by cable installation, operation and decommissioning. There are no pMCZs that are potentially affected by the project</p>	<p>EATL understand Natural England's position regarding the Orford Inshore rMCZ and recognise that if this site is designated a pMCZ prior to the construction of East Anglia THREE then further work would be required by EATL to assess potential impacts to the features and provide mitigation if appropriate.</p>
<p>The percentage of the East Anglia Zone affected by EA3 is stated in paragraph 291 of Chapter 10 of the Environmental Statement Report as 0.34% which is different to that stated in Table 10.2 (0.43%). Please can the Applicant clarify the correct figure.</p>	<p>The correct figure is 0.43%. This was a typographic error in the assessment section of the ES, however it does not make a material difference to the significance of the impact.</p>
<p>Homogeneity: Natural England advises that the assertion made by the Applicant that habitats across the Southern North Sea are ubiquitous and of low ecological sensitivity should be evidenced/removed/clarified. While Natural England agrees with the Applicant that cumulatively impacts may be low, and the East Anglia Three zone benthic habitats are homogenous this assumption cannot be extended to the cumulative sensitivity of habitats (many of which are Annex I features of N2K sites) across the southern North Sea.</p>	<p>EATL recognises that there are habitats of importance for nature conservation across the North Sea, the intention was to highlight that the habitats within the site and wider Zone are relatively common across the North Sea and that given the substrate type (e.g. subtidal mixed sediment) are not particularly sensitive themselves, notwithstanding any designation they may have.</p>
<p>The assessment of cumulative impacts varies in context between the North Sea and the southern North Sea. Natural England would welcome consistency, notably in paragraph 361 of the Environmental Statement Report.</p>	<p>Noted it should be southern North Sea throughout</p>

Relevant Representation Comment	EATLs response
Onshore ecology	
Bats may still suffer a small effect during construction due to loss of commuting and foraging habitat, but this is not likely to constitute more than a low impact.	Noted

If you wish to discuss the above or any other issues in connection with the Project, please contact Keith Morrison, EA3 Senior Project Manager, ScottishPower Renewables, 4th Floor, Atlantic Quay, Glasgow G2 8JB or by email at Eastangliathree@scottishpower.com

Yours faithfully



Keith Morrison
Senior Project Manager

East Anglia THREE
Offshore Windfarm

East Anglia THREE

Response to NE Section 56 Consultation Annex 1: Ornithology and Updated Cumulative Collision Risk Tables

Author – MacArthur Green
East Anglia Offshore Wind Limited
Date – May 2016
Revision History – Revision A

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1.1 Introduction

1. In Natural England's Relevant Representation for the East Anglia THREE Windfarm application (Natural England 2016), further work or clarifications were requested by Natural England to enable a robust assessment in relation to offshore ornithology to be undertaken. The key concerns identified by Natural England were:
 - a. Use of Potential Biological Removal vs. Population Viability Analysis;
 - b. EIA impacts on guillemot, razorbill and puffin;
 - c. EIA impacts on kittiwake; and
 - d. EIA impacts on great black-backed gull.
2. In addition to the above main requests, several lower priority requests and comments which were made are addressed in this note:
 - a. Presentation of a combined table for two separate ones (Tables 13.31 and 13.34) presented in the ornithology chapter of the Environmental Statement to assist interpretation;
 - b. Provision of further details of recorded gannet flight heights; and
 - c. Assessment of additive impacts of displacement and collision risk.
3. This note provides responses from EATL with respect to the above topics. The remaining comments and questions made by Natural England in their Relevant Representation have been addressed by means of clarifications in a table of responses covering all topics, of which this note is an appendix.
4. Following submission of the ES for East Anglia THREE, modifications to the design of the Hornsea Project Two Wind Farm were submitted to the Planning Inspectorate (SmartWind 2015a). Updated cumulative collision tables have therefore been produced for East Anglia THREE and these have been included in this note.

1.2 Use of Potential Biological Removal vs. Population Viability Analysis

5. Natural England (2016) stated that Population Viability Analysis (PVA) is their preferred method for assessing impacts on populations, rather than Potential Biological Removal (PBR), wherever the former is available. EATL is in agreement with this statement, however we also consider that PBR does have merit as it can provide a useful context for determining if additional assessment using a PVA approach is warranted. For example, if the results from PBR indicate that an impact will be very small relative to the population affected then there is little justification for population modelling.
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6. In Natural England's written submission for deadline 6 of the Hornsea Project Two Examination (Natural England 2015a), it is stated that while Natural England prefer the use of PVA over PBR, the latter (i.e. PBR) may still be useful. Paragraph 2.21 of Natural England (2015a) states:
 7. *'Natural England has based its assessment of impacts for the HRA species on PVA models produced by the Applicant for colonies at [Flamborough and Filey Coast] FFC pSPA. However, there are currently no suitable PVA models at an appropriate scale for the EIA species considered above, with the exception of gannet where there is a SOSS PVA model for the UK gannet population which can be used to evaluate impacts for the smaller North Sea scale (WWT 2012). Due to the lack of available PVA models at an appropriate scale for kittiwake, [lesser black backed gull] LBBG and [great black backed gull] GBBG, Natural England has considered the results from PBR models in assessing the significance of EIA impacts for these species.'*
 8. Based on this, therefore Natural England and EATL are in agreement that PBR may be useful, and indeed Natural England used the results of PBR to reach conclusions on certain impacts in relation to the Hornsea Project Two Wind Farm. We are not aware of any further evidence having been produced since November 2015 which would lead to a change in this position, and therefore consider it reasonable to present PBR results for the East Anglia THREE assessment, with the caveat that should these results indicate potentially significant impacts then further population modelling (e.g. PVA) may be necessary.

1.3 EIA impacts on guillemot, razorbill and puffin;

9. Natural England does not agree with the methods used to estimate annual displacement impacts on guillemot, razorbill and puffin. This aspect was discussed at Evidence Plan meetings, however no agreement on the most appropriate method was reached. The key aspects of disagreement are:
 - a. Natural England advised that the impact in each biologically defined season should be summed to obtain an annual total. EATL consider that this is not appropriate for two reasons; a) it will incorporate an unknown (and potentially large) amount of double counting (i.e. individuals may be present in more than one season) and b) species-specific differences in the number of nonbreeding seasons means that impacts will be artificially inflated (guillemot have one non-breeding season, razorbill three, however there is no reason to expect impacts for these two species to differ by three times).
 - b. Natural England disagreed with the method used to estimate the reference population during the breeding season (with respect to the number of immature birds potentially present).
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10. Natural England therefore advised that further assessment of auk displacement was required.
11. Following a review of options which could provide Natural England with the requested additional assessment, work undertaken by Natural England (2015a) with respect to the Hornsea Project Two Offshore Wind Farm Application was identified as providing a suitably robust approach. This conclusion was reached on the basis that Natural England applied this assessment in relation to the Hornsea Project Two Wind Farm (in a submission dated 25th November 2015) and therefore as East Anglia THREE is the next offshore wind farm to reach examination, its application remains appropriate for assessing the same impacts at this site.
12. Natural England (2015a) used PBR to assess the cumulative impact of displacement on auks. The relevant sections from Tables 6 and 7 in Natural England (2015a) for guillemot, razorbill and puffin, have been reproduced in Table 1, together with the modelling parameters required to calculate the PBR recovery factor (*Fr*) value. The displacement mortality for the East Anglia THREE project has been added to the Hornsea Project Two cumulative total to permit recalculation of the *Fr* for all sites up to and including East Anglia THREE. Note that to obtain an annual figure for East Anglia THREE the seasonal displacement values have been summed (i.e. using the method advocated by Natural England). While EATL do not agree that this is the most appropriate method for estimating annual impacts due to reasons set out in the ES (and summarised above), using this method ensures that the worst case impact (as Natural England would estimate it) has been presented.

Table 1. Data presented in Tables 6 and 7 of Natural England (2015a) with PBR parameters used to calculate *Fr*. Shaded cells indicate values taken from Natural England (2015a), unfilled cells provide an update of the calculations with the inclusion of estimated annual displacement mortality due to the East Anglia THREE project. Note that where a range of values is shown these bracket the impact range from 30% displacement and 1% mortality to 70% displacement and 10% mortality (guillemot and razorbill) and from 10% displacement and 1% mortality to 70% displacement and 10% mortality (puffin) as per Natural England (2015a). The impact range is reflected in the *Fr* ranges in the final column.

Species	Cumulative total up to project:	NE population scale	Project impact considered by NE (annual total)	Nmin	Adult survival	Age first breeding	Lambda max.	Rmax	Fr
Guillemot	HP2	2045078	515-12032	1879933	0.939	6	1.079	0.079	0.007 - 0.163
	EA3		529-12349						0.007 - 0.167
Razorbill	HP2	591874	235-5473	544079	0.895	5	1.109	0.109	0.008 - 0.185
	EA3		252-5890						0.009 - 0.199
Puffin	HP2	868689	39-2737	798540	0.906	5	1.105	0.105	0.001 - 0.0656
	EA3		39-2771						0.001 - 0.0664

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13. The estimated range of *Fr* values for guillemot presented in Natural England (2015a) was from <0.01 to 0.163 (from 30% displacement and 1% mortality to 70% displacement and 10% mortality). Since the highest value (0.163) was obtained under the most precautionary assumptions (70% displaced and 10% mortality) and was below an *Fr* threshold of 0.2, Natural England concluded that '*predicted mortality levels are sustainable under all scenarios*'. Including the East Anglia THREE project displacement increases the highest *Fr* value (under the assumption of 70% displacement and 10% mortality) to 0.167 (Table 1).
 14. The estimated range of *Fr* values for razorbill presented in Natural England (2015a) was from <0.01 to 0.185 (from 30% displacement and 1% mortality to 70% displacement and 10% mortality). Since the highest value (0.185) was obtained under the most precautionary assumptions (70% displaced and 10% mortality) and was below an *Fr* threshold of 0.2, Natural England concluded that '*predicted mortality levels are sustainable under all scenarios*'. Including the East Anglia THREE project displacement increases the highest *Fr* value (under the assumption of 70% displacement and 10% mortality) to 0.199 (Table 1).
 15. The estimated range of *Fr* values for puffin presented in Natural England (2015a) was from <0.01 to 0.065 (from 30% displacement and 1% mortality to 70% displacement and 10% mortality). Since the highest value (0.065) was obtained under the most precautionary assumptions (70% displaced and 10% mortality) and was below an *Fr* threshold of 0.1, Natural England concluded that '*the predicted mortality level from projects cumulatively in UK North Sea waters are sustainable*'. The inclusion of displacement from the East Anglia THREE project increases the highest *Fr* value to 0.066 (Table 1).
 16. Following this assessment, in paragraph 2.43 of Natural England (2015a) it was stated that:
 17. '*Therefore at a North Sea EIA scale Natural England are able to conclude no significant effect for guillemot, razorbill and puffin from the project alone and cumulatively with other projects in North Sea UK waters.*'
 18. As can be seen, updating this assessment to include worst case displacement mortality from the East Anglia THREE project the *Fr* values for each species remain below the sustainable thresholds considered appropriate by Natural England. Therefore, the above conclusion (no significant effects), with respect to the cumulative impact on these species, is considered to remain valid for the East Anglia THREE project.
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1.4 EIA impacts on kittiwake and great black-backed gull

19. Following discussions with Natural England during Evidence Plan meetings a PVA model for kittiwake was developed and presented for the assessment of kittiwake impacts at the wider North Sea scale. Following review of the ES Natural England advised that further consideration of two key aspects was required: the role of density dependent regulation and the appropriate reference population to use.
 20. With respect to density dependence, Natural England (2016) stated:
 21. *‘There appears to be little clear evidence to suggest compensatory density dependence is operating on the kittiwake population at a North Sea scale, therefore Natural England advises that the assessment should focus on outputs from the density independent models.’*
 22. Most demographic parameters of seabirds are likely to show some density-dependent variation (Newton 1998). Cairns (1987) pointed out that life history theory predicts that seabird breeding success will show a compensatory density-dependent response at an earlier stage of reduced food abundance and adult survival is likely to show less response until food abundance is drastically reduced. Age at first breeding may vary in a compensatory density-dependent way at an intermediate level. Empirical evidence provides some support for Cairns’ predictions (Cury et al. 2011; Furness 2015). There are extensive data on breeding success of kittiwakes, showing that breeding success declines with reduction in food supply which is consistent with but does not prove compensatory density-dependent limitation by food supply (Frederiksen et al. 2005; Furness 2007).
 23. Furness and Birkhead (1984) showed that the spatial distribution of kittiwake colonies indicated compensatory density-dependent competition for resources in the marine areas around colonies; numbers breeding at neighbouring colonies were influenced by the neighbouring kittiwake colony size.
 24. Mean age of first breeding of male kittiwakes decreased from 4.59 years in 1961-70 to 3.69 in 1981-90 (Coulson 2011). The lower age of first breeding in the 1980s coincided with a much increased adult mortality, and Coulson (2011) interpreted that as evidence that competition for nest sites at the colony influenced age of first breeding so acted in a compensatory density-dependent manner.
 25. Coulson (2011) showed that the annual rate of increase in size of 46 kittiwake colonies in the UK between 1959 and 1969 was inversely related to colony size. Colonies of 1-10 pairs in 1959 increased on average by 70% up to 1969. Colonies of 10-100 pairs in 1959 increased on average by 20% up to 1969. Colonies of 100-1000 pairs in 1959 increased on average by 5%. Colonies of
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1000-10,000 pairs in 1959 increased on average by 3%. This implies very strong compensatory density-dependence. It is unclear just from these changes in numbers which particular demographic parameters were affected, but Coulson (2011) inferred that the most likely candidate is the rate of net immigration into each colony. Coulson (2011) inferred from his detailed observational studies, and from population modelling, that the main reason for the progressive differences in growth of an individual colony is the balance between immigration and emigration of immature birds. Frederiksen et al. (2005) found that for the period 1986-2000, there was no relationship between colony size and colony growth rate, and suggested that compensatory density-dependence occurred during the expansion phase but not necessarily at all stages of population change.

26. A compensatory density-dependent reduction in colony growth rate is also clearly evident from data on colony size over a period of decades for colonies studied in detail. Numbers at Marsden (Tyne & Wear) showed a rate of increase that progressively decreased as numbers grew (Coulson 2011, Figure 11.5). Numbers at nearby Coquet Island (Coulson 2011, Figure 11.6) show exactly the same trend with colony size. However, numbers grew rapidly at Coquet at the same time that growth had virtually ceased at Marsden (in the 1990s). This shows clearly that the rate of growth was a colony-specific feature related to local competition, and was not a consequence of region-wide variations in conditions. According to Coulson (2011) '*examination of the rates of increase of kittiwake colonies with time almost always showed the same pattern*' as described above. This pattern implies compensatory density-dependence at individual colonies according to local conditions.
27. Most kittiwake colonies in the UK North Sea have declined in breeding numbers in the last few years, most strongly in the north. Decreases in numbers appear to have been greater in large colonies than in small ones, suggesting a density-dependent effect with competition increasing most in the largest colonies as resources have declined.
28. Jovani et al. (2015) found empirical evidence from the data on the distribution of colony sizes of seabirds (including kittiwakes) in relation to breeding season foraging range for density-dependence through competition for resources around breeding colonies.
29. In conclusion, there is strong evidence, summarised above, for compensatory density dependence acting on the kittiwake population of the UK, although exact mechanisms remain to be determined and there is some evidence to suggest that the strength of density-dependence may vary in relation to environmental conditions.

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30. On this basis the density dependent version of the PVA model is considered the more robust one on which to base assessment.
 31. With respect to the appropriate reference population size, Natural England (2016) stated:
 32. *‘Natural England advises that the Applicant further considers whether the kittiwake PVA model has been constructed at the appropriate population scale for assessing EIA impacts. We appreciate that the Applicant has carried out at a North Sea BDMPS scale assessment which is the scale that we initially accepted impacts should be measured against. However, further consideration is required as to whether it is biologically meaningful and therefore appropriate to construct a PVA model at this scale. Using the North Sea BDMPS is appropriate for HRA because impacts are apportioned back to individual SPA colonies, but for EIA if the North Sea BDMPS scale is used it does not consider a biologically discrete population.’*
 33. The appropriate spatial scale at which to model impacts should be informed by evidence on the extent to which individual colonies either represent closed populations or are part of a much larger meta-population. If colonies form a meta-population then we need to consider the spatial scale over which colony dynamics is influenced by immigration-emigration processes between colonies.
 34. Coulson (2011) inferred from his detailed observational studies, and from population modelling, that the main reason for the progressive differences in growth of an individual colony is the balance between immigration and emigration of immature birds. At newly formed colonies at North Shields and Coquet Island, it took 9 and 7 years respectively before the first locally-reared bird bred in these colonies (Coulson 2011). Coulson (2011) inferred that almost all kittiwakes recruiting into small and newly formed colonies are immigrants. Furthermore, he inferred from ringing evidence that numbers of immigrants exceed numbers of locally born kittiwakes recruiting into a colony even when the colony has grown to a substantial size. Therefore, kittiwake colonies form a larger meta-population.
 35. At North Shields over a long-term study period, 91% of female recruits were immigrants, as were 63.5% of male recruits (Coulson 2011). Birds moved up to 1,600 km from their place of birth to breed, with a bi-modal distribution of distances, one peak being within 100 km of the natal colony and the second being between 400 and 1000 km from the natal colony. Therefore, the spatial scale over which colonies interact is at least 1000 km.
 36. These detailed data on emigration of juveniles contrast with the observation that once a kittiwake has established a nest site, it normally returns to the same nest site each year. Emigration of established breeding adults is very
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- unusual, but can occur in extreme cases when large areas of colonies are physically destroyed, or are severely affected by predators or by long-term severe food shortage causing extreme breeding failure (Danchin and Monnat 1992; Coulson 2011; Ponchon et al. 2015).
37. High rates of emigration of juvenile birds imply a meta-population structure that makes modelling of colonies assuming those are closed populations inappropriate. The meta-population of kittiwakes is over a large spatial scale. Because a significant proportion of emigrants recruit into colonies 400 to 1000 km away from their place of birth, the dynamics of kittiwake colonies will be influenced by factors affecting colonies over at least a range of 400 to 1000 km. This suggests that the entire North Sea kittiwake population should be treated as one meta-population rather than as numerous closed individual colony populations, and there would be a case for modelling the population at an even larger spatial scale than just the North Sea, although increasing the spatial scale further makes the modelling increasingly complex because it is unlikely that demographic parameters appropriate for the North Sea colonies would necessarily be appropriate for colonies in other oceanographic systems.
 38. On this basis use of the BDMPS population sizes as the reference population in the kittiwake PVA model is considered robust for assessment.
 39. Natural England (2016) advised that further consideration of great black-backed gull collision impacts should be conducted, including a proposal that a PVA model should be developed to provide further assessment.
 40. As discussed above, EATL and Natural England are essentially in agreement that PVA provides greater insights for assessments than PBR. However, EATL maintain a position that PBR is a useful tool which can be used as a filter to distinguish between instances when PVA is unnecessary (i.e. impacts are very small) and those when it is warranted.
 41. This rationale was applied by Natural England in the use of PBR for considering cumulative impacts up to and including the Hornsea Project Two Offshore Wind Farm (Natural England 2015a). Since East Anglia THREE is the next offshore wind farm to reach examination, updating this assessment is considered to provide a robust approach for assessing the same impacts, with the caveat that if this indicates potentially significant impacts then PVA will be justified.
 42. The following sections of this note present an update of the cumulative assessment conducted by Natural England (2015a) for the Hornsea Project Two Wind Farm, with the addition of the annual collision impacts for kittiwake and great black-backed gull estimated for the East Anglia THREE project (EATL 2015). East Anglia THREE is the only additional wind farm in the
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English North Sea which has submitted an application since the assessment was conducted by Natural England (2015a). Therefore, no other projects need to be considered in order to bring Natural England’s cumulative assessments up to date.

43. The relevant sections from Tables 4 and 5 in Natural England (2015a) have been reproduced below (Table 2), together with the modelling parameters required to calculate the PBR recovery factor (*Fr*) presented in Natural England (2015). The cumulative mortality estimated for the East Anglia THREE project has then been added for each species to permit recalculation of the *Fr* using the same method but including all the wind farms listed in the EATL (2015) cumulative assessment.
44. For each species, two cumulative totals have been presented for the East Anglia THREE project. The first are the values presented in the ES (EATL 2015), while the second are revised cumulative totals which include the revised estimates for the Hornsea Project Two assessment (Smart Wind 2015a) which were made after the East Anglia THREE ES was submitted. The updated cumulative collision mortality tables for gannet, kittiwake, lesser black-backed gull and great black-backed gull are presented in Tables 4 to 7 of this note.
45. It should also be noted that the difference in the cumulative collision values between those presented for projects up to and including Hornsea Project Two and those up to and including East Anglia THREE is partially accounted for by the inclusion of the estimated East Anglia THREE mortality but also reflects the inclusion of a larger number of wind farms in the East Anglia THREE cumulative assessment. This further highlights the precautionary nature of the current assessment.

Table 2. Data presented in Tables 4 and 5 of Natural England (2015) with parameters used to calculate *Fr*. Rows labelled ‘EA3’ update the calculations to include collisions at East Anglia THREE. Shaded cells indicate values taken from Natural England (2015).

Species	Final project included in cumulative assessment	Population scale	Project impact considered by NE	Nmin	Adult survival	Age first breeding	Lambda max.	Rmax	<i>Fr</i>
Kittiwake	HP2	839456	3616	771668	0.854	4	1.144	0.144	0.065
	EA3 (ES)		4003						0.072
	EA3 (revised)		3654						0.066
Great black-	HP2	91399	679	84018	0.93	5	1.094	0.094	0.173

Species	Final project included in cumulative assessment	Population scale	Project impact considered by NE	Nmin	Adult survival	Age first breeding	Lambda max.	Rmax	Fr
	EA3 (ES)		1048						0.267
	EA3 (revised)		882						0.224

46. The estimated *Fr* value for the North Sea kittiwake population presented in Natural England (2015a) was 0.065. This value was considered in relation to a sustainable threshold defined as ‘less than 0.5’. Following the update to the cumulative total including the East Anglia THREE collision estimates (from the ES and the revised one) the *Fr* value increases to between 0.066 and 0.072.
47. The estimated PBR *Fr* value for great black-backed gull presented in Natural England (2015a) was 0.173, which was considered in relation to a sustainable threshold defined as ‘0.5’. Following the update to the cumulative total including the East Anglia THREE collision estimates (from the ES and the revised one) the *Fr* value increases to between 0.224 and 0.267.
48. On the basis of the *Fr* values it was concluded in Natural England (2015a) that:
49. ‘...the impacts to kittiwake and great black-backed gull under EIA at the North Sea population scale when considered cumulatively with other wind farms in the North Sea can be considered unlikely to give rise to a significant effect.’
50. Following the update to this cumulative assessment using the East Anglia THREE cumulative collision mortality values in place of those presented by Natural England (2015a), the *Fr* values increase by small amounts and remain well below the sustainable thresholds considered appropriate by Natural England. Therefore, the above conclusion, with respect to the cumulative impact on these species, is considered to remain valid for the East Anglia THREE project.
51. Following this assessment EATL consider that undertaking additional assessment and modelling for kittiwake and great black-backed gull is unnecessary in order to establish that there will be no significant impacts on these species as a result of mortality at the East Anglia THREE site acting either alone or cumulatively.

1.5 Combined collision risk table

Natural England (2016) requested that the seasonal collision estimates for East Anglia THREE (Table 13.31) should be included in the table of

percentage increases in mortality (Table 13.34) to assist reviewing. Table 3 provides this combined table.

Table 3 Percentage increase in seasonal BDMPS and annual biogeographic mortality due to collisions at the East Anglia THREE site, including seasonal and annual collision mortality (this table combines the seasonal collision values from Table 13.31 and the increases in mortality from table 13.34 in the ES).

Species	Baseline average mortality	Band model	Reference population and percentage increase in mortality											
			Spring Migration			Wintering			Autumn Migration			Annual		
			CRM	BDMPS	Increase in mortality (%)	CRM	BDMPS	Increase in mortality (%)	CRM	BDMPS	Increase in mortality (%)	CRM	Biogeographic population	Increase in mortality (%)
Gannet	0.191	1	11	248385	0.027	n/a			38	456298	0.041	56	1,180,000	0.025
Kittiwake	0.156	1	49	627816	0.050	n/a			90	829937	0.069	147	5,100,000	0.018
Lesser black-backed gull	0.126	2	1	197483	0.004	2	39314	0.040	6	209007	0.023	11	864,000	0.010
		3	1		0.004	2		0.040	6		0.023	11		
Herring gull	0.172	2	n/a			25	466511	0.031	n/a			25	1,098,000	0.013
		3	25	0.031	25	0.013								
Great black-backed gull	0.07	2	n/a			37	91399	0.575	n/a			42	235,000	0.255
		3	40	0.621	45	0.273								

1.6 Gannet and kittiwake flight height data

52. Natural England agreed that site specific flight heights should be used in collision risk modelling if sufficient data are available. However, they also consider it appropriate to present a range of flight heights. Collision modelling in the ES used site specific flight heights for gannet and kittiwake as these were the only species for which sufficient data were collected (n=251 and n=208 respectively). Histograms of these data are provided below (Figures 1 and 2).

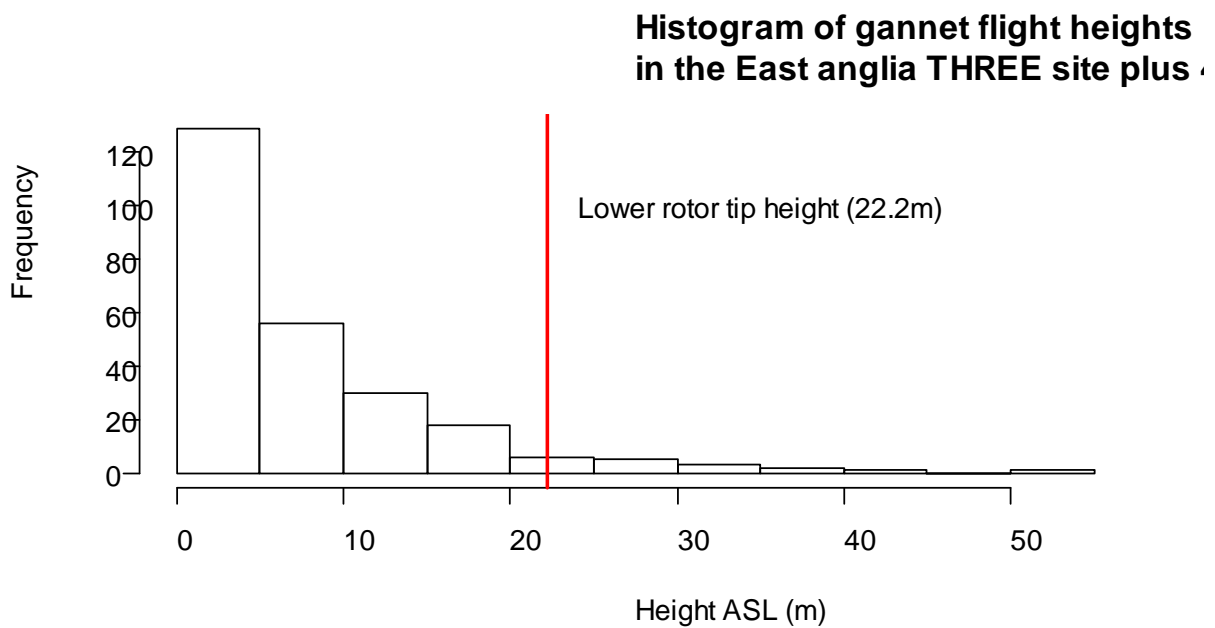


Figure 1. Gannet flight height observations at the East Anglia THREE site.

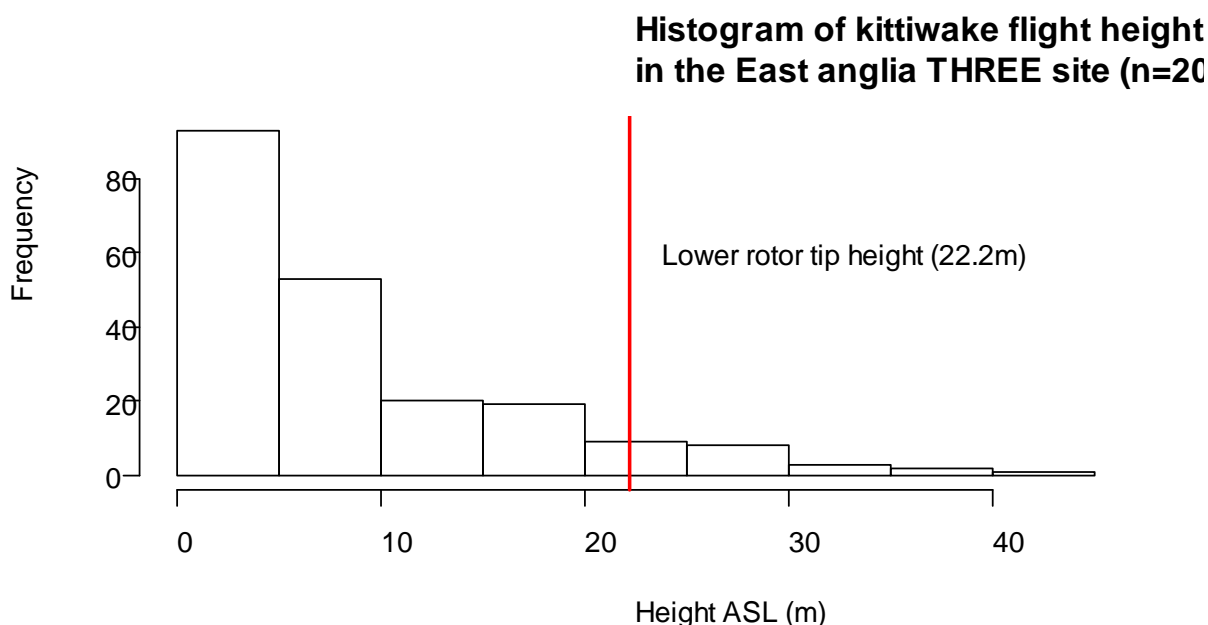


Figure 2. Kittiwake flight height observations at the East Anglia THREE site.

1.7 Revised cumulative collision mortality

53. Tables 4 to 7 presented below provide updated cumulative and in-combination collision mortalities for gannet, kittiwake, lesser black-backed gull and great black-backed gull and replace the following ones in Chapter 13 Offshore Ornithology (EATL 2015a):

- Table 4 replaces 'Table 13.45 – Cumulative Collision Risk Assessment for Gannet'.
- Table 5 replaces 'Table 13.46 – Cumulative Collision Risk Assessment for Kittiwake'.
- Table 6 replaces 'Table 13.47 – Cumulative Collision Risk Assessment for Lesser black-backed gull.'
- Table 7 replaces 'Table 13.49 – Cumulative Collision Risk Assessment for Great black-backed gull.'

54. These updates reflect revisions to the collision estimates for the Hornsea Project Two Wind Farm (SmartWind 2015a, Natural England 2015b) which occurred following submission of the East Anglia THREE application (EATL 2015a,b) during the examination for Hornsea Project Two.

55. Tables 4 to 7 also replace the following ones from The Information for the Habitats Regulations Assessment (EATL 2015b):

- Table 4 replaces 'Table 3.6 Gannet collision mortality for all wind farms with potential connectivity to the Flamborough and Filey Coast pSPA.'
- Table 5 replaces 'Table 3.7 Kittiwake collision mortality for all wind farms with potential connectivity to the Flamborough and Filey Coast pSPA.'

-
- Table 6 replaces 'Table 3.5 Lesser black-backed gull collision mortality for all wind farms (nonbreeding) and those with potential connectivity during the breeding season with the Alde-Ore SPA.'
56. It should be noted that the list of wind farms included in the cumulative and in-combination assessments for EATL (2015a,b) and updated in this note is longer than that assessed for Hornsea Project Two (see Table 10 of Natural England 2015b for the full list included for Hornsea Project Two). Consequently, the cumulative totals presented in this note differ slightly from those presented in SmartWind (2015a) and Natural England (2015b).
57. It should also be noted that the collision estimates for herring gull at the Hornsea Project Two wind farm which were presented in EATL (2015a) were erroneously attributed to the Hornsea Project Two application (SmartWind 2015b). This document did not contain a herring gull collision assessment. These collision estimates should have been attributed to the supporting technical annex for the Hornsea Project One assessment (SmartWind 2013).

Table 4. Updated gannet collision risk. This table includes revised estimates for Hornsea Project Two. Collisions have been apportioned to the Flamborough and Filey Coast pSPA in each season and summed for the year. The percentage apportioned in the breeding season has been calculated using the percentages presented in EATL (2015). This table replaces Table 13.45 in EATL (2015a) and Table 3.6 in EATL (2015b).

Tier	Project	Breeding season			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
1	Beatrice Demonstrator	0.6	0	0.0	0.9	1.9	0.02	0.7	3.3	0.02	2.2	0.0	1
1	Greater Gabbard	14.0	0	0.0	8.8	4.2	0.37	4.8	5.6	0.27	27.5	0.6	2
1	Gunfleet Sands	0.0	0	0.0	0.0	4.2	0.00	0.0	5.6	0.00	0.0	0.0	1
1	Kentish Flats	1.4	0	0.0	0.8	4.2	0.03	1.1	5.6	0.06	3.3	0.1	1
1	Lincs	2.1	100	2.1	1.3	4.2	0.05	1.7	5.6	0.09	5.0	2.2	2
1	London Array	2.3	0	0.0	1.4	4.2	0.06	1.8	5.6	0.10	5.5	0.2	2
1	Lynn and Inner Dowsing	0.2	100	0.2	0.1	4.2	0.01	0.2	5.6	0.01	0.5	0.2	1
1	Scroby Sands	0.0	100	0.0	0.0	4.2	0.00	0.0	3.3	0.00	0.0	0.0	1
1	Sheringham Shoal	14.1	100	14.1	3.5	4.2	0.15	0.0	3.3	0.00	17.6	14.2	2
1	Teesside	4.9	50	2.4	1.7	1.5	0.03	0.0	5.6	0.00	6.7	2.5	2
1	Thanet	1.1	0	0.0	0.0	4.2	0.00	0.0	5.6	0.00	1.1	0.0	2
1	Humber Gateway	1.9	100	1.9	1.1	4.2	0.05	1.5	5.6	0.08	4.5	2.0	2
1	Westernmost Rough	0.2	100	0.2	0.1	1.5	0.00	0.2	5.6	0.01	0.5	0.2	2
3	Beatrice	37.4	0	0.0	48.8	1.9	0.93	9.5	3.3	0.31	95.7	1.2	3
3	Blyth Demonstration Project	3.5	0	0.0	2.1	1.5	0.03	2.8	5.6	0.16	8.4	0.2	2
3	Dogger Bank Creyke Beck Projects A and B	5.6	50	2.8	6.6	1.5	0.10	4.3	5.6	0.24	16.5	3.1	4
3	Dudgeon	22.3	100	22.3	38.9	4.2	1.64	19.1	5.6	1.07	80.3	25.0	1
3	East Anglia ONE	5.0	100	5.0	198.0	4.2	8.32	10.0	5.6	0.56	213.0	13.9	5
3	EOWDC	4.2	0	0.0	5.1	1.8	0.09	0.1	3.4	0.00	9.3	0.1	2
3	Firth of Forth Alpha and Bravo	800.8	0	0.0	49.3	1.8	0.89	65.8	3.4	2.24	915.9	3.1	1
3	Galloper	18.1	0	0.0	30.9	4.2	1.30	12.6	5.6	0.71	61.6	2.0	2
3	Hornsea Project One	11.5	100	11.5	32.0	4.2	1.34	22.5	5.6	1.26	66.0	14.1	4
3	Inch Cape	336.9	0	0.0	29.2	1.8	0.53	5.2	3.4	0.18	371.3	0.7	2
3	Moray Firth (EDA)	80.6	0	0.0	35.4	1.9	0.67	8.9	3.3	0.29	124.9	1.0	1
3	Near na Gaoithe	509.3	0	0.0	26.1	1.8	0.47	34.8	3.4	1.18	570.1	1.7	2
3	Race Bank	33.7	100	33.7	11.7	4.2	0.49	4.1	5.6	0.23	49.5	34.4	2
3	Rampion	36.2	0	0.0	63.5	4.2	2.67	2.1	5.6	0.12	101.8	2.8	1
3	Dogger Bank Teesside Projects A and B	14.8	50	7.4	10.1	1.5	0.15	10.8	5.6	0.61	35.7	8.1	4

Tier	Project	Breeding season			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
4	Triton Knoll	26.8	100	26.8	64.1	4.2	2.69	30.1	5.6	1.69	121.0	31.1	2
4	Hornsea Project Two	7.0	100	7.0	14.0	4.2	0.59	6.0	5.6	0.34	27.0	7.9	6
4	East Anglia THREE	7.0	100	7.0	38.0	4.2	1.60	11.0	5.6	0.62	56.0	9.2	7
	TOTAL	2003.2		144.3	723.7		25.2	271.6		12.4	2998.5	182.0	

*Data sources:

1. Natural England (2014)
2. SmartWind (2015c)
3. Beatrice Offshore Windfarm Ltd. (2013)
4. Forewind (2014)
5. East Anglia THREE Ltd. (2015c)
6. SmartWind (2015a)
7. East Anglia THREE Ltd. (2015a)

Table 5. Updated kittiwake collision risk. This table includes revised estimates for Hornsea Project Two. Collisions have been apportioned to the Flamborough and Filey Coast pSPA in each season and summed for the year. The percentage apportioned in the breeding season has been calculated using the percentages presented in EAOL (2015; EA3 method) and also using the method presented in NE (2015; NE method) to assist comparison with the previous assessment for both wind farms. The annual total for FFC includes the breeding season estimates calculated using the EA3 method. This table replaces Table 13.46 in EATL (2015a) and Table 3.7 in EATL (2015b).

Tier	Project	Breeding season – EA3 method			Breeding season – NE method			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
1	Beatrice Demonstrator	0	16.8	0.0			0.0	2.1	5.4	0.11	1.7	7.2	0.12	4.95	0.2	1
1	Greater Gabbard	1.1	16.8	0.2			0.0	15	5.4	0.81	11.4	7.2	0.82	27.5	1.8	1
1	Gunfleet Sands	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Kentish Flats	0	16.8	0.0			0.0	0.9	5.4	0.05	0.7	7.2	0.05	2.2	0.1	1
1	Lincs	0.70	16.8	0.1	0.92	100	0.9	1.16	5.4	0.06	0.69	7.2	0.05	2.75	0.2	1
1	London Array	1.4	16.8	0.2			0.0	2.3	5.4	0.12	1.8	7.2	0.13	5.5	0.5	1
1	Lynn and Inner Dowsing	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Scroby Sands	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Sheringham Shoal	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Teesside	38.4	16.8	6.5			0.0	24	5.4	1.30	2.5	7.2	0.18	77.08	7.9	1
1	Thanet	0.3	16.8	0.1			0.0	0.5	5.4	0.03	0.4	7.2	0.03	1.1	0.1	1
1	Humber Gateway	1.9	100	1.9	2.55	100	2.6	3.19	5.4	0.17	1.9	7.2	0.14	7.7	2.2	1
1	Westermost Rough	0.10	100	0.1	0.18	100	0.2	0.22	5.4	0.01	0.132	7.2	0.01	0.55	0.1	1
3	Beatrice	94.7	16.8	15.9			0.0	10.7	5.4	0.58	39.8	7.2	2.87	145.2	19.4	3
3	Blyth Demonstration Project	1.4	16.8	0.2			0.0	2.3	5.4	0.12	1.4	7.2	0.10	5.39	0.5	1
3	Dogger Bank Creyke Beck Projects A and B	288.0	16.8	48.4	288	19.3	55.6	135	5.4	7.29	295	7.2	21.24	718.85	76.9	1
3	Dudgeon	0.0	16.8	0.0	0	100	0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	1
3	East Anglia ONE	2.0	16.8	0.3			0.0	242	5.4	13.07	71	7.2	5.11	314	18.5	4
3*	EOWDC	11.8	16.8	2.0			0.0	5.8	5.4	0.31	1.1	7.2	0.08	18.7	2.4	1
3	Firth of Forth Alpha and Bravo	153.1	16.8	25.7			0.0	313.1	5.4	16.91	247.6	7.2	17.83	715	60.5	1
3	Galloper	6.3	16.8	1.1			0.0	27.8	5.4	1.50	31.8	7.2	2.29	65.89	4.8	1

Tier	Project	Breeding season – EA3 method			Breeding season – NE method			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
3	Hornsea Project One	44.0	16.8	7.4	47.9	66.6	31.9	55.9	5.4	3.02	20.9	7.2	1.50	122	11.9	1
3	Inch Cape	13.1	16.8	2.2			0.0	224.8	5.4	12.14	63.5	7.2	4.57	301.42	18.9	1
3	Moray Firth (EDA)	43.6	16.8	7.3			0.0	2	5.4	0.11	19.3	7.2	1.39	45.4	8.8	1
3	Near na Gaoithe	32.9	16.8	5.5			0.0	56.1	5.4	3.03	4.4	7.2	0.32	93.39	8.9	1
3	Race Bank	1.90	16.8	0.3	1.86	100	1.9	23.9	5.4	1.29	5.59	7.2	0.40	31.35	2.0	1
3	Rampion	54.40	16.8	9.1			0.0	37.4	5.4	2.02	29.7	7.2	2.14	121	13.3	1
3	Dogger Bank Teesside Projects A and B	136.9	16.8	23.0	136.9	19.3	26.4	90.7	5.4	4.90	216.9	7.2	15.62	444.4	43.5	1
4	Triton Knoll	24.60	16.8	4.1	24.6	100	24.6	139	5.4	7.51	45.4	7.2	3.27	209	14.9	1
4	Hornsea Project Two	16.0	16.8	2.7	16	83	13.3	9	5.4	0.49	3	7.2	0.22	27	3.4	5
4	East Anglia THREE	8.00	16.8	1.3			0.0	90	5.4	4.86	49	8.2	4.02	146.3	10.2	6
	TOTAL			165.7			157.3			81.8			84.5	3653.6	332.0	

*Data sources:

1. Natural England (2015b)
2. Natural England (2014)
3. Beatrice Offshore Windfarm Ltd. (2013)
4. East Anglia THREE Ltd. (2015c)
5. SmartWind (2015a)
6. East Anglia THREE Ltd. (2015a)

Table 6. Updated lesser black-backed gull collision risk. This table includes revised estimates for Hornsea Project Two. All collisions during the breeding season at wind farms located within 141 km of the Alde-Ore SPA have been apportioned to that population. This table replaces Table 13.47 in EATL (2015a) and Table 3.5 in EATL (2015b).

Tier	Project	Breeding season			Nonbreeding season		Ref.*
		Total	% Alde-Ore SPA	Alde-Ore SPA	Total	Total	
1	Beatrice Demonstrator	0.0			0.0	0.0	1
1	Greater Gabbard	12.4	100	12.4	49.6	62.0	2
1	Gunfleet Sands	1.0			0.0	1.0	1
1	Kentish Flats	0.3	100	0.3	1.3	1.6	3
1	Lincs	1.7			6.8	8.5	2
1	London Array	0.0			0.0	0.0	NA
1	Lynn and Inner Dowsing	0.0			0.0	0.0	1
1	Scroby Sands	0.0			0.0	0.0	1
1	Sheringham Shoal	1.7	100	1.7	6.6	8.3	2
1	Teesside	0.0			0.0	0.0	NA
1	Thanet	3.2	100	3.2	12.8	16.0	2
1	Humber Gateway	0.3			1.1	1.3	2
1	Westermost Rough	0.1			0.3	0.3	2
3	Beatrice	0.0			0.0	0.0	NA
3	Blyth Demonstration Project	0.0			0.0	0.0	NA
3	Dogger Bank Creyke Beck Projects A and B	2.6			10.4	13.0	2
3	Dudgeon	7.7	100	7.7	30.6	38.3	1
3	East Anglia ONE	8.0	100	8.0	53.0	61.0	4
3	EOWDC	0.0			0.0	0.0	NA
3	Firth of Forth Alpha and Bravo	2.1			8.4	10.5	2
3	Galloper	27.8	100	27.8	111.0	138.8	5
3	Hornsea Project One	4.4			17.4	21.8	2
3	Inch Cape	0.0			0.0	0.0	NA
3	Moray Firth (EDA)	0.0			0.0	0.0	NA
3	Near na Gaoithe	0.3			1.2	1.5	1
3	Race Bank	43.2			10.8	54.0	2
3	Rampion	1.6			6.3	7.9	1
3	Dogger Bank Teesside Projects A and B	2.4			9.6	12.0	2
4	Triton Knoll	7.4			29.6	37.0	6
4	Hornsea Project Two	2.0			2.0	4.0	7
4	East Anglia THREE	2.0	100	2.0	9.0	11.0	8
	TOTAL	131.9		63.0	377.7	509.6	

*Data sources:

1. E.ON (2013a)
2. SmartWind (2015b)
3. KFWL (2011)
4. East Anglia THREE Ltd. (2015c)
5. RWE (2011)
6. TKOWL (2012)
7. SmartWind (2015a)
8. East Anglia THREE Ltd. (2015a)

Table 7. Updated great black-backed gull collision risk. This table includes revised estimates for Hornsea Project Two. All collisions during the breeding season at wind farms located within 141 km of the Alde-Ore SPA have been apportioned to that population. This table replaces Table 13.49 in EATL (2015a).

Tier	Project	Breeding season	Nonbreeding season	Annual	Ref.*
1	Beatrice Demonstrator	0.0	0.0	0.0	NA
1	Greater Gabbard	15.0	60.0	75.0	1
1	Gunfleet Sands	0.0	0.0	0.0	2
1	Kentish Flats	0.1	0.2	0.3	2
1	Lincs	0.0	0.0	0.0	2
1	London Array	0.0	0.0	0.0	2
1	Lynn and Inner Dowsing	0.0	0.0	0.0	NA
1	Scroby Sands	0.0	0.0	0.0	NA
1	Sheringham Shoal	0.0	0.0	0.0	NA
1	Teesside	8.7	34.8	43.6	3
1	Thanet	0.1	0.4	0.5	3
1	Humber Gateway	1.3	5.1	6.3	2
1	Westermost Rough	0.0	0.0	0.1	2
3	Beatrice	30.2	120.8	151.0	4
3	Blyth Demonstration Project	1.3	5.1	6.3	5
3	Dogger Bank Creyke Beck Projects A and B	5.8	23.3	29.1	3
3	Dudgeon	0.0	0.0	0.0	NA
3	East Anglia ONE	1.0	70.0	71.0	6
3	EOWDC	0.6	2.4	3.0	3
3	Firth of Forth Alpha and Bravo	13.4	53.4	66.8	3
3	Galloper	4.5	18.0	22.5	7
3	Hornsea Project One	17.2	68.6	85.8	2
3	Inch Cape	0.0	36.8	36.8	2
3	Moray Firth (EDA)	9.5	25.5	35.0	2
3	Near na Gaoithe	0.9	3.6	4.5	2
3	Race Bank	0.0	0.0	0.0	NA
3	Rampion	5.2	20.8	26.0	8
3	Dogger Bank Teesside Projects A and B	6.4	25.5	31.9	3
4	Triton Knoll	24.4	97.6	122.0	2
4	Hornsea Project Two	3.0	20.0	23.0	9
4	East Anglia THREE	5.0	37.0	42.0	10
	TOTAL	153.4	728.9	882.4	

*Data sources:

1. Banks et al. (2006)
2. SmartWind (2014)
3. SmartWind (2015b)
4. Beatrice Offshore Windfarm Ltd. (2013)
5. Engena (2007)
6. East Anglia THREE Ltd. (2015c)
7. RWE (2011)
8. E.ON (2013b)
9. SmartWind (2015a)
10. East Anglia THREE Ltd. (2015a)

1.8 Conclusion

58. Natural England's Relevant Representation for the East Anglia THREE offshore wind farm (Natural England 2016) raised concerns regarding EIA level effects of displacement on auks and collision risk to kittiwake and great black-backed gull.
59. This note provides further discussion on topics identified by Natural England (e.g. density dependent population regulation) and application of methods used by Natural England (2015b) in relation to the Hornsea Project Two Wind Farm, updated to include the one additional project (East Anglia THREE) which has been submitted since the original work was conducted.
60. Natural England (2015b) reached conclusions of no significant effects on the sensitive receptors at the EIA level, due to the Hornsea Project Two Wind Farm acting cumulatively with other North Sea wind farms. As demonstrated in this note, inclusion of the East Anglia THREE project does not alter these conclusions and there will therefore be no significant effects on the species discussed here (guillemot, razorbill, puffin, kittiwake and great black-backed gull) as a result of the East Anglia THREE project acting either alone or cumulatively with other wind farms in the North Sea UK waters.

1.9 References

Banks et al. (2006) *The Potential Effects on Birds of the Greater Gabbard Offshore Wind Farm Report for February 2004 to April 2006*. BTO Research Report No. 440.

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Appendix 3 March 2016 Meeting Minutes

East Anglia THREE
Offshore Windfarm

East Anglia THREE

Ornithology Meeting
24/3/16

East Anglia THREE Ornithology Meeting			
Date of meeting:	24/03/16	Venue:	Tudor St
Attendees:			
Name	Position	Org	Initials
[REDACTED]	Senior Project Management	SPR	[REDACTED]
[REDACTED]	Offshore Policy Manager	SPR	[REDACTED]
[REDACTED]	Environment Manager	SPR	[REDACTED]
[REDACTED]	Case Officer	MMO	[REDACTED]
[REDACTED]	Marine Senior Advisor	NE	[REDACTED]
[REDACTED]	Marine Lead Advisor	NE	[REDACTED]
[REDACTED]	Principal Advisor	NE	[REDACTED]
[REDACTED]	Ornithologist	NE	[REDACTED]
[REDACTED]	Conservation Officer	RSPB	[REDACTED]
[REDACTED]	Casework Officer	RSPB	[REDACTED]
[REDACTED]	Lead EIA Coordinator	RHDHV	[REDACTED]
[REDACTED]	Ornithologist	McG	[REDACTED]
Apologies:			

Discussion	Action
1 Introductions & Health and Safety	n/a
<p>2 Project update</p> <p>SPR and Vattenfall have formally concluded joint venture activities within the East Anglia Zone. SPR will now take forward the development of projects in the south of the zone and Vattenfall will develop projects in the north</p> <p>Vattenfall has identified two project areas part of which includes the former East Anglia FOUR site. In addition to East Anglia ONE and East Anglia THREE, SPR is progressing the development stage of a further 2 projects</p> <p>Both companies will continue to communicate regarding their respective plans and proposals</p> <p>Project timeline</p> <ul style="list-style-type: none"> • DCO submission November 2015 • S56 consultation closes 22 April 2016 • Expected Decision in Summer 2017 • If consented construction would commence in 2020 at the earliest 	
3 Overview of the ornithology assessment in the application	

MT – Overview of the onshore assessment (slide 7)

Assessment focus:

- Breeding – Cetti's warbler, marsh harrier, bird assemblage
- Nonbreeding – brent goose, avocet, other waterbirds

Embedded mitigation to minimise impacts at the Deben (restriction on disturbing construction activities which could affect brent geese between 1st Nov. – 28th Feb)

EIA: No impacts assessed as > minor significance

HRA (brent geese): no adverse effect on integrity alone or in-combination

█ – confirmed NE & RSPB content with the assessment and the proposed mitigation for onshore matters

█ – provided an overview of the outstanding points on the offshore assessment (slides 8 – 22)

Assessment focus:

- Displacement – red-throated diver, gannet, auks
- Collision – gannet, kittiwake, large gulls
- CIA wind farm list agreed during evidence plan

Red-throated diver (RTD) cable laying

█ – NE have some concerns around the approach to the return of birds after displacement, however they accept that this will not change the significance of impact assessed (slide 14)

█ – RTD not raised in the section 56 response
█ – RSPB happy with position on RTD

█ – check on the displacement figures for RTD >2km

In the most recent reporting (Percival 2014) the percentage declines have fallen compared with Percival (2010) used in the ES (2014 value cf 2010 value):
Wind farm (-82 cf -94),
0-0.5km (-47 cf -83),
0.5-1km (-10 cf -77),
1-2km (+19 cf -59),
2-3km (+33 cf 0).
Since these values are smaller than those in Percival 2010 (as used in the ES) the current assessment is precautionary.

Seasons

■ - Using the core periods of the seasons – this is a precautionary approach (**slide 12**)
Collision risk – season not material as this is an annual total

Guillemot & razorbill displacement

■ - more to be done in relation to seasonality. EA3 only is OK but question is with cumulative impact assessment (CIA). TF would like to see the displacement summing all seasons and adding impacts from breeding seasons from other NS wind farms

Auk foraging

■ NE happy with approach

Auk displacement mortality

■ – view that it is not just about looking at two different methods – also need to look at the full range of mortality 1 – 10%. There is not enough evidence to say it is 1%. The CIA does not take into account breeding season impacts, NE would like to see this

■ – breeding season complicates the reference population question

■ – is there potential to look at a worst case of recruitment to nearest designated site and then suggest something more realistic from this point?

RSPB – content that this doesn't materially affect outcome

Gannet collision height

■ – happy with Band Option 1

RSPB – want to see all Band options presented

■ – (post meeting note) all band options presented in Appendix 13.3, and options 1 & 2 in the chapter Table 13.31

Interpretation of kittiwake PVA

■ – what is the impact of tuning strength of density dependence to achieve stable baseline population,

■ – this simply refines the model to prevent a small offset between starting and end populations under baseline (no impact) scenario. It has no effect on model results.

■ - what is effect of applying downward trend to density independent model?

■ – adjusting demographic rates in order to achieve a particular trajectory in a density independent model is unrealistic and overly precautionary. Populations are regulated by resource competition (which is what stops uncontrolled population growth). A declining population indicates the current size is above the environment's carrying capacity. The most appropriate way to model a decline in size is to use a density

■ – need to look at this again with reference to s56 comments

dependent model adjusted to achieve a specific future size.

■ – need to bring it back to key point that OWF impacts in context of wider patterns – 4% = 0.16% over 25 years (**slide 21**)

■ – want to see the rationale for the BDMPS population use, this isn't appropriate to the scale. NE would not advocate using BDMPS population for PVA in EIA – SPR should consider using UK colony scale

■ – do not agree that UK colony population is relevant to the assessment; any decrease would in any case be proportional. RSPB – agree with NE that need to see density independent modelling for PVA, but agree with SPR that impacts are not significant

Netherlands comments

■ – a point to note that some sites that that the Rijkswaterstaat wished to be included were not explicitly covered in the HRA screening, these will be included in a cover note

■ – confirmed that NE would not be commenting on transboundary issues

SPA extensions

■ – EATL included high-level assessment in the HRA
■ – minor concern on HRA for Outer Thames Estuary or Greater Wash SPA dependent on where the operational port is and what the routes are. NE will share a best practice note covering operational disturbance

■ – NE best practice

■ - Need to add clarification on Hamford Water

■ – any issues such as this can be dealt with through the written representations or SoCG

Gannet collision impacts

■ – key issue for RSPB gannet collisions. RSPB suggest raising turbine air draft height would mitigate

■ – there is potential for this as mitigation, but there are large implications for cost and MoD radar interference

RSPB – have done some work on raising height which they can share

Great Black-backed Gull – EIA

■ – cumulative collision at 99.5% is 16% above baseline mortality – NE would like to see population modelling. NE acknowledge that the Rampion PBR used in the assessment

■ – **to provide best practice guidance**

■ – **will discuss internally if there is potential for increasing clearance**

■ – **to provide RSPB working on this**

EATL to discuss options for GBB gull PVA.

<p>but as PBR not accepted now, NE would like to see PVA undertaken</p> <p>■ – using new avoidance rates we are at a 1/3 of mortality based on previously consented projects. Therefore we are well within previously accepted levels of cumulative mortality, therefore do we need to undertake further work</p> <p>■ – NE see that a PVA would remove any uncertainty around this impact</p>	
<p>In-Principle Monitoring Plan (IPMP)</p> <p>■ – broadly aligned with EA1 plans</p> <p>■ – will wait for certainty of auks and GBBG before detailed comment on IPMP. Would prefer that any proposed survey work was aligned with the BDMPS dates</p> <p>■ – add IPMP to the SoCG</p>	
<p>Next steps</p> <p>SPR to reply to NE s56 response in next 3-4 weeks</p> <p>RSPB will provide a response to S56 and if SPR provide info on raising the air draft height then this will be included in the response – i.e. RSPB unlikely to raise any issues. If SPR not able to raise the height, then RSPB will consider whether their position and may attend the hearing, in which case a SOCG will be required.</p> <p>Wrap up SoCG in same timeframe</p>	

East Anglia THREE
Offshore Windfarm

East Anglia THREE

Marine Mammals Meeting
24/3/16

East Anglia THREE Marine Mammals Meeting

Date of meeting:	24/03/16	Venue:	Tudor Street
Attendees:			
Name	Position	Org	Initials
[REDACTED]	Senior Project Management	SPR	[REDACTED]
[REDACTED]	Offshore Policy Manager	SPR	[REDACTED]
[REDACTED]	Environment Manager	SPR	[REDACTED]
[REDACTED]	Case Officer	MMO	[REDACTED]
[REDACTED]	Marine Senior Advisor	NE	[REDACTED]
[REDACTED]	Marine Lead Advisor	NE	[REDACTED]
[REDACTED] (phone)	Senior Specialist	NE	[REDACTED]
[REDACTED]	Lead EIA Coordinator	RHDHV	[REDACTED]
[REDACTED] (phone)	Senior Consultant (Marine Mammals)	RHDHV	[REDACTED]
Apologies: None			

Discussion	Action
<p>1 Introductions & Health and Safety</p> <p>Dutch jack-up capsized, industry working to learn any lessons</p>	n/a
<p>2 Project update (slides 3 – 6)</p> <p>SPR and Vattenfall have formally concluded joint venture activities within the East Anglia Zone. SPR will now take forward the development of projects in the south of the zone and Vattenfall will develop projects in the north</p> <p>Vattenfall has identified two project areas part of which includes the former East Anglia FOUR site. In addition to East Anglia ONE and East Anglia THREE, SPR is progressing the development stage of a further 2 projects</p> <p>Both companies will continue to communicate regarding their respective plans and proposals</p> <p>Project timeline</p> <ul style="list-style-type: none"> • DCO submission November 2015 • S56 consultation closes 22 April 2016 • Expected Decision in Summer 2017 • If consented construction would commence in 2020 at the earliest 	n/a
<p>3 Overview of the Marine Mammal assessment in the application (slides 7 – 22)</p>	

<p>■ – summarised the baseline, methodology and assessment</p> <p>■ – asked if there were any comments on the cumulative impact assessment (CIA) scenarios (WCS & realistic)?</p> <p>■ – NE have no concerns around CIA, Claire Ludgate happy working through the evidence plan that she understood the rationale for the approach and scenarios</p> <p>■ – NE happy to see a range of impacts presented in the CIA</p> <p>■ – asked about the number of overlapping projects</p> <p>■ – SAC workshop, DECC advised of deployment approx, 1GW p/a based on current estimate to JNCC</p> <p>■ – in NE response to s56 there is a caveat on the corkscrew injuries, this is not thought to be a major issue – but note that further work may come forward which may need to be taken into account</p> <p>■ – Interim PCoD – sought clarification on how much weight will NE put on PCoD for future responses?</p> <p>■ – Latest date given for PCoD is April. PCoD likely to be used as context for NE considerations and used to inform discussions with regulators with regard to management</p>	<p>■ - Send the cumulative section of the ES chapter to VC</p>
<p>4 - Feedback from attendees on impact assessment</p> <p>■ – confirmed that matters closed on EIA, NE are happy with the assessment</p> <p>■ – stated that it is likely that CIA will be issue for ExA, therefore any Statement of Common Ground (SoCG) should highlight the uncertainty within this part of the assessment</p> <p>■ – NGOs have raised concern that they have no opportunity to comment on MMMP proposals as this is post-consent. Do NE or MMO have any objections to them being consulted?</p> <p>■ – NE are open to consultation</p> <p>■ – MMO prefer not to have specific parties named to keep flexibility/future proof the Marine Licence</p> <p>■ – IPMP – ■ pSAC assessment may need validating – therefore there may be a requirement for pre and post monitoring</p>	<p>■ - Add in statement on CIA uncertainty in SoCG</p>

<p>■ – SPR have proposed either strategic or site-specific in IPMP</p> <p>■ – MMO will aim to draft licence conditions to maintain flexibility</p> <p>■ – happy with IPMP as it stands, this is useful to provide guidance post-consent on thoughts during application period</p> <p>■ – Note that a subgroup of the Renewable UK Consents and Licencing Group and NE are currently discussing post-consent monitoring– the focus is on ornithology, mammals parked while pSAC discussions are on-going</p>	
<p>5 - Future conservation designations</p> <p>■ –as it stands there is no assessment of the pSAC within the application as there is a lack of information to enable a thorough assessment. SPR acknowledge that the consultation on the proposed site boundaries and evidence base is open but as there is still uncertainty over management measures would see any assessment done now to be potentially abortive</p> <p>■ – Suggested that the assessment should be left as long as possible to allow full sight of the information, but SPR should provide comfort to Examiner that a submission will be made by the last deadline of the examination. NE happy to work with SPR on this assessment.</p> <p>■ – a clear statement of intent will be included in the SoCG. It is important that in the examination it is clear that the pSAC designation process does not affect consideration of the application; SPR will undertake assessment when there are clear guidelines.</p> <p>■ – discussions underway within the industry on potential ways to undertake the assessment based on initial suggestions from JNCC.</p> <p>■ – suggested that it may be useful to have a joint NE / industry (or project) statement on the current status of assessment work for submission to the ExA until such time that the full assessment is available.</p> <p>■ – SPR would welcome discussions on joint statement either at a project or RUK level.</p> <p>■ – EA3 have concerns over the proposed identification of seasonal areas of importance of the pSAC</p> <p>■ – There is no requirement to reflect seasonal aspect in the site boundary, NE expect feedback on the seasonal proposal in consultation responses.</p>	<p>■ – will add clear statement in the SoCG reflecting HRA and commitment to assessment</p> <p>■ – will discuss with JNCC if they are keen on joint statement</p>

<p>6 - Next steps</p> <p>■ – MMO have internal 5th April meeting to discuss s56 response, will send on once drafted / finalised</p> <p>■ – will circulate a revised SoCG capturing issues discussed at this meeting</p> <p>It was noted that all parties are satisfied with the evidence plan for EA3, this has succeeded in front-loading discussions and providing assessment that all parties are happy with</p>	<p>■ – provide s56 response when available</p> <p>■ – circulate revised SoCG</p>
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Appendix 4 June 2016 Meeting Minutes and Auk Displacement Note

East Anglia THREE
Offshore Windfarm

East Anglia THREE

Natural England Meeting Minutes 8th June 2016



**SCOTTISHPOWER
RENEWABLES**

East Anglia THREE Natural England Meeting

Date of meeting:	8 th June	Venue:	RHDHV London
Attendees:			
Name	Position	Org	Initials
██████████	Senior Project Manager	SPR	████
██████████	Senior Environmental Manager	SPR	████
██████████	Offshore Policy Manager	SPR	████
██████████ (telephone)	Marine Senior Advisor	NE	████
██████████	Marine Lead Advisor	NE	████
██████████	Ornithologist	NE	████
██████████ (telephone)	Ornithologist	NE	████
██████████	Ornithologist	McG	████
██████████	Ornithologist	McG	████
██████████	Lead EIA Coordinator	RHDHV	████
Apologies: none			

Discussion	Action
1 – H&S – no issues	
<p>2 – Ornithology</p> <ul style="list-style-type: none"> • The draft statement of common ground (SoCG) was used as the basis of the discussion, focusing on those areas which had yet to be agreed. The references below are to the lines within the draft SoCG <p>2i – Red-throated diver displacement. Both methods are discussed in ES (see Table 13.17). NE to update the SoCG comment to reflect fact that both methods are shown. Agree that the method does not affect the significance.</p> <p>2j – Annual displacement. ██████ would like to see full matrix to look at EIA impacts (CIA). NE do not agree that PBR appropriate tool for screening</p> <p>██████ – EATL have taken Hornsea P2 final figures and added on EA3. This was done for simplicity to avoid presenting a number of matrices/tables</p> <p>██████ – would like to see the matrices, using the Hornsea P2 figures, with a narrative to fully justify the requirement for no further modelling</p> <p>██████ – notwithstanding presenting this, EATL will provide text on concerns with this approach and highlight areas of precaution</p> <p>3b – Construction displacement – there is no disagreement on this point now</p> <p>3d – Operational displacement impacts - there is no disagreement on this point now</p>	<p style="text-align: center;">Update SoCG (EATL & NE)</p> <p>██████ to discuss format of matrix prior to circulation</p> <p>██████ – produce matrix plus text</p> <p style="text-align: center;">Update SoCG (EATL & NE)</p> <p style="text-align: center;">Update SoCG (EATL & NE)</p>

<p>3h – migrating great skua, Arctic skua, common tern and Arctic tern. No disagreement, need to update wording from ‘no impact’ to ‘negligible impact’</p> <p>4c – Cumulative displacement impacts - covered by discussion above (see 2j)</p> <p>4d – Separate out into the 3 species as each different</p> <p>Gannet <ul style="list-style-type: none"> – can we remove gannet – would like to see updated PVA impacts are small and GB population is approaching double size since previous PVA, there is little justification for a new PVA.</p> <p>CIA – kittiwake</p> <p>There was a discussion on the differences between the density dependent and independent models. It was accepted there is a range between the independent & dependent results where the actual number lies.</p> <p>Scale – north sea or UK? There was a discussion about the appropriate population scale to be used for the assessment – it would be useful to have narrative around population scale chosen and uncertainty, with text around the ratios of impact – BDMPS/North Sea is correct scale to use, in any case as the impacts would be apportioned if UK scale used the relative impact would be scaled to the population and the result would be the same ACTION – narrative can be added – SoCG maintains CIA impact but small contribution from EA3 ACTION – to provide information on the density dependent model for</p> <p>Great black backed gull (GBBG) – NE did ask for PVA on Hornsea but this was not produced during the examination. Maintain view that PVA required – NE believe PVA should be done. Position unchanged from Hornsea that PVA should be done – maintain that given the scale of impact, PVA will add little value to the assessment – demographic rates missing for GBBG therefore large uncertainty with any model, would need to agree input and accept uncertainty</p>	<p>Update SoCG (EATL)</p> <p>See 2j</p> <p>Update SoCG – separate out the 3 species</p> <p>EATL Provide clarification note on the model used, include discussion on dependent vs independent models</p> <p>Update SoCG to accept cumulative impact but small effect from EA3</p> <p>EATL to consider undertaking PVA for GBBG & gannet</p>
<p>3 – Mammals</p> <ul style="list-style-type: none"> • Update on pSAC (NE) <ul style="list-style-type: none"> – no date for management advice – all help and steer gratefully received – waiting for JNCC, will share position as soon as they 	

<p>know ACTION date in diary post HOW02 – 17th august placeholder sent</p> <ul style="list-style-type: none"> • Victoria suggest letter of comfort from NE? <p>■ – wording in the written rep</p>	
<p>4 – Other topics</p> <ul style="list-style-type: none"> • Orford MCZ • ACTION AT to get back – resolve whether assessment requested 	
<p>5 – Rule 6 letter (also attached), examination time table and working</p> <p>Reinstate the regular calls? ■■■■■ to discuss and come back to ■</p>	
<p>6 – AoB</p>	

Norfolk Boreas Offshore Wind Farm

Appendix 2

East Anglia THREE Appropriate
Assessment

Applicant: Norfolk Boreas Limited
Document Reference: ExA.ASR-NE.D8.V1
Deadline 8
Date: April 2020
Revision: Version 1

**RECORD OF THE HABITATS REGULATIONS ASSESSMENT UNDERTAKEN
UNDER REGULATION 61 OF THE CONSERVATION OF HABITATS AND
SPECIES REGULATIONS 2010 AND REGULATION 25 OF THE OFFSHORE
MARINE CONSERVATION (NATURAL HABITATS &c.) REGULATIONS 2007 FOR
AN APPLICATION UNDER THE PLANNING ACT 2008**

This report includes a transboundary assessment of impacts

***Project Title:* East Anglia THREE Offshore Wind Farm**

Date: 7th August 2017

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Introduction

Background

- 1.1 This is a record of the Habitats Regulations Assessment (“HRA”) that the Secretary of State for Business, Energy and Industrial Strategy has undertaken under the Conservation of Habitats and Species Regulations 2010 (“the Habitats Regulations”) and the Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007 (“the Offshore Habitats Regulations”) in respect of the Development Consent Order (“DCO”) and Deemed Marine Licences (“dMLs”) for East Anglia THREE Offshore Wind Farm and its associated infrastructure (the “Project”). For the purposes of these Regulations the Secretary of State is the competent authority.
- 1.2 The report also contains analysis and assessment of the potential impacts of the Project upon designated sites in other European Economic Area States (“transboundary sites”). This is included under the transboundary assessment section of the report (Section 13).
- 1.3 The project will comprise offshore wind turbines and offshore electrical platforms, and offshore and onshore export cables taking power to onshore electrical substations. The installed generating capacity will have an output of up to 1,200MW. The western boundary of the wind turbine zone is approximately 69km from the port of Lowestoft and the zone covers an area of approximately 305km². The transmission cables will come ashore at Bawdsey in Suffolk, and then run underground to the National Grid substation near Bramford. The Project application is described in more detail in Section 2.
- 1.4 The Project constitutes a nationally significant infrastructure project (NSIP) as defined by s.14(1)(a) of the Planning Act 2008 as it is for a generating station of over 100MW.
- 1.5 The Project was accepted by the Planning Inspectorate (“PINS”) on 15 December 2015 and a four-member Panel of Inspectors (“the Panel”) was appointed as the Examining Authority (“ExA”) for the application. The examination of the Project application began on 28 June 2016 and completed on 28 December 2016. The Panel submitted its report of the examination, including its recommendation (“the ExA’s Report”), to the Secretary of State on 28 March 2017.
- 1.6 The Secretary of State’s conclusions on habitats and wild birds issues contained in this report have been informed by the ExA’s Report, and further information and analysis, including the ExA’s Report on the Implications for European Sites (“RIES”) and written responses to it.

Habitats Regulations Assessment (HRA)

- 1.7 Council Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) and Council Directive 2009/147/EC on the conservation of wild birds (“the Birds Directive”) aim to ensure the long-term survival of certain species and habitats by protecting them from adverse effects of plans or projects.
- 1.8 The Habitats Directive provides for the designation of sites for the protection of habitats and species of European importance. These sites are called Special Areas of Conservation

("SACs"). The Birds Directive provides for the classification of sites for the protection of rare and vulnerable birds and for regularly occurring migratory species. These sites are called Special Protection Areas ("SPAs"). SACs and SPAs are collectively termed European sites and form part of a network of protected sites across Europe. This network is called Natura 2000.

1.9 Government undertakes a formal public consultation before SPAs or SACs are designated. At this stage sites are referred to as Proposed SPAs (pSPAs) and possible SACs (pSACs). Government policy is to afford such sites in the United Kingdom the same protection as European sites. When a pSAC is submitted to the European Commission it becomes a candidate SAC (cSAC). The level of protection afforded to cSACs is the same as SACs.

1.10 The Convention on Wetlands of International Importance 1972 ("the Ramsar Convention") provides for the listing of wetlands of international importance. These sites are called Ramsar sites. Government policy is to afford Ramsar sites in the United Kingdom the same protection as European sites.

1.11 In the UK, the Habitats Regulations transpose the Habitats and Birds Directives into national law as far as the 12 nm limit of territorial waters. Beyond territorial waters, the Offshore Habitats Regulations serve the same function for the UK's offshore marine area. The Project covers areas within and outside the 12 nm limit and on shore so both sets of Regulations apply.

1.12 Regulation 61 of the Habitats Regulations provides that:

....before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in-combination with other plans or projects), and (b) is not directly connected with or necessary to the management of that site, [the competent authority] must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

1.13 Regulation 25 of the Offshore Habitats Regulations contains similar provisions:

Before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which (a) is to be carried out on any part of the waters or on or in any part of the seabed or subsoil comprising an offshore marine area or on or in relation to an offshore marine installation (b) is likely to have a significant effect on a European marine site (either alone or in-combination with other plans or projects) and (c) is not directly connected with or necessary to the management of that site, a competent authority must make an appropriate assessment of the implications for that site in view of that site's conservation objectives..

1.14 This Project is not directly connected with, or necessary to, the management of a European site or a European marine site. The Habitats Regulations and the Offshore Habitats Regulations require that, where the project is likely to have a significant effect ("LSE") on any such site,

where not connected with, or necessary to, the management of that European site, an appropriate assessment (“AA”) is carried out to determine whether or not the project will have an adverse effect on the integrity of the site in view of that site’s Conservation Objectives. In this document, the assessments as to whether there are LSEs, and, where required, the AAs, are collectively referred to as the Habitats Regulations Assessment (“HRA”).

- 1.15 The HRA takes account of mitigation measures which are secured by requirements and conditions.
- 1.16 This report should be read in conjunction with the following documents that provide extensive background information:
- The ExA’s Report
 - The RIES
 - The Applicant’s ES
 - The Applicant’s HRA (and associated documents)
 - Plus other documents submitted during the Examination and during the course of the Secretary of State’s consideration of the Application, available at:
<https://infrastructure.planninginspectorate.gov.uk/projects/eastern/east-anglia-three-offshore-wind-farm/>
- 1.17 The key information in these documents and written representations is summarised and referenced in this HRA. The reference system used within this HRA follows that used by the ExA’s report.

The RIES and Statutory Consultation

- 1.18 Under the Habitats Regulations and the Offshore Habitats Regulations the competent authority must, for the purposes of an AA, consult the appropriate nature conservation body and have regard to any representation made by that body within such reasonable time as the authority specifies.
- 1.19 Natural England (“NE”) is the Statutory Nature Conservation Body (“SNCB”) for England and for English waters within the 12 nm limit. The Joint Nature Conservation Committee (“JNCC”) is the SNCB beyond 12 nm, but this duty has been discharged by NE following the 2013 Triennial Review of both organisations (Defra, 2013). However, JNCC retains responsibility as the statutory advisor for European Protected sites that are located outside the territorial sea and UK internal waters (i.e. more than 12 nautical miles offshore) and as such continues to provide advice to NE on the significance of any potential impacts on interest features of such sites.
- 1.20 The ExA prepared a RIES, with support from the Planning Inspectorate’s Environmental Services Team. The RIES was based on matrices provided by the Applicant and relevant information provided by Interested Parties. The RIES documented the information received during the examination (up until 17 November 2016) and presented the ExA’s understanding of the main facts regarding the HRA to be carried out by the Secretary of State.

- 1.21 The RIES was published on PINS planning portal website¹ and the ExA notified Interested Parties that it had been published. Consultation on the RIES was undertaken between 17 November and 8 December 2016. The RIES was issued to ensure that Interested Parties, including the SNCBs, were consulted formally on habitat regulations matters, as required under regulation 61(3) of the Habitats Regulations and regulation 25(3) of the Offshore Habitats Regulations.
- 1.22 The Secretary of State is content to accept the ExA's recommendation that the RIES, and consultation on it, represents an appropriate body of information to enable the Secretary of State to fulfil his duties in respect of European sites.

¹<https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/EN010056/EN010056-001447Report%20on%20the%20Implications%20for%20European%20Sites.pdf>

Development Description

2.1 The East Anglia Zone is located in the southern North Sea, about 30 miles off the east coast of East Anglia. The Project will be located north of the previously consented East Anglia ONE.

Development Components

2.2 The Project comprises an offshore wind farm, consisting in total of up to 172 wind turbine generators, with an installed capacity of up to 1,200MW, and all offshore and onshore infrastructure necessary to connect to the national grid. The application is for development consent to construct, operate and maintain the Project.

2.3 The key offshore components of the Project, as outlined in the ES, are as follows:

- Offshore wind turbines and their associated foundations;
- Offshore electrical platforms – up to four collector stations and up to two converter stations supporting some of the windfarm’s electrical equipment, and possibly incorporating offshore facilities (including accommodation) for operation and maintenance of the windfarm.
- Sub-sea cables
 - Inter-array cable: These cables typically link / join / connect wind turbines with each other and with offshore platforms.
 - Platform link cable: Would link or connect two or more offshore platforms within the Project site..
 - Export cable: Usually the cable that joins the last electrical offshore platform with the landfall area.
 - Interconnector cable: The cables would link the Project with East Anglia ONE to allow the transmission of electricity between the two projects when required.
- Fibre optic cables which will be buried along or laid alongside the electrical cables.
- A possible separate accommodation platform with associated foundations.
- Scour protection around foundations and cable protection on inter-array, platform link, interconnection and offshore export sub-sea cables as required.
- Up to two meteorological masts (met masts) and their associated foundations for monitoring wind speeds during the operational phase (additional to measurement met masts within the East Anglia Zone, which are subject to a separate consent application).

- Monitoring equipment including up to two floating Light Detection and Ranging (LiDAR) and two wave buoys.

2.4 The key onshore components of the proposed project, as outlined in the ES, would comprise the following:

- The landfall site with associated transition bays to connect the offshore and onshore cables;
- Up to four onshore electrical cables;
- Up to 62 jointing bay locations each with up to two jointing bays;
- One transition bay location with up to four transition bays containing the connection between the offshore cable and the onshore cable;
- One onshore substation compound (for up to two electrical substations);
- Up to two onshore fibre optic cables; and
- Landscaping and tree planting around the substation location.

2.5 Full details of the infrastructure to be used in the Development are detailed in Schedule 1, Part 1 of the DCO.

2.6 During the Examination the Applicant requested various changes to the Project (outlined in the ExA Report Section 2.2). This included an increase the draught height of 70% of its wind turbine generators (WTG) by 2m [REP5-012]. This was in response to concerns relating to collision risk for certain bird species, which is discussed further in the sections below.

Rochdale Envelope

2.7 The Applicant has adopted a 'Rochdale Envelope' approach within their ES. The Rochdale Envelope is a term used in planning to reflect that often a developer will not know all of the details associated with the proposal at the time of application. The Rochdale Envelope allows the Applicant to set out the broad range of options under consideration and then carry out an ES based on the realistic worst case scenario for each of those options. These options are used within the ES to assess the significance of the Project's environmental effects. This allows the Applicant to apply for a DCO that allows some flexibility in the final design of the Project whilst providing certainty that no greater environmental effects than those described in the ES can occur, providing the final project design lies within the options assessed.

2.8 Within the context of the Rochdale Envelope the application provides for different types of electrical solution technologies, the requirement for offshore substations and different sizes of onshore substations.

2.9 The ES is based on the assessment of the realistic worst case scenario in environmental terms. The Project is however, bound by the DCO application boundary, which sets out areas within which the infrastructure can be located, together with various technical restrictions.

Development stages

Construction

- 2.10 The final construction programme will be submitted to the Marine Management Organisation (“MMO”) under the requirements of the dMLs (Condition 13(1) in Schedules 10 to 13 and Condition 6(1) in Schedules 14 and 15). The Code of Construction Practice, which will detail the onshore programme of construction, will be required under the DCO to be submitted to the Local Planning Authorities for their approval (Requirement 22).
- 2.11 The offshore elements of the Project will be constructed in a single phase or over two phases. Under the Single Phased approach the project would be constructed in one single build period (anticipated to be up to 41 months). Under a two-phased approach each phase would consist of construction up to 600MW. Construction of Phase 2 would commence a maximum of 18 months after the start of onshore construction of Phase 1.

Operation and Maintenance

- 2.12 Once commissioned, the windfarm would operate for up to 25 years. All offshore and onshore infrastructure including wind turbines, foundations, cables and offshore substations would be monitored and maintained during this period in order to maximise operational efficiency and safety for other sea users.

Offshore Decommissioning

- 2.13 Decommissioning for the offshore elements of the project is regulated under the Energy Act 2004. Broadly speaking, under that Act, the Secretary of State has powers to require a person who is responsible for an offshore renewable energy installation to prepare a costed decommissioning programme setting out how the project will be removed and ensure that the programme is carried out. The Secretary of State can approve, modify or reject a decommissioning programme at any point.
- 2.14 It is not possible at this stage to predict with any certainty what the European and Ramsar site context of the Project will be in the future as sites may change over that time. Decommissioning activities will need to comply with all relevant UK legislation at that time. Separate authorisations will also be required as part of decommissioning, after the preparation of an ES and HRA by the authorising body (including appropriate consultation with the relevant SNCBs). Decommissioning plans are included as Requirements 10 and 31 within the DCO for the Project. The DCO also allows the Secretary of State to require the restoration of the offshore works in the case of abandonment or decay. The decommissioning plan will be updated during the project's lifespan to take account of changing best practice and new technologies.
- 2.15 If the environmental baseline were to be similar to the current situation, then the impacts of decommissioning of the Project could be expected to be similar to the anticipated impacts of

construction, without the impacts of piling. On this basis, the Secretary of State considers that it is reasonable not to include a detailed discussion on decommissioning impacts in this report. He is satisfied that decommissioning effects will be addressed fully by the relevant authorities, prior to decommissioning and in light of more detailed information on decommissioning processes and environmental conditions at that time.

Development location and designated sites

Location

3.1 Figure 1 shows the Project location in the southern region of the North Sea. The black line delineates the East Anglia Zone boundary. The Project array and cable route to landfall are indicated in red. The western boundary of the Project is 69km from Lowestoft and the eastern boundary is 101km from the nearest point of the Netherlands coastline. Figure 2 shows the location of the onshore cable route corridor (red line).

Figure 1 Location of the Project within the East Anglia Zone boundary [APP-274]

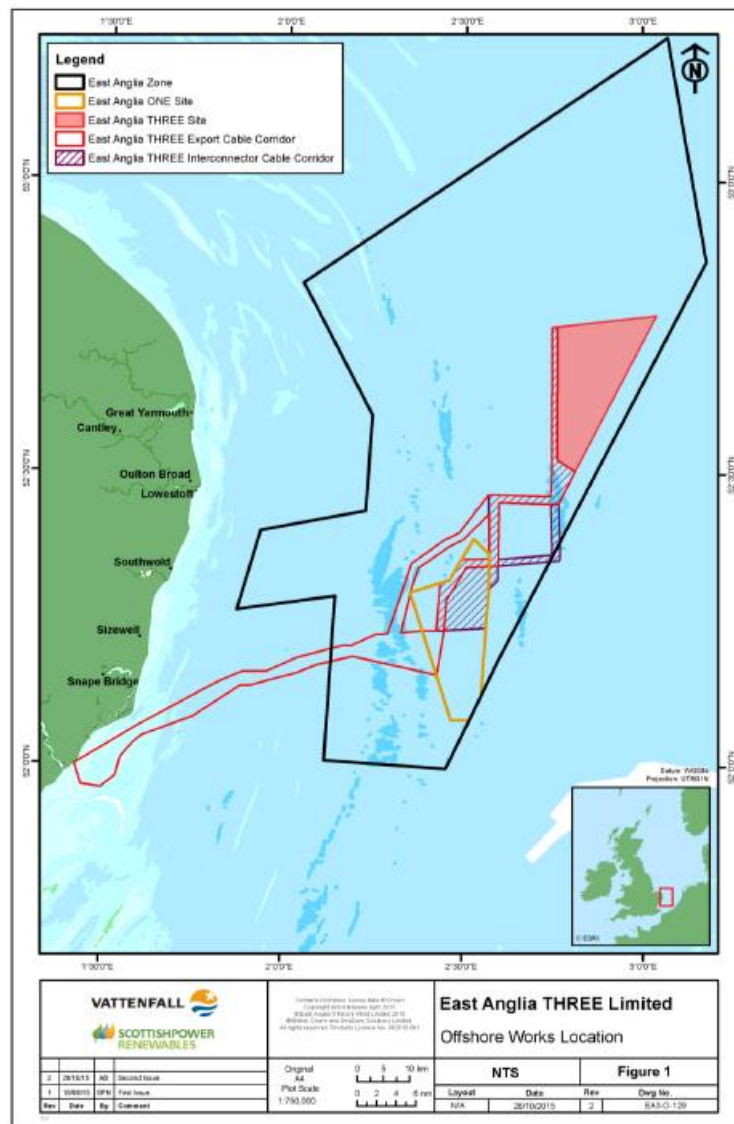
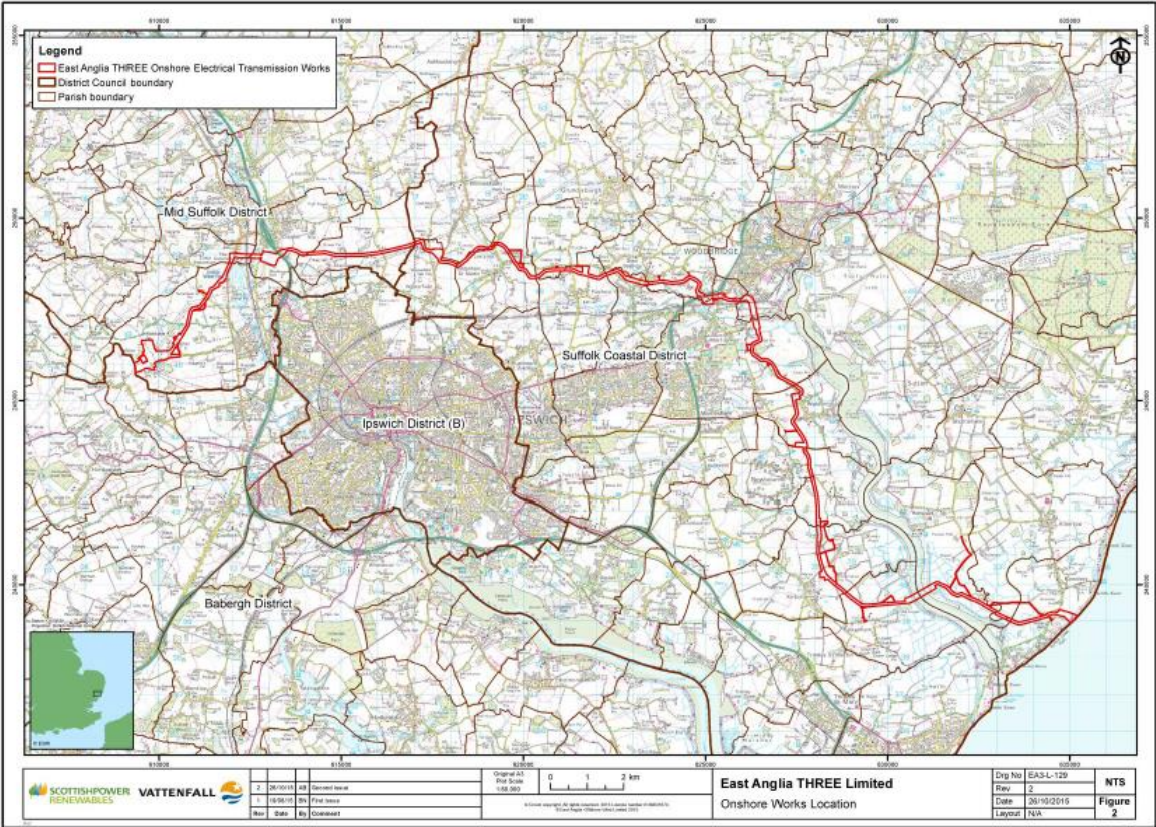


Figure 2: Location of export cable landfall and route through Suffolk from the landfall at Bawdsey to the National Grid substation near Bramford [APP-274]



European and International Sites

- 3.2 The project is not connected with or necessary to the management of nature conservation for any European Site.
- 3.3 The RIES identified the European sites, the likely impacts of the Project on those sites, and mitigation measures as proposed up to the point that the RIES was released for consultation.
- 3.4 Annex 2 of the RIES listed all the UK European Sites considered by the Applicant. The Applicant's Screening Matrices [App-102] also considered the non-UK European sites that could potentially be affected by the Project. Both documents should be referred to view the full list of European sites considered. As no other European sites were identified by Interested Parties during the Examination, the Secretary of State is satisfied that all the relevant European sites have been considered during the Examination of this project.

Likely Significant Effects (“LSE”) Test

- 4.1 Under regulation 61 of the Habitats Regulations and regulation 25 of the Offshore Habitats Regulations, the Secretary of State must consider whether a development is likely to significantly effect any European site, either alone or in-combination with other plans or projects. A LSE is, in this context, any effect that may be reasonably predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excluding trivial or inconsequential effects. An AA is required if a plan or project is likely to have a significant effect on a European site, either alone or in-combination with other plans or projects.
- 4.2 The purpose of this test is to identify LSEs on European sites that may result from the Project and to record the Secretary of State’s conclusions on the need for an AA and his reasons for including activities, sites or plans or projects for further consideration in the AA. For those features where a LSE is identified, these must be subject to an AA. This review of potential implications can be described as a ‘two-tier process’ with the LSE test as the first tier and the review of effects on integrity (AA) as the second tier.
- 4.3 This section addresses this first step of the HRA, for which the Secretary of State has considered the potential impacts of the Project both alone and in-combination with other plans or projects on each of the interest features of the European sites identified in the RIES to determine whether or not significant effects are likely.
- 4.4 Of all the European sites identified during Examination, the Applicant concluded that significant effects were likely for six sites and their qualifying features either alone or in-combination:
- Alde-Ore Estuary SPA and Ramsar site
 - Deben Estuary SPA and Ramsar site
 - Flamborough and Filey Coast pSPA (FFC pSPA)
 - Flamborough Head and Bempton Cliffs SPA (FHBC SPA)
 - Outer Thames SPA/pSPA
 - Southern North Sea cSAC (SNS cSAC)

Likely Significant Effects

- 4.5 The Secretary of State has considered the potential construction and operational impacts of the Project on all relevant interest features to determine whether significant effects are likely in the context of the Habitats and the Offshore Habitats Regulations. As noted the Secretary of State recognises that powers are in place for decommissioning effects to be addressed fully by the relevant authorities, prior to decommissioning and in light of more detailed information on

decommissioning processes and environmental conditions at that time. He therefore considers that it is reasonable not to include a detailed discussion on decommissioning impacts in this report and notes that decommissioning is not a barrier to the development being granted development consent.

Potential Impacts

4.6 The ExA identified that LSEs cannot be excluded due to the following potential impacts:

- Bird collision risk during the operational phase.
- Bird disturbance and displacement during construction and operation.
- Marine mammal disturbance from underwater noise during construction and operation.
- Marine mammal collision risk
- Marine mammal prey impacts

4.7 For each designated site, Table 1 summarises the features for which significant effects cannot be excluded. The reader is invited to refer to the published ExA report and the RIES for information on other sites and features for which there is not likely to be a significant effect. The Secretary of State notes that, at Deadline 7, NE confirmed that *“the RIES has accurately captured our submissions on the Examination of East Anglia THREE and [we] do not have any further submissions to make at this time”* [REP7-023]. For his consideration of LSEs the Secretary of State has considered and adopted the same conclusions as ExA in the RIES for the reasons set out in the RIES.

Table 1 European sites for which significant effects cannot be excluded, when the Project is considered alone or in-combination with plans or projects, on the listed qualifying features (summarised from the ExA's Report and the RIES). In the table "x" indicates that a likely significant effect was identified.

European Site	Features identified as having LSE	Impact Type	LSE Alone	LSE In-Combination
Flamborough and Filey Coast pSPA	Gannet	Collision during the operational phase	x	x
	Kittiwake	Collision during the operational phase	x	x
Flamborough Head and Bempton Cliffs SPA	Kittiwake	Collision during the operational phase	x	x
Outer Thames Estuary SPA and pSPA	Red-throated Diver	Disturbance and displacement during construction and operation	x	x
Deben Bay Estuary SPA and Ramsar site	Dark-bellied Brent Goose	Disturbance during construction	x	x
Alde-Ore Estuary SPA and Ramsar site	Lesser black-backed gull	Collision during the operational phase	x	x
Southern North Sea cSAC	Harbour porpoise	Disturbance from underwater noise during construction and operation; collision risk; and impacts to prey	x	x

- 4.8 While the Secretary of State has adopted the conclusions of the RIES, he notes that the Applicant's consideration of a LSE on the SNS cSAC, due to the potential for harbour porpoise mortality or permanent auditory injury to occur from underwater piling noise, received a high level of attention during the Examination. As such, the Secretary of State has considered the matter in detail, below.
- 4.9 In agreement with NE, The Applicant concluded that there would be no impact once embedded mitigation is applied. Measures to prevent injury will be delivered through the Marine Mammal Mitigation Protocol (MMMP), which is secured in the Condition 13(1)(f) of the dMLs in Schedules 10-13.
- 4.10 The draft MMMP was provided as part of the Application [APP-298]. This document provides a draft protocol, which includes the establishment of an exclusion zone up to 1000m radius (from pile location) before each pile activity and soft-start piling procedures in line with JNCC guidance on piling²³. The final MMMP will be developed in the pre-construction period and will be based upon best available information and mitigation methodologies at that time, in consultation with the relevant authorities.
- 4.11 During the Examination WDC was concerned about the 500 metre exclusion zone, which is recommended distance from pile location in the JNCC guidance. However, in response the Applicant stated that whilst it acknowledges that JNCC guidance includes for a 500m exclusion zone, the Applicant's assessment [APP-120] allowed for and assessed a larger zone of up to 1km.
- 4.12 NE advised that "*measures drafted in the MMMP are in line with current best practice and we do not consider it necessary to recommend no pile driving during construction*" [REP2-018]. Furthermore, the SoCG between the Applicant and NE records that: "*It is agreed by both parties that the draft MMMP will be developed post consent in consultation with Natural England to reflect the most update [sic] advice on appropriate mitigation measures.*"
- 4.13 The Secretary of State notes that the ExA was sufficiently confident to recommend the draft MMMP as a mitigation measure. Having considered all the representations made, the Secretary of State is satisfied that he can rely on the embedded mitigation in the dMMMP to prevent permanent acoustic injury and death and a LSE (alone and in-combination with other plans or projects) can be excluded on this basis. As such, the Secretary of State gives no further consideration to the potential for harbour porpoise death or auditory injury to occur from underwater piling noise within this Appropriate Assessment.

² http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling%20protocol_August%202010.pdf

³ JNCC guidance states that the radius of the mitigation zone should be no less than 500 metres.

Likely Significant Effects: The Project Alone

- 4.14 The Secretary of State agrees with the recommendations of the ExA, and concludes that likely significant effects cannot be excluded at the six sites listed in Table 1, when the Project is considered alone.
- 4.15 These sites are taken forward to the AA to consider whether the Project will result in an adverse effect upon the integrity of these sites.

Likely Significant Effects: In-Combination

- 4.16 Under the Habitats Regulations and the Offshore Habitat Regulations, the Secretary of State is obliged to consider whether other plans or projects in-combination with the Project might affect European sites. In this case there are a number of other plans or projects which could potentially affect some of the same European sites. The approach used by the Applicant to assess in-combination effects was to select projects which may affect the designated site feature under consideration. The plans or projects included in the in-combination assessment include a number of planned and existing offshore wind farms within the vicinity of the Project and a number of projects expected to affect coastal habitats, for example works to extract aggregates, or lay cables or pipelines.
- 4.17 The Secretary of State agrees with the recommendations of the ExA, and concludes that LSEs cannot be excluded at the six sites listed in Table 1 when the impacts of the Project are considered in-combination with other plans or projects. The Examination did not identify any other European sites in which LSEs could not be excluded.
- 4.18 The six sites listed above are taken forward to the AA to consider whether the Project in-combination with other plans or projects will result in an adverse effect upon the integrity of these sites.

Appropriate Assessment

Test for Adverse Effect on Site Integrity

- 5.1 The requirement to undertake an AA is triggered when a competent authority, in this case the Secretary of State, determines that a plan or project is likely to have a significant effect on a European site either alone or in-combination with other plans or projects. Guidance issued by the European Commission states that the purpose of an AA is to determine whether adverse effects on the integrity of the site can be ruled out as a result of the plan or project, either alone or in-combination with other plans or projects, in view of the site's conservation objectives (European Commission, 2001).
- 5.2 The purpose of this AA is to determine whether or not adverse effect on integrity of those sites and features identified during the LSE test can be ruled out as a result of the Project alone or in-combination with other plans or projects in view of the site's conservation objectives and using the best scientific evidence available.
- 5.3 If the competent authority cannot ascertain the absence of an adverse effect on integrity within reasonable scientific doubt, then under the Habitats Regulations and the Offshore Habitats Regulations, alternative solutions should be sought. In the absence of an acceptable alternative, the project can proceed only if there are imperative reasons of overriding public interest ("IROPI") and suitable compensation measures identified. Considerations of IROPI and compensation are beyond the scope of an AA.

Conservation Objectives

- 5.4 Guidance from the European Commission indicates that disturbance to a species or deterioration of a European site must be considered in relation to the integrity of that site and its conservation objectives (European Commission, 2000). Section 4.6.3 of that guidance defines site integrity as:
- ...the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified.*
- 5.5 Conservation objectives outline the desired state for a European site, in terms of the interest features for which it has been designated. If these interest features are being managed in a way which maintains their nature conservation value, they are assessed as being in a 'favourable condition'. An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation (English Nature, 1997).
- 5.6 There are no set thresholds at which impacts on site integrity are considered to be adverse. This is a matter for interpretation on a site-by-site basis, depending on the designated feature and nature, scale and significance of the impact. Conservation objectives have been used by the Secretary of State to consider whether the Project has the potential for having an adverse effect

on integrity, either alone or in-combination. The potential for the Project to have an adverse effect on site integrity is next considered for each site in turn.

Flamborough and Filey Coast potential pSPA

- 6.1 The Flamborough and Filey Coast proposed Special Protection Area (FFC pSPA) is located on the Yorkshire coast between Bridlington and Scarborough. The cliffs of Flamborough Head rise to 135 metres and are composed of chalk and other sedimentary rocks. The site supports large numbers of breeding seabirds including kittiwake, *Rissa tridactyla*, and auks (guillemot, *Uria aalge*; razorbill, *Alca torda*; and puffin, *Fratercula arctica*), as well as the only mainland-breeding colony of gannet, *Morus bassanus*, in the UK. The seabirds feed and raft in the waters around the cliffs, as well as feeding more widely in the North Sea. The intertidal chalk platforms are also used as roosting sites, particularly at low water and notably by juvenile kittiwakes.
- 6.2 This pSPA is a proposed geographical extension to the existing Flamborough Head and Bempton Cliffs (FHBC) SPA and would add several species to the formal citation. The pSPA consists of the following proposed changes to the existing FHBC SPA:
- A landward extension to the north west of the existing site to incorporate important breeding colonies of seabirds.
 - Marine extensions out to 2 km to protect the waters which are important to these species of breeding birds.
 - Modification of the landward boundary such that the features of the pSPA are protected in the future.
- 6.3 The proposals also include changes to the qualifying species such that the qualifying features would now be:
- (i) In the breeding season:
- *Morus bassanus* Northern gannet
 - *Rissa tridactyla* Black-legged kittiwake
 - *Uria aalge* Common guillemot
 - *Alca torda* Razorbill
- (ii) Seabird assemblage in the breeding season of 215,750 birds including black-legged kittiwake, northern gannet, common guillemot, razorbill, northern fulmar, great cormorant, European shag, herring gull and Atlantic puffin.
- 6.4 Formal consultation on the FFC pSPA was completed on 14 April 2014. The site is currently in the process of being classified as a SPA under the provisions of the Birds Directive. The proposals for the FFC pSPA comprise changes to the FHBC site boundary; the FFC pSPA covers 8,039.60ha across areas in the East Riding of Yorkshire, North Yorkshire and Scarborough, of which the marine extension covers 7,471.78ha.
- 6.5 It is Government policy to treat pSPAs as if they were a fully designated European site under the Habitats Regulations. As such, the Secretary of State considers it necessary to consider the potential impacts of the Project, both alone and in-combination with other plans or projects, upon this potential site.

6.6 NE published draft conservation objectives for FFC pSPA in November 2015⁴. These are set out in Table 2 below.

Table 2 Draft conservation Objectives for Flamborough and Filey Coast pSPA

Conservation Objectives	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • 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 population of each of the qualifying features, and, • The distribution of the qualifying features within the site.
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6.7 The Secretary of State has considered the potential for the Project to constitute an adverse effect on site integrity for each feature for which a significant effect is likely.

Northern Gannet

Alone assessment

- 6.8 A LSE upon the gannet interest feature of the FFC pSPA was identified because of the potential for the Project alone to introduce the risk of collision mortality during the operational phase.
- 6.9 There is a potential risk of collision with the wind turbine rotors and associated infrastructure resulting in injury or fatality to birds which fly through the Project site whilst foraging for food and commuting between breeding sites and foraging areas [APP-121].
- 6.10 To inform an Appropriate Assessment the Applicant undertook collision risk modelling (CRM) and presented the results in the HRA report [APP-101]. Collision risk models incorporate a range of parameters, such as bird flight height and calculated avoidance rate. Using a 0.989 avoidance rate (Cook *et al.* 2014), two model outputs were produced: one that incorporated site specific flight height data and, alternatively, one that incorporated generic flight heights. The two approaches are described as Band Option 1 and Band Option 2, respectively, in Band (2000, 2012).
- 6.11 Using Band Option 1, collision mortality at the Project site was estimated to be 11 birds in spring migration (December – March), 7 in the breeding season (April to August) and 38 in autumn migration (September – November). This gave an annual total of 56 birds. Using Band Option 2, collision mortality was estimated to be slightly higher, at 16 birds in spring, 9 birds in the breeding season and 55 birds in autumn, giving a total of 80 birds.
- 6.12 Estimates of the proportion of birds present in the Project site that originated from FFC pSPA during the breeding season and on migration in autumn and spring were calculated, using methods presented in Furness (2015) and the updated colony estimates in Murray *et al.* (2015). For the assessment of breeding season impacts, the Applicant assumed that all birds present on

⁴ <http://publications.naturalengland.org.uk/publication/5511099672690688>

the Project site originated from FFC pSPA. For autumn and spring migration periods, the Applicant calculated that 4.2% and 5.6% (respectively) of the birds observed were predicted to originate from FFC pSPA.

- 6.13 Applying these percentages to the collision estimates, above, gave the following mortality estimates:

Band Option 1

(Breeding season = 7) + (Autumn Migration = 1.6) + (Spring Migration = 0.62) = **9.22**

Band Option 2

(Breeding season = 9) + (Autumn Migration = 2.31) + (Spring Migration = 0.9) = **12.21**

- 6.14 The Applicant's HRA described this impact in the context of the FFC pSPA gannet population (11,061 pairs). The Applicant asserted that population modelling of the FFC pSPA (MacArthur Green 2015) indicated that, for either Band option, the estimated mortality (due to the Project alone) would have no detectable effect on the population.

- 6.15 On this basis, the Applicant assessed that there would be no adverse effect on the gannet feature of the FFC pSPA due to the project alone. Natural England agreed with the Applicant that "*there is likely to be no adverse effect on integrity the FFC pSPA due to the EA3 project alone*" [RR-003].

- 6.16 The RSPB, however, raised a number of concerns in relation to the above assessment. A full account of these concerns is given in the RSPBs written representations [REP2-023]. In summary the RSPB challenged the following parameters in the Applicant's assessment of collision risk:

- The use of a 0.989 avoidance rate in the breeding season
- The use of Band Option 1
- An assumption by the Applicant that collision risk estimates are overestimates

- 6.17 Notwithstanding the above concerns, the RSPB considered that, overall, collision risk could be reduced if the Applicant were to raise the draught height of the Project's wind turbine generators (WTG). The Applicant stood by the parameters used for CRM (on the basis that they had been agreed with NE at the Evidence Plan stage) [REP3-005], but made a commitment to increase the Wind (WTG) draught height by 2 metres in 70% of the WTGs to reduce the collision risk. This change has been secured in Requirement 2(2) of the DCO and Condition 1(2) of the generation assets dMLs in Schedules 10 and 11 of the DCO.

- 6.18 Having secured this change to the project design, the Applicant produced new collision mortality estimates to demonstrate the resultant reduced collision risk [REP5-026]. For example, using Band Option 1, the Applicant calculated that the annual collision mortality estimate for the entire Project would be reduced from 56 to 49 birds.

- 6.19 The RSPB did not comment on this reduction specifically in relation to the Applicants assessment for the Project alone. However, the Secretary of State notes that the RSPB stated that its

concerns in relation to the in-combination assessment for gannet (an altogether larger impact, see below) were reduced due to the Applicant's commitment to increase WTG draught height by 2m in 70% of WTGs [REP5-005].

- 6.20 Given the reduction in collision risk mortality identified during the Examination by the Applicant, and the positions taken by NE and the RSPB, the ExA was content to recommend that the effects from the Project alone on the gannet qualifying feature are such that an adverse effect on integrity on the FFC pSPA would be avoided.

Conclusions

- 6.21 The Secretary of State recognises the methodological disagreements between the RSPB and the Applicant. He has considered the representations made by the Applicant, NE and the RSPB and the recommendation as made by the ExA. The Secretary of State is satisfied that the potential increased gannet collision mortality as a result of the Project alone would not represent an adverse effect upon the integrity of the FFC pSPA. For this conclusion he places particular weight on the advice of NE and the significance of the impact in the context of the current gannet population supported by the FFC pSPA.

In-combination assessment

- 6.22 A likely significant effect upon the gannet interest feature of the FFC pSPA was identified because of the potential for the Project, in-combination with other plans or projects, to increase the risk of collision mortality.
- 6.23 The following projects were considered in the Applicant's in-combination assessment [APP-101]:

- Beatrice Demonstrator
- Greater Gabbard
- Gunfleet Sands
- Kentish Flats
- Lincs
- London Array
- Lynn and Inner Dowsing
- Scroby Sands
- Sheringham Shoal
- Teesside
- Thanet
- Humber Gateway
- Westermost Rough
- Beatrice
- Blyth (NaREC Demonstration)
- Dogger Bank Creyke Beck A & B
- Dudgeon
- East Anglia ONE
- EOWDC (Aberdeen OWF)
- Firth of Forth Alpha and Bravo
- Galloper
- Hornsea Project 1
- Inch Cape
- Moray Firth
- Neart na Goithe
- Race Bank
- Rampion
- Dogger Bank Teesside A & B
- Triton Knoll
- Horsea Project 2
- East Anglia THREE

- 6.24 The Applicant presented estimated collision mortalities for each project using Band Options 1 or 2 (depending on what has previously been presented) and a 0.989 avoidance rate [APP-101]. These estimates were updated at Deadline 2 to reflect revisions to the Hornsea Project 2 ornithology assessments, which were made after the Project application had been submitted [REP2-053] The updated estimates gave a cumulative collision mortality total of 2998.5 (271.6 birds in spring migration (December – March), 2003.2 in breeding season (April to August) and 723.7 in autumn migration (September – November)). From this, the Applicant apportioned 182 to the FFC pSPA (12.4 for spring, 25.2 for autumn and 144.3 for the breeding season).
- 6.25 The Applicant's HRA discussed the collision risk mortality estimates in the context of population modelling outputs from a Population Viability Analysis (PVA), which was undertaken during the Hornsea Project 2 Examination, (MacArthur Green 2015) and a Potential Biological Removal (PBR) calculation, which was undertaken for East Anglia ONE (EA1). The Applicant asserted that, at the level of mortality estimated, the FFC pSPA population would still be expected to grow. Furthermore, the Applicant identified that PBR thresholds, previously accepted by NE for other offshore wind farm projects, were larger than the current in-combination total.
- 6.26 The Applicant's HRA went on to describe how the collision risk estimate values could be overly precautionary because an apparent lower risk of collision at night for this species had not been accounted for.
- 6.27 The Applicant stated that, on this basis, it is "*reasonable to assess that there will be no adverse effect on the integrity of Flamborough and Filey Coast pSPA as a result of gannet collisions at the proposed East Anglia THREE project in-combination with other projects*".
- 6.28 NE and RSPB did not agree with this conclusion, as both organisations raised concerns in relation the Applicant's assessment of population level impact. Taking into account the findings of a recent report by the British Trust for Ornithology (Cook & Robinson 2015) NE stated that it no longer advocated the use of PBR modelling for such an assessment and asked the Applicant to provide an updated PVA [RR-003; REP2-017].
- 6.29 The Applicant questioned the need to undertake further population modelling, given that such modelling was presented during the Hornsea Project II Examination. In the Applicant's view, additional mortalities from the Project attributable to the FFC pSPA would not affect the conclusions of the previous assessment [REP2-053].
- 6.30 The RSPB supported NE's general position on PBR and, separately, raised a number of other concerns in relation to the parameters used in the Applicant's gannet in-combination assessment [REP2-023]. In the RSPB's view, use of the Applicant's preferred CRM parameters would result in the contribution of the Project to the in-combination total being underestimated.
- 6.31 The RSPB maintained "residual concerns" about the approach and scientific procedures used in the Applicant's assessment. However, as the Examination progressed, the RSPB's concerns regarding the overall significance of an in-combination impact reduced [REP5-005].

- 6.32 As described in paragraph above, during the Examination the Applicant made a commitment to increase the Wind (WTG) draught height by 2 metres in 70% of the WTGs. For the purposes of the in-combination assessment, the Applicant also informed the ExA of a planned reduction in WTG at the already consent EA1.
- 6.33 This reduction was made possible through an EA1 non-material change application that was approved in March 2016 and which amended the original 2014 EA1 DCO to allow for the construction of a 750MW wind farm with a High Voltage Alternating Current (HVAC) comprising up to 150 WTGs. Under Requirement 35 of the EA1 DCO, prior to construction, the undertaker must give written notice to the Secretary of State, the MMO and the relevant planning authority, detailing whether it intends to construct using HVAC technology or with the originally consented High Voltage Direct Current (HVDC) technology. Once notice is given, the undertaker must construct using either, wholly, the HVAC option or the HVDC option.
- 6.34 On 16th September 2016, East Anglia One Limited wrote to the Secretary of State, the MMO and relevant authorities to provide notification that the HVAC technology had been selected and, further, that the windfarm would be constructed using 102 x 7MW turbines. On providing such notification, the right to revert to a 1,200MW HVDC project fell away. Therefore the effect of the notification was to reduce the maximum number of wind turbines for the East Anglia ONE wind farm from 240 to 150 turbines.
- 6.35 There was a discussion between the ExA and the Applicant at the second Environmental Matters Issue Specific Hearing [REP6-017] regarding the legal status of the statement referring to 102 turbines, as the HVAC option for EA1 allowed for “a gross electrical output capacity of up to 750MW comprising up to 150 wind turbine generators.” The Applicant stressed that the commercial reality is that a contract for 102 turbines has been entered into by EA1 with a supplier and only 102 turbines will be constructed.
- 6.36 Notwithstanding this, the Applicant provided several updates to the CRM assessment [REP4-011; REP5-026; REP6-044]. Table 3 summarises the final updated in-combination assessment for a range of developmental scenarios [REP6-044]. Alongside the in-combination mortality figure calculated for all offshore wind farm projects consented up to Hornsea Project 2, the Applicant also produced annual in-combination totals for both 150 WTGs and 102 WTGs scenarios at EA1.

Table 3 Summary of annual total in-combination mortality for the breeding gannet feature of the FFC SPA by scenario [REP6-044]

In-combination consented total up to and including Hornsea Project 2			In-combination consented total up to and including revised EA3 estimates (with 102 WTG)	In-combination consented total up to and including revised EA3 estimates (with 150 WTG)
With original consented EA1	With 102 WTG EA1 estimates	With 150 WTG EA1 estimates		

estimates				
173	165.2	168.2	173	176.3

- 6.37 Following this submission, the ExA asked NE to consider the in-combination assessment on the basis that up to 150 WTGs could be constructed under the EA1 DCO. NE's final position on this was provided in an updated SoCG with the Applicant [REP7-023]: *“NE advises that there is no Adverse Effect on Integrity (AEoI) and no significant effect (EIA) for the project alone. However, it is not possible to rule out significant effects to gannet when considered cumulatively, but NE agrees that due to the revised East Anglia THREE design (i.e. increase in draught height) and the reduction of the contribution to the cumulative total from East Anglia ONE (due to the adoption of the smaller HVAC wind farm), the total cumulative impact is now smaller than the consented position as of the Hornsea 2 consent. Given the above NE has no further concerns.”*
- 6.38 The reductions in collision risk mortality identified during the Examination by the Applicant, and the positions taken by NE and the RSPB, led the ExA to conclude that the in-combination effects on the gannet qualifying features of the pSPA would not be great enough to lead to an adverse effect on the integrity of the site. The ExA arrived at this conclusion by considering the Applicant's decision to raise the draught height of 70% of the WTG by 2m, together with the secured reduction of WTG at EA1 from an original maximum of 240 to a maximum of 150.

Conclusions

- 6.39 The Secretary of State recognises the residual methodological disagreements between the parties and welcomes the reduction in collision risk estimates presented during the Examination. He has considered the representations made by the Applicant, NE and the RSPB and the recommendation as made by the ExA. The Secretary of State is satisfied that, the potential increased gannet collision mortality as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the FFC pSPA. For this conclusion he acknowledges the limitations of the population models referred to in the Applicant's assessment, but has regard to their indicative outputs. He places particular weight on the Applicant's decision to raise the draught height of 70% of the WTG by 2m, together with the secured reduction of WTG at EA1 from an original maximum of 240 to a maximum of 150.

Black-legged Kittiwake

Alone assessment

- 6.40 A LSE upon the kittiwake interest feature of the FFC pSPA was identified because of the potential for the Project alone to increase the risk of collision mortality during the operational phase.
- 6.41 To inform an Appropriate Assessment the Applicant undertook collision risk modelling (CRM) using Band Option 1 and an avoidance rate of 0.989. Collision mortality at the Project site was estimated to be 49 birds in spring migration (December – March), 8 in the breeding season (April to August) and 90 in autumn migration (September – November). This gave an annual total of 147 birds.
- 6.42 Estimates of the proportion of birds present in the Project site that originated from FFC pSPA during the breeding season and on migration in autumn and spring were calculated, using methods presented in Furness (2015). For the assessment of breeding season impacts, the Applicant assumed that 16.8% of birds present on the Project site originated from FFC pSPA. For autumn and spring migration periods, the Applicant calculated that 8.2%⁵ and 5.4% (respectively) of the birds observed were predicted to originate from FFC pSPA.
- 6.43 Applying these percentages to the collision estimates, above, gave the following mortality estimates:
- (Breeding season = 1.3) + (Autumn Migration = 4.86) + (Spring Migration = 4.02) = **10.18**
- 6.44 The Applicant's HRA described this impact in the context of the FFC pSPA kittiwake population (37,618 pairs). The Applicant asserted that this level of additional mortality would have no impact on the population. The Applicant also considered this to be the case if even in view of higher collision estimates derived from Band Option 2 outputs.
- 6.45 On this basis, the Applicant assessed that there would be no adverse effect on the Kittiwake feature of the FFC pSPA due to the project alone. Natural England agreed with the Applicant that "*the impacts from the project alone will not have an adverse effect on the integrity of Flamborough and Filey Coast pSPA.*" [RR-003].
- 6.46 The RSPB, however, raised a number of concerns in relation to the above assessment. A full account of these concerns is given in the RSPBs written representations [REP2-023]. In summary the RSPB challenged the following parameters in the Applicant's assessment of collision risk:
- The use of Band Option 1
 - An assumption by the Applicant that collision risk estimates are overestimates

⁵ The Applicant's HRA [APP-101] gives this percentage as 7.2% but this was updated to 8.2% in a response to the Section 56 Consultation [REP2-053].

- 6.47 Notwithstanding the above concerns, the RSPB considered that, overall, collision risk could be reduced if the Applicant were to raise the draught height of the Project's wind turbine generators (WTG).
- 6.48 As described above, the Applicant secured this change to the project design and produced new collision mortality estimates to reflect the resultant reduction in collision risk [REP5-026]. For example, using Band Option 1, the Applicant calculated that the annual collision mortality estimate for the entire project would be reduced from 147 to 112 birds.
- 6.49 The RSPB did not comment on this reduction specifically in relation to the Applicants assessment for the Project alone. However, the Secretary of State notes that the RSPB stated that its concerns in relation to the in-combination assessment for kittiwake (an altogether larger impact) were reduced due to the Applicant's commitment to increase WTG draught height by 2m in 70% of WTGs [REP5-005].
- 6.50 Given the reduction in collision risk mortality identified during the Examination by the Applicant, and the positions taken by NE and the RSPB, the ExA was content to recommend that the effects from the Project alone on the kittiwake qualifying feature are such that an adverse effect on integrity on the FFC pSPA would be avoided.

Conclusions

- 6.51 The Secretary of State recognises the methodological disagreements between the RSPB and the Applicant. He has considered the representations made by the Applicant, NE and the RSPB and the recommendation as made by the ExA. The Secretary of State is satisfied that the potential increased kittiwake collision mortality as a result of the Project alone would not represent an adverse effect upon the integrity of the FFC pSPA. For this conclusion he places particular weight on the advice of NE and the significance of the impact in the context of the kittiwake population supported by the FFC pSPA.

In-combination assessment

- 6.52 A likely significant effect upon the kittiwake interest feature of the FFC pSPA was identified because of the potential for the Project, in-combination with other plans or projects, to increase the risk of collision
- 6.53 The Applicant's in-combination assessment considered the same projects as listed above for gannet (paragraph 6.23).
- 6.54 The Applicant presented estimated collision mortalities for each project using Band Options 1 or 2 (depending on what has previously been presented by each project) and a 0.989 avoidance rate [APP-101]. These estimates were updated at Deadline 2 to reflect revisions to the Hornsea Project 2 ornithology assessments, which had occurred after Project application had been submitted [REP2-053]. The updated estimates gave a collision mortality in-combination total of 332 (84.5 birds in spring migration (December – March), 165.7 in breeding season (April to August) and 81.8 in autumn migration (September – November)).

- 6.55 The Applicant’s HRA discussed the collision risk mortality estimates in the context of population modelling outputs from a Population Viability Analysis (PVA), which was undertaken during the Hornsea Project 2 Examination (MacArthur Green 2015). The Applicant also referenced a Potential Biological Removal (PBR) calculation, which was undertaken for Hornsea Project 1. The Applicant asserted that, at the level of mortality estimated, there would be a reduced median population growth rate, but of a magnitude that would generate only a small risk to the population’s conservation objectives. Furthermore, the Applicant identified the PBR threshold, previously accepted by NE (512 adult breeding birds), was larger than the current in-combination total.
- 6.56 The Applicant’s HRA went on to describe how the collision risk estimate values could be overly precautionous because an apparent lower risk of collision at night for this species had not been accounted for.
- 6.57 The Applicant stated that, on this basis, it is reasonable to conclude that *“there will be no adverse effect on the integrity of Flamborough and Filey Coast pSPA as a result of kittiwake collisions at the proposed East Anglia THREE project in combination with other projects.”*
- 6.58 The RSPB did not agree with this position, and its written representation raised several specific concerns in relation to the parameters and assumptions used in the Applicant’s kittiwake in-combination assessment.
- 6.59 The RSPB maintained “residual concerns” about the approach and scientific procedures used in the Applicant’s assessment. However, as the Examination progressed, the RSPB’s concerns regarding the overall significance of an in-combination impact reduced [REP5-005].
- 6.60 As described above, during the Examination the Applicant made a commitment to increase the Wind (WTG) draught height by 2 metres in 70% of the WTGs and informed the ExA of a planned reduction in WTG at the already consented EA1.
- 6.61 Table 4 summarises the final updated in-combination mortality assessment for a range of developmental scenarios [REP6-044]. Alongside the in-combination mortality figure calculated for all offshore wind farm projects consented up to Hornsea Project 2, the Applicant also produced annual in-combination totals for both 150 WTGs at EA1 and 102 WTGs scenarios at EA1.

Table 4 Summary of annual total in-combination mortality for the breeding kittiwake feature of the FFC SPA by scenario [REP6-044]

In-combination consented total up to and including Hornsea Project 2			In-combination consented total up to and including revised EA3 estimates (with 102 WTG)	In-combination consented total up to and including revised EA3 estimates (with 150 WTG)
With original consented EA1 estimates	With 102 WTG EA1 estimates	With 150 WTG EA1 estimates		

322	311.6	315.4	320	323.2
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6.62 Following this submission, the ExA asked NE to consider the in-combination assessment on the basis that up to 150 WTGs could be constructed under the EA1 DCO. NE's final position on this was provided in an updated SoCG with the Applicant [REP7-023]: NE advised that *"the EA3 contribution while not de minimis is so small as to not materially alter the significance or the likelihood of an adverse effect on the integrity of the SPA.*

6.63 The reductions in collision risk mortality identified during the Examination by the Applicant, and the positions taken by NE and the RSPB, led the ExA to conclude that the in-combination effects on the kittiwake qualifying features of the pSPA would not be great enough to lead to an adverse effect on the integrity of the site. The ExA arrived at this conclusion by considering the Applicant's decision to raise the draught height of 70% of the WTG by 2m, together with the secured reduction of WTG at EA1 from an original maximum of 240 to a maximum of 150.

Conclusions

6.64 The Secretary of State recognises the residual methodological disagreements between the parties and welcomes the reduction in collision risk estimates presented during the Examination. He has considered the representations made by the Applicant, NE and the RSPB and the recommendation as made by the ExA. The Secretary of State is satisfied that, the potential increased kittiwake collision mortality as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the FFC pSPA. For this conclusion he acknowledges the limitations of the population models referred to in the Applicant's assessment, but has regard to their indicative outputs. He places particular weight on the Applicant's decision to raise the draught height of 70% of the WTG by 2m, together with the secured reduction of WTG at EA1 from an original maximum of 240 to a maximum of 150.

Overall Conclusion on the FFC pSPA

6.65 The Secretary of State is satisfied that the Project alone and in-combination with other plans or projects would not represent an adverse effect upon the integrity of the FFC pSPA.

Flamborough Head and Bempton Cliffs SPA

- 7.1 Flamborough Head is located on the central Yorkshire coast of eastern England. The site supports large numbers of breeding seabirds including kittiwake and auks, as well as the only mainland-breeding colony of gannet in the UK. The seabirds feed and raft in the waters around the cliffs, outside the SPA, as well as feeding more widely in the North Sea. The intertidal chalk platforms are also used as roosting sites, particularly at low water and notably by juvenile kittiwakes.
- 7.1. The conservation objectives for FHBC SPA are the same as the conservation objectives for FFC pSPA. These are set out in Table 5 below.

Table 5 Conservation Objectives for Flamborough Head and Bempton Cliffs SPA

Conservation Objectives	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • 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 population of each of the qualifying features, and, • The distribution of the qualifying features within the site.
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- 7.2. The Conservation Objectives available on the NE website lists breeding black-legged kittiwake *Rissa tridactyla* as the only feature⁶.
- 7.3. A LSE upon the kittiwake feature of the FHBC SPA was identified because of potential for the Project, both alone and in-combination with other plans or projects, to increase the risk of collision mortality during the operational phase.
- 7.4. NE state that the advice provided on the FFC pSPA also applies to the FHBC SPA [RR-0031]. The Applicant’s HRA report [APP-101] provided an assessment on adverse effects on site integrity for the qualifying features of the FFC pSPA, but during Examination, at the request of the ExA, the Applicant provided screening and integrity matrixes for both the FFC pSPA and the FHBC SPA. The ExA’s recommendations considered the implications for both sites together (see section 6).
- 7.5. The Secretary of State’s assessment for the FFC pSPA has considered in detail the impact upon the kittiwake feature of both the FFC pSPA and the FHBC SPA. Given the overlap of the interest feature between the two sites, the Secretary of State considers that there is no requirement to repeat the assessment of the impacts of the Project for the features of the FHBC SPA. For a detailed assessment of the impacts, please refer to section 6.

⁶ <http://publications.naturalengland.org.uk/publication/5400434877399040>

7.6. On the basis of the analysis and conclusions reached in section 6, the Secretary of State is satisfied that the Project, when considered both alone and in-combination with other plans or projects, will not have an adverse effect upon the integrity of the FHBC SPA.

Alde-Ore Estuary SPA and Ramsar

- 8.1. The Alde-Ore Estuary SPA and Ramsar site covers 2,417 ha and is located on and around the Suffolk coast. It 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 also includes the Alde-Ore Estuary SSSI, which was notified in 1952, with the SSSI boundary being coincident with that of the SPA and Ramsar sites. The shingle and saline lagoon habitats of the SSSI comprise the Orfordness to Shingle Street SAC, while its estuary habitats comprise the Alde, Ore and Butley Estuaries SAC. The SPA/Ramsar site also forms part of the Alde-Ore and Butley European Marine Site.
- 8.2. There are a variety of habitats within the site, including intertidal mud-flats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and semi-intensified grazing marsh. The Orfordness/Shingle Street land form is geomorphologically unique within the UK in combining a shingle spit with a cusped foreland. 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/Ramsar site⁷.
- 8.3. The Suffolk Wildlife Trust, the National Trust and the RSPB have nature reserves within the SPA/Ramsar.
- 8.4. The qualifying features for the site are⁸:
- *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
 - *Recurvirostra avosetta*; Pied avocet (Non-breeding)
 - *Recurvirostra avosetta*; Pied avocet (Breeding)
 - *Philomachus pugnax*; Ruff (Non-breeding)
 - *Tringa totanus*; Common redshank (Non-breeding)
 - *Larus fuscus*; Lesser black-backed gull (Breeding)
 - *Sterna sandvicensis*; Sandwich tern (Breeding)
 - *Sterna albifrons*; Little tern (Breeding)

⁷ <http://jncc.defra.gov.uk/page-2010>

⁸ <http://publications.naturalengland.org.uk/publication/5170168510545920>

8.5. The conservation objectives of the site are as set out in Table 6:

Table 6 Conservation Objectives for the Alde-Ore Estuary SPA

Conservation Objectives	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • 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 population of each of the qualifying features, and, • The distribution of the qualifying features within the site.
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8.6. As described in section 4, a LSE upon the lesser black-backed gull interest feature of the Alde-Ore Estuary SPA and Ramsar was identified because of the potential for increased collision risk from the Project alone and in-combination with other plans or projects.

Alone assessment

8.7. To inform the Appropriate Assessment the Applicant undertook CRM using both Band Option 1 and Band Option 2 with an avoidance rate of 0.995 [App-101]. Table 7 shows the calculated annual on-site lesser black-backed gull collision mortality by month.

Table 7 Band Option 1 (site-specific flight heights) and Option 2 (generic flight heights) collision risk estimates for lesser black-backed gull per month.

Month	Collisions	
	Option 1	Option 2
January	1	1
February	0	0
March	0	0
April	2	1
May	2	1
June	2	1
July	0	0
August	7	4
September	4	2
October	0	0
November	2	1

December	0	0
Total	20	11

8.8. The Applicant stated that, in agreement with Natural England, collision risk estimates were calculated using generic flight heights (Band Option 2), owing to the small numbers of this species found at the Project site. Using Band option 2, only 2 collisions were predicted during the migration-free breeding season. On the basis of the seasonal percentages of Alde-Ore SPA birds predicted to be on the Project site, the attributable mortality using option 2 figures were calculated to be:

- Autumn (August-October): $6 \times 3.3\% = 0.198$ birds
- Winter (November-February): $2 \times 10\% = 0.2$ birds
- Spring (March-April): $1 \times 3.3\% = 0.033$ birds
- Migration-free breeding season (May-July): $2 \times 10\% = 0.2$ birds
- Total for Alde-Ore SPA = 0.63 birds

8.9. The Applicant stated that Natural mortality for the SPA population (assuming approximately 6,666 birds of all ages) would be around 940 individuals per year, an average mortality rate of 14.10% (using immature and adult survival rates from Horswill and Robinson (2015)). A total additional mortality of 0.63 birds due to collisions at the Project site would increase this to 14.11%, an increase of 0.07%. Following an approach adopted by NE for recent assessments (e.g. Natural England, 2014), an increase in mortality of less than 1% is considered to be undetectable against the range of background variation.

8.10. On this basis, the Applicant concluded: *“It is, therefore, reasonable to conclude that there will be no adverse effect on the integrity of the Alde-Ore Estuary SPA as a result of lesser black-backed gull collisions at the proposed East Anglia THREE project alone.”* [App-101].

8.11. NE confirmed in its RR [RR-003] that it agreed that it was reasonable to conclude that there would be no adverse effects on the Alde-Ore Estuary SPA from collisions at the Project site alone. The RSPB in its SoCG with the Applicant [REP2-049] stated that it agreed that the Project alone has no adverse effects on the integrity of the Alde-Ore Estuary SPA and Ramsar site. The ExA was also satisfied that, taking the relevant conservation objectives into account, an adverse effect on the integrity of the Alde-Ore Estuary SPA and Ramsar site can be excluded when considering the Project alone.

Conclusion

8.12. The Secretary of State has considered the representations made by the Applicant, NE and the RSPB and the recommendation as made by the ExA. He agrees that the predicted additional collision mortality would be undetectable against background variation. The Secretary of State is, therefore, satisfied that the potential increased lesser black-backed gull collision mortality as a

result of the Project alone would not represent an adverse effect upon the integrity of the Alde-Ore Estuary SPA.

In-combination assessment

- 8.13. The Applicant's in-combination assessment considered the same projects as listed above for gannet and kittiwake features of the FFC pSPA (see paragraph 6.23).
- 8.14. As described above, the Applicant calculated the annual collision risk mortality total to be 0.63 birds. However, the combined annual mortality was calculated to be 997. This is expected to increase annual mortality rate from 14.10% to 14.97%.
- 8.15. The HRA report went on to discuss the Secretary of State's (for Energy and Climate Change) conclusions on the EA1 wind farm, together with subsequent changes to the avoidance rate since the EA1 calculations. The Applicant concluded that the contribution of the Project was so small as to not materially alter the overall in-combination mortality figure or the likelihood of an adverse effect on the integrity of the Alde-Ore Estuary SPA and Ramsar site.
- 8.16. As described for the FFC pSPA/FHBC SPA above, the Applicant provided an updated CRM at D4 [REP4-011] and revised CRM at D5 [REP5-026] on the basis of a proposed reduction in WTG to be installed at the consented EA1 offshore wind farm and a change to the design of the Project. These included revised cumulative figures for the lesser black-backed gull in respect of the Applicant's EIA assessment. The revised CRM for EIA concluded that for lesser black-backed gull, the updated cumulative totals including EA3 are lower than those used to support the most recently consented Hornsea Project Two offshore wind farm.
- 8.17. NE [REP4-029] had commented during the Examination on a discrepancy between the cumulative totals used by the Applicant. In Section 3 of the revised CRM [REP5-026] the Applicant provided its reasoning for the difference in cumulative numbers. For clarity, the Applicant also provided tables of cumulative numbers as Appendix 2 to the revised CRM [REP5-026]; these included Table A2.3 in respect of the lesser black-backed gull, including those apportioned to the Alde-Ore Estuary SPA.
- 8.18. Appendix 3 of the revised CRM [REP5-026] presented a table of monthly and annual lesser black-backed gull mortality using Band Option 1 and for three different avoidance rates, for 150 WTGs at the EA1 site.
- 8.19. NE confirmed both in respect of the Applicant's updated CRM issued at D4 and revised CRM at D5, that it acknowledged that (subject to the reductions in the EA1 design being legally binding) the updated cumulative totals including the Project were lower than the totals used to support the most recently consented Hornsea Project Two offshore wind farm [REP4-029 and REP5-010]. No specific comments were made in relation to the Applicant's HRA. However, the updated SoCG between the Applicant and NE submitted for D7 [REP7-023] stated the agreed position that the Project alone and in-combination would have no adverse effects on the integrity of the Alde-Ore Estuary SPA and Ramsar. The updated RSPB SoCG also stated the RSPB's position that it

agrees that the Project alone and in combination would have no adverse effects on the integrity of the Alde-Ore Estuary SPA and Ramsar site.

- 8.20. The reductions in collision risk mortality identified during the Examination by the Applicant, and the positions taken by NE and the RSPB, lead the ExA to conclude that the in-combination effects on the lesser black-backed gull qualifying features of the SPA would not be great enough to lead to an adverse effect on the integrity of the site.

Conclusions

- 8.21. The Secretary of State is satisfied that, the potential increased lesser black-backed gull collision mortality as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the Alde-Ore Estuary SPA and Ramsar.

Overall Conclusion on the Alde-Ore Estuary SPA and Ramsar

- 8.22. The Secretary of State is satisfied that the Project alone and in-combination with other plans or projects would not represent an adverse effect upon the integrity of the Alde-Ore Estuary SPA and Ramsar.

The Deben Estuary SPA and Ramsar

- 9.1. The Deben Estuary is located on the coast of Suffolk in eastern England. It extends south-eastwards for over 12 km from the town of Woodbridge to the sea just north of Felixstowe. It is relatively narrow and sheltered, and has limited amounts of freshwater input. The estuary mouth is the narrowest section and is protected by the presence of shifting sandbanks. The intertidal areas are constrained by sea walls. The saltmarsh and intertidal mud-flats that occupy the majority of the site, however, display the most complete range of saltmarsh community types in Suffolk. The estuary holds a range of swamp communities that fringe the estuary, and occasionally form larger stands. In general, these are dominated by Common Reed *Phragmites australis*. The estuary is of importance for its wintering waterbirds, especially Avocet *Recurvirostra avosetta*.
- 9.2. Deben Estuary SPA qualifies under Article 4.1 of the EU Birds Directive by supporting internationally important populations of regularly occurring Annex 1 species. It also qualifies under Article 4.2 of the EU Birds Directive in that it supports internationally important populations of regularly occurring migratory species.
- 9.3. Deben Estuary was classified as an SPA on 31 March 1996. Deben Estuary was also listed on 31 March 1996 as a Ramsar site under the Ramsar convention for its internationally important wetland status.
- 9.4. The qualifying features for the site are:
- *Branta bernicla bernicla*.; Dark-bellied brent goose (Non-breeding)
 - *Recurvirostra avosetta*; Pied avocet (Non-breeding)
- 9.5. The conservation objectives of the site are as set out in Table 7:

Table 7 Conservation Objectives for the Deben Estuary SPA

Conservation Objectives	<p>Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 bird species, under the Birds Directive, in particular:</p> <ul style="list-style-type: none"> • Intertidal mudflat communities • Saltmarsh communities
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- 9.6. Targets set in the assessment of favourable condition are 'no significant reduction in numbers or displacement of wintering birds from an established baseline, subject to natural change; no decrease in extent of habitat from an established baseline, subject to natural change; no increase in obstructions to existing bird view lines, subject to natural change; presence and abundance of prey species should not deviate significantly from established baseline level, subject to natural

change; vegetation height in saltmarsh areas used for roosting should not deviate significantly from an established baseline, subject to natural change⁹.

- 9.7. A LSE upon the dark-bellied brent goose interest feature of the Deben Estuary SPA and Ramsar was identified because of the potential for construction disturbance from the Project alone and in combination with other plans or projects.
- 9.8. To inform the Appropriate Assessment the Applicant provided an account of dark-bellied brent goose status and ecology including the results of surveys carried out within the SPA in the winters of 2011-2012 and 2013-2014. Peak counts occurred in February (2184) and December (1588), respectively [App-101].

Alone assessment

- 9.9. The onshore cable route for the Project lies within (in part) the Deben Estuary SPA and Ramsar. The Applicant's HRA report [APP-101] stated that potentially disturbing activities would, however, be minimal within the site boundary as cables would be inserted into pre-installed ducts including ducting under the River Deben. Nevertheless, to avoid disturbing dark-bellied brent geese, the Applicant has committed to restricting potentially disturbing construction works between 1st November and the end of February (when over-wintering numbers are at their peak). This was agreed through discussions with NE and RSPB as part of the Evidence Plan process (see also Evidence Plan Log with NE [APP-107]).
- 9.10. The Applicant included mitigation and management measures for works in the Deben Estuary area within the outline landscape and ecological management strategy (OLEMS) [APP-286] submitted with the DCO application.
- 9.11. The OLEMS at Table 2 includes the following avoidance and mitigation measures for dark-bellied brent geese (noting that the text remained unchanged in the updated OLEMS submitted at Deadline 6 [REP6-046 and REP6-047]).

"For the avoidance of disturbance of feeding Brent Geese, during periods of construction works, from the 1st November to 28/29th February the only activities to be undertaken at the east side of the Deben Estuary (i.e. between Ferry Road and the Deben Estuary) would be:

- Walk-over site investigation or survey works; or*
- Any inspections required to assess the integrity, safety and security of EATL assets; or Any response required for the purposes of ensuring the health, safety and security of employees, contractors and the general public, unless otherwise agreed with Natural England.*

Access by vehicle would be from either Access B or Access C (but not from both simultaneously to ensure that any disturbance is localised).

For the same period, during times of severe weather (prolonged cold conditions), access will only be taken for the purposes of health, safety and security unless otherwise agreed with Natural

⁹ <http://publications.naturalengland.org.uk/publication/2993195>

England. The definition of 'severe weather' will be the same as that used to implement the Statutory Suspension of Wildfowl Shooting in Severe Winter Weather measure under the Wildlife and Countryside Act. The severe weather condition will come into force at 00h01 following the day when the relevant Secretary of State signs the necessary Statutory Instrument to bring the requirement into force. The suspension will end after a maximum period of 14 days unless otherwise extended by the Secretary of State through the signing of a further Statutory Instrument. After the end of the shooting season and up until the end of February, the same weather criteria shall apply, albeit without a signed order from the Secretary of State: EATL shall be responsible for monitoring local temperatures for this purpose."

- 9.12. Included in the DCO is Requirement 21(3) , which states: "*Construction works between Ferry Road and the River Deben must be carried out in accordance with the embedded mitigation relating to onshore ornithology contained in Table 2 of the outline landscape and ecological management strategy, which must be incorporated into the ecological management plan.*"
- 9.13. The SoCG between the Applicant and NE submitted for D7 [REP7-023] confirmed the position that the project, would have no adverse effects on the integrity of the Deben Estuary SPA and Ramsar. The SoCG stated that "*it is agreed by both parties that the proposed mitigation measures for limiting impacts to wintering birds are suitable for the project.*" The SoCG with the RSBP stated agreement the project would not have an adverse effect on the integrity of the Deben Estuary SPA.
- 9.14. The ExA concurred with the views of NE and the RSPB that the proposed mitigation measures to avoid works at the Deben Estuary, as specified in the OLEMS and DCO, adequately secures the necessary measures to avoid adverse impacts on the dark-bellied brent geese qualifying feature of the Deben Estuary SPA and Ramsar site.

Conclusions

- 9.15. The Secretary of State is satisfied that, the potential disturbing activities during construction as a result of the Project alone, would not represent an adverse effect upon the integrity of the Deben Estuary SPA and Ramsar. For this conclusion he places particular weight on the mitigation as specified in the OLEMS and Requirement 21(3) of the DCO.

In-combination assessment

- 9.16. The Applicant's HRA recognised that EA1 construction activities may cause some disturbance to geese as construction work may occur during winter. However, the Applicant's HRA also noted that mitigation is already in place to reduce the level of disturbance from EA1 activities. As provided for above, construction activities associated with the Project will not take place during winter, so disturbance will be minimal, and, in winter, will be limited to site visits. According the Applicant's HRA, site visits may be required over multiple years, so limited disturbance may affect geese for several successive years, but the level of cumulative disturbance will be small in relation to the normal background levels of disturbance at this site caused by recreational activity and agricultural activity, bearing in mind that English Nature (2001) noted geese at this site are frequently disturbed by boats landing and being launched, and by jet skiing.

- 9.17. The SoCG between the Applicant and NE submitted for D7 [REP7-023] confirmed the position that the project in-combination with other plans or projects, would have no adverse effects on the integrity of the Deben Estuary SPA and Ramsar. The SoCG stated that *"it is agreed by both parties that the proposed mitigation measures for limiting impacts to wintering birds are suitable for the project."* The SoCG with the RSBP stated agreement the project in-combination with other plans or projects would not have an adverse effect on the integrity of the Deben Estuary SPA.
- 9.18. The ExA concurred with the views of NE and the RSPB that the proposed mitigation measures to avoid works at the Deben Estuary, as specified in the OLEMS and DCO, adequately secures the necessary measures to avoid adverse impacts on the dark-bellied brent geese qualifying features of the Deben Estuary SPA and Ramsar site,

Conclusions

- 9.19. The Secretary of State is satisfied that, the potential disturbing activities during construction as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the Deben Estuary SPA and Ramsar. For this conclusion he places particular weight on the mitigation as specified in the OLEMS and Requirement 21(3) of the DCO.

Overall Conclusion on the Alde-Ore SPA and Ramsar

- 9.20. The Secretary of State is satisfied that the Project alone and in-combination with other plans or projects would not represent an adverse effect upon the integrity of the Deben Estuary SPA and Ramsar.

The Outer Thames Estuary SPA & pSPA

- 10.1. The Outer Thames Estuary SPA lies along the east coast of England, predominantly in the coastal waters of the southern North Sea between the Thames Estuary and the east Norfolk coast.
- 10.2. The area of the SPA contains areas of shallow and deeper water, with high tidal current streams and a range of mobile sediments, including several shallow sandbanks. Much of the area is less than 20m water depth, extending into the 20-50 m depth contour towards the eastern boundary of the SPA.
- 10.3. This SPA crosses the 12 nautical mile boundary and therefore lies partly in territorial and partly in offshore waters; hence it is a site for which both Natural England and JNCC have responsibility to provide statutory advice. The SPA lies along the east coast of England in the southern North Sea and extends northward from the Thames Estuary to the sea area off Great Yarmouth on the East Norfolk Coast.
- 10.4. The Outer Thames Estuary SPA was designated in August 2010 with the Annex 1 species red-throated diver *Gavia stellate* as the sole feature. An estimated 6,466 red-throated divers winter in the SPA (counts from 1989-2006/07).
- 10.5. The conservation objective for the Outer Thames Estuary SPA is, “subject to natural change, maintain or enhance the red-throated diver population and its supporting habitats in favourable condition”. The interest feature red-throated diver will be considered to be in favourable condition only when both of the following two conditions are met¹⁰:
 - The size of the red-throated diver population is at, or shows only no significant fluctuation around the mean population at the time of designation of the SPA to account for natural change; and
 - The extent of the supporting habitat within the site is maintained.
- 10.6. Formal consultation on proposed extensions to the existing Outer Thames Estuary SPA boundary closed on the 14 July 2016. The new pSPA (the existing SPA plus the proposed extensions) now affords additional protection to little tern and common tern foraging areas, enhancing the protection already afforded to their feeding and nesting areas in the adjacent coastal SPAs (Foulness SPA, Breydon Water SPA and Minsmere to Walberswick SPA). NE’s conservation objectives¹¹ for the site are as set out in Table 8:

¹⁰ <http://jncc.defra.gov.uk/page-7249>

¹¹ <http://publications.naturalengland.org.uk/publication/4927106139029504>

Table 8 Natural England’s Conservation Objectives for the Outer Thames SPA and pSPA

Conservation Objectives	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • 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 population of each of the qualifying features, and, • The distribution of the qualifying features within the site.
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10.7. A LSE upon only the red-throated diver interest feature of the Outer Thames Estuary SPA/pSPA was identified due to the potential for disturbance from the Project alone and in-combination with other plans or projects to cause displacement of red-throated diver.

10.8. During the Examination, the SPA and the pSPA were referred to interchangeably. As noted above, the pSPA affords additional protection to species of tern. However, the pSPA does not enhance the level of protection already afforded to the red-throated diver feature. On this basis, the Secretary of State is satisfied that that one assessment for the red-throated diver feature can be applied to both sites.

Alone assessment

10.9. An assessment of red-throated diver displacement during cable-laying operations was included in the Applicant’s HRA report [App-101]. A worst-case scenario was applied to the assessment, which assumed that there would be 100% displacement of birds in a 2km buffer surrounding the cable-laying vessel(s).

10.10. The assessment indicated that between 18.6 and 22.8 red-throated divers would be displaced at any one time during cable-laying, which would lead to a 0.6% increase in red-throated diver density in other parts of the SPA/pSPA. A worst-case scenario assuming 10% of displaced birds die would add 0.1 to 0.2% to the natural mortality during two years of cable laying operations, which was considered too small to be detectable and was therefore considered not to be significant. The Applicant therefore concluded that there would be no adverse effect on the integrity of the Outer Thames Estuary SPA.

10.11. NE stated in its RR [RR-003] that it agreed with the Applicant’s approach of estimating the magnitude of disturbance to red-throated divers during construction on a ‘worst-case’ basis assuming that there would be 100% displacement of birds in a 2km buffer surrounding the cable-laying vessel(s). NE also commented that the scenario of 10% mortality was very precautionary. It therefore concluded that, even using these precautionary assumptions, the additional mortality was likely to be less than 1%.

10.12. Despite this conclusion, the Applicant provided wording for an amendment to Condition 13 of the relevant dMLs to include the identification of vessel routeing and procedures to be adopted within those routes. Specifically, these amendments include Condition 13(1)(c)(v) of Schedules 10 and

11, Condition 13(1)(c)(vi) of Schedules 12 and 13 and Condition 6(c)(iii) of Schedules 14 and 15. These secure details of the vessels and vessel transit corridors in the Construction Method Statement to minimise disturbance to red-throated diver.

10.13. NE also advised that consideration should be given in the HRA to operational and maintenance activities that may cause disturbance of red-throated diver arising from transiting to the site from the operational port. However, NE considered that if best practice vessel operations were adopted then any likely significant effect could be removed [RR-003].

10.14. In respect of construction and operation, vessel transiting procedures are secured through Condition 13(1)(d)(vi) of Schedules 10 to 13 and Condition 6(d)(vi) of Schedules 14 and 15, which are to be detailed in the Project Environmental Management Plan (PEMP).

10.15. The updated SoCG between the Applicant and NE [REP7-023], submitted at Deadline 7, maintains the position of both parties that it is agreed that the Project alone would have no adverse effect on the integrity of the Outer Thames Estuary SPA. The SoCG between the Applicant and RSPB also demonstrates that the RSPB agrees with the Applicant's conclusion that the Project alone would have no adverse effect on the integrity of the Outer Thames Estuary SPA.

10.16. The ExA concurred with the views of NE and the RSPB that, with the addition of best practice vessel control measures during construction and operation, as detailed in the Applicant's representation [REP7-018] and as secured through conditions in the dMLs, impacts on the red-throated diver qualifying feature of the Outer Thames Estuary SPA can be minimised. On this basis the ExA was satisfied that an adverse effect on the integrity of the Outer Thames Estuary SPA can be excluded from the Project alone.

Conclusions

10.17. The Secretary of State is satisfied that, the potential displacement of red-throated diver as a result of the Project alone, would not represent an adverse effect upon the integrity of the Outer Thames Estuary SPA and pSPA. For this conclusion he places particular weight on procedures secured in the dMLS.

In-combination assessment

10.18. In-combination effects were considered in the Applicant's HRA report [APP-101]. The contribution of the Project to in-combination effects was assessed as fewer than two deaths per year over two successive years. In the Applicant's view, the additional mortalities would be too small to be detectable and would not materially alter any overall in-combination impact. Therefore, the contribution of the Project to in-combination impact on the red-throated diver population was assessed as negligible by the Applicant.

10.19. The updated SoCG between the Applicant and NE [REP7-023], submitted at Deadline 7, sets out the position of both parties that it is agreed that the Project in-combination with other plans or projects would have no adverse effect on the integrity of the Outer Thames Estuary SPA. The SoCG between the Applicant and RSPB also states that the RSPB agrees with the Applicant's

conclusion that the Project in-combination with other plans or projects would not have an adverse effect on the integrity on the Outer Thames Estuary SPA.

10.20. The ExA concurred with the views of NE and the RSPB that, with the addition of best practice vessel control measures during construction and operation (as detailed in the Applicant's representation [REP7-018] and as secured through conditions of the dMLs), impacts on the red-throated diver qualifying feature of the Outer Thames Estuary SPA can be minimised. On this basis the ExA was satisfied that an adverse effect on the integrity of the Outer Thames Estuary SPA conservation objectives can be excluded both from the Project in-combination with other plans or projects.

Conclusions

10.21. The Secretary of State is satisfied that, the potential displacement of red-throated diver as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the Outer Thames Estuary SPA and pSPA. For this conclusion he places particular weight on procedures secured in the dMLs

Overall Conclusion on the Outer Thames Estuary SPA & pSPA

10.22. The Secretary of State is satisfied that the Project alone and in-combination with other plans or projects would not represent an adverse effect upon the integrity of the Outer Thames SPA and pSPA

Southern North Sea cSAC

- 11.1 The Southern North Sea (SNS) cSAC is located to the east of England. This site stretches from the central North Sea (north of Dogger Bank) to the Straits of Dover in the south, covering an area of 36 951km². The majority of this site lies offshore, though it does extend into coastal areas of Norfolk and Suffolk crossing the 12 nautical mile boundary and hence, both Natural England and JNCC are responsible for providing statutory advice. A mix of habitats, such as sandbanks and gravel beds, are included in the site.
- 11.2 The site's qualifying feature is harbour porpoise *Phocoena phocoena*. Seasonal differences in the relative use of the site have been identified based on the analyses of Heinänen and Skov (2015) which shows that harbour porpoise occur in elevated densities in some parts of the site compared to others during summer and winter. JNCC & NE's Draft Conservation Objectives and Advice on Activities document¹² states that seasonality in porpoise distribution should be considered in the assessment of impacts and proposed management.
- 11.3 The site was formally recommended to Government as a draft SAC (dSAC) in June 2015. A Formal Consultation on the site ran between January and May 2015 and, during this time, the site became a possible SAC (pSAC). At the close of Examination, the status of the site was still a pSAC and final Conservation Objectives and guidance on management measures were not available.
- 11.4 During the Examination NE provided draft Conservation Objectives in its written representation [REP2-017]: *"To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for the UK harbour porpoise.*
- To ensure for harbour porpoise that, subject to natural change, the following attributes are maintained or restored in the long term:*
- *The species is a viable component of the site.*
 - *There is no significant disturbance of the species.*
 - *The supporting habitats and processes relevant to harbour porpoises and their prey are maintained"*
- 11.5 Since the close of Examination, the site was submitted to the European Commission and it became a candidate Special Area of Conservation (cSAC). On 26th June 2017 the site was included in the Register of European Offshore Marine Sites, which is compiled and maintained under Regulation 16 of the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended).The site boundaries have not changed from those considered during the Examination of the Project, but Conservation Objectives have since been updated and are

¹² <http://jncc.defra.gov.uk/pdf/SouthernNorthSeaConservationObjectivesAndAdviceOnActivities.pdf>

available on the JNCC website (Table 9)¹³. Final advice and guidance on management measures for the site are yet to be published.

Table 9: Updated Conservation Objectives for Southern North Sea cSAC

Conservation Objectives	<p>To ensure that the integrity of the site is maintained and that it makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for harbour porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that:</p> <ul style="list-style-type: none"> • Harbour porpoise is a viable component of the site; • There is no significant disturbance of the species; and • The condition of supporting habitats and processes, and the availability of prey is maintained.
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11.6 The Secretary of State has given consideration to the draft Conservation Objectives presented during the Examination and the updated Conservation Objectives that were made available after the Examination. The Secretary of State is satisfied that the changes made to the draft Conservation Objectives are non-material and, as such, further a consultation with the Interested Parties is not required.

11.7 A LSE upon the harbour porpoise interest feature of the SNS cSAC was identified because of the potential for the Project alone and in-combination with other plans or projects to:

- disturb and displace harbour porpoise as a result of increased noise levels during construction and operation;
- change the availability of prey during construction and operation; and
- introduce the risk of collision with vessels during construction and operation.

11.8 The Secretary of State has addressed each impact separately in the Appropriate Assessment. First, however, the Secretary of State has considered the following matters that relate to all areas of his assessment.

Specific Considerations

Baseline Surveys

11.9 The Applicant's ES provides an account of baseline conditions, including an estimate of density of harbour porpoise on the Project site [App-120].

11.10 During the Examination, Whale and Dolphin Conservation (WDC) raised concerns about the adequacy of the surveys [REP2-008]. The ExA summarised these concerns as follows:

- The methodology for the boat-based surveys used was not adequate for assessing relative marine mammal abundance;

¹³ <http://jncc.defra.gov.uk/page-7243>

- The area covered in the boat-based surveys was not large enough to fully assess the population of marine mammals that could be impacted;
- The surveys covered the EA1 project site and did not extend to the EA3 WTG array site, resulting in insufficient and imprecise data; and
- Further dedicated marine mammal surveys should be undertaken.

11.11 WDC claimed that the methodology used to survey for marine mammals was designed for surveying seabirds in relation to offshore wind farms. It maintained that: *“Marine mammal surveys that are developed as an add-on to boat based bird surveys are inadequately designed monitoring programmes that cannot provide a sufficient baseline to characterise the environment”*.

11.12 The Applicant commented [REP3-005] that the boat-based surveys described in the ES [APP-120] were used only to provide context for the site-specific data, and no reliance was put on EA1 data to calculate the number of harbour porpoise in the EA3 WTG array site.

11.13 Estimates of abundance and density were generated from two years of site-specific (EA3 WTG array site plus 4km buffer) aerial surveys as described in the Applicant's Baseline Marine Mammal Technical Report [APP-165]. The site-specific surveys and densities generated from these surveys were determined by the Applicant to be more reliable and realistic for the Project, than those derived from the Small Cetaceans in the European Atlantic and North Sea surveys (SCANS II), which are now 10 years old (SCANS II surveys were also used for context but not to generate estimates of abundance or density).

11.14 The Applicant acknowledged that there may be some difficulties in identifying marine mammals to a species level from the aerial surveys. Taking a precautionary approach, all sightings classified as ‘Unidentified dolphin/porpoise’ in the survey data have been assumed by the Applicant to be harbour porpoise, and used to generate a maximum density for harbour porpoise.

11.15 The appropriateness of the survey methods, duration and analysis and characterisation of the baseline were agreed with NE during the Evidence Plan process [REP2-053].

11.16 WDC, in its SoCG with the Applicant [REP2-056], acknowledged that the assessment has been based on the best available evidence. WDC also agrees that: *“the applicant has taken a precautionary approach to aerial surveys by assigning any unidentified cetaceans as harbour porpoise. We believe this is the best approach as it is well known it is hard to identify marine mammals to species level from high definition aerial surveys”*.

11.17 In the revised SoCG submitted at D7 [REP7-025], WDC stated that it is reviewing its position on aerial surveys, and its position regarding the difficulty of *“identifying marine mammal at species level from aerial surveys causes us to be cautious about the results of the survey and using these without a correlating boat-based surveys (sic) to obtain accurate baseline data”* may be subject to change. However, there was no further comment from WDC on this issue throughout the remainder of the Examination.

11.18 In its recommendation, the ExA accepted that there are difficulties in accurately identifying numbers of marine mammals at species level, but it was satisfied that the Applicant has taken a precautionary approach and has based its assessment of abundance and density on the best available evidence. The Secretary of State agrees with this conclusion.

HRA Assessment Documentation

11.19 The Applicant provided several documents to inform the HRA in relation to harbour porpoise, both within the Application and during the Examination. However, a document called Revision B SNS pSAC HRA report [REP6-021] represents the most up to date version of the Applicant's assessment.

11.20 Within this report the Applicant made a detailed assessment of effects and made several references to 'likely significant effects' and 'no likely significant effects' in its conclusions. The Secretary of State considers the detail within these assessments goes beyond that which would be required to assess the potential for likely significant effects, primarily because the Applicant has assessed each effect against the draft conservation objectives. The Secretary of State, therefore, considers it appropriate to use the information provided in this report to undertake an Appropriate Assessment of all the likely significant effects identified for the SNS cSAC in the RIES.

Alone assessment

Disturbance and displacement of harbour porpoise as a result of increased noise levels during construction and operation

11.21 The Applicant identified the potential for there to be an increased risk of disturbance and displacement due to increased noise levels during construction and operation [REP6-021; REP6-022]. Noise generated from piling operations took up much of the focus during the Examination, but other noise generating activities were also considered.

11.22 To address the effect of piling, the Applicant outlined the different forms of behavioural disturbance that could occur at different distances [REP6-021]. In the Applicant's view, a fleeing response is likely at the onset distance at which harbour porpoise could experience an auditory temporary threshold shift (TTS). Referencing Southall et al (2007), the Applicant recognised that avoidance is possible beyond this distance and, should an individual respond, such behaviour could also have an effect on foraging, reproduction or survival.

11.23 The Applicant used project-specific noise propagation modelling to estimate the worst case footprint for both behavioural responses (i.e. fleeing/TTS and possible avoidance). These outputs were then compared to a harbour porpoise reference population to understand the impact. In agreement with NE, the Applicant used the North Sea Management Unit (MU) (IAMMWG 2015) as a reference population.

11.24 Modelling showed that the fleeing /TTS response has a range up to a maximum of 8km and a maximum area of 281.6km². This equates to approximately 0.04% of the North Sea MU area or 83 individuals. The possible avoidance response is a maximum range of 70km with a maximum

area of 13,469km², which equates to approximately 1.99% of the North Sea MU area or 3,960 individuals (based on 100% avoidance). However, the Applicant considered that not all individuals that are exposed to the possible avoidance noise level will respond. Assuming 75% of the harbour porpoise respond, the estimated number of individuals affected (based on a density estimate of 0.294 individuals/km²) is 2,970, which represents 1.3% of the North Sea MU population. If 50% respond, then approximately 0.9% of the North Sea MU population could be displaced [REP6-021].

11.25 The Applicant also discussed the effect of increased vessel noise during construction and operation. It is expected that associated vessels will be limited to the Project site and offshore cable corridors and any increase in vessel movements to and from the site would be relatively small in comparison to existing vessel movements in the area and harbour porpoise North Sea MU. The Applicant concluded that their likely contribution to the overall background underwater noise is likely to be low and any further disturbance or displacement of harbour porpoise that might occur would be temporary, intermittent and short-term.

11.26 Overall, the Applicant concluded that, in the worst case, the percentage of the North Sea MU that could be affected would be minimal and therefore, significant disturbance is unlikely.

11.27 In a written submission for Deadline 4 [REP4-029], NE welcomed the assessment against the North Sea MU reference population. NE stated that this is in line with JNCC and Natural England (2016) draft Conservation Objectives and Advice on Activities, which states that it is how the impacts within the site translate into effects on the North Sea MU population that are of greatest concern. However, to inform the Secretary of State's HRA, NE also asked the Applicant to assess the percentage of the pSAC affected. This site-based approach was supported by TWT [REP5-007] and WDC [REP7-077].

11.28 NE provided further advice to the Applicant on how this assessment should be carried out [REP6-021]. NE considered that, in the absence of finalised management measures, the Applicant should undertake an assessment with use of the following parameters:

- A distance of 26km from an individual piling location should be used to assess the area of pSAC habitat harbour porpoise may be disturbed from during piling operations.
- Displacement of harbour porpoise should not exceed 20% of the seasonal component of the pSAC at any one time and or on average exceed 10% of the seasonal component of the pSAC over the duration of that season.
- The effect of the project should be considered in the context of the seasonal components of the pSAC, rather than the pSAC as a whole.

11.29 Using this approach, the Applicant calculated that piling operations had the potential to affect a maximum area of 2,829.5km² (10.5%) of the summer pSAC or 1,908.1km² (15%) of the winter pSAC at any one time based on the worst case scenario (two concurrent pile driving vessels with vessel separation to ensure maximum effect area on seasonal component of pSAC). The Applicant also demonstrated that, in the worst-case scenario, the average area impacted over the

summer and winter seasons would be less than 10% of the area of each seasonal component of the pSAC.¹⁴

- 11.30 The Applicant concluded its assessment of disturbance and displacement by stating “*based on currently available information, there is no potential for an LSE*”
- 11.31 At Deadline 7, NE stated that it had no further comments to make on this assessment and was satisfied that all its comments had been taken into consideration by the Applicant [REP7-010]. It is also noted that the SoCG between the Applicant and NE states that: “*It is agreed by both parties that the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC is adequate and robust and that the conclusions are valid*” [REP7-023].
- 11.32 TWT also provided comments on the Applicant’s assessment at Deadline 7 [REP7-012]. TWT stated that it could not agree with the conclusions of no LSE for impacts of pile driving alone, due to “*the lack of adequate formal guidance from the SNCBs*”. WDC also disagreed with the Applicant’s conclusions on the basis that the details of the SNS pSAC were still in draft form [REP7-007].
- 11.33 To address this issue, the Applicant agreed to provide a draft Site Integrity Plan (dSIP). A first draft was submitted at Deadline 4 [REP4-013] and the document was updated at Deadline 7 [REP7-029] to take account of comments from Interested Parties.
- 11.34 The purpose of the dSIP is to set out the Applicant’s approach to delivering any mitigation or management measures to ensure the avoidance of significant disturbance of harbour porpoise according to the site’s conservation objectives, and therefore allow the conclusion of “*no adverse effect beyond reasonable scientific doubt*” on the site [REP4-013]. The dSIP will be updated prior to construction to reflect any further guidance received from JNCC and NE with regards to the site’s conservation objectives and management measures and once final construction methods have been confirmed [REP4-013]. The dSIP puts forward a number of potential mitigation measures such as: a schedule to control piling events; the use of alternative foundation methodologies; and noise mitigation systems.
- 11.35 The dSIP is a certified document under Article 32 of the DCO and the final plan is secured through Condition 13(2) of Schedules 10 to 13 (the Generation and Transmission Assets dMLs) of the DCO. The wording of Condition 13(2) states: “*(2) In the event that driven or part-driven pile foundations are proposed to be used, the licenced activities, or any phase of those activities must not commence until an East Anglia THREE Project Southern North Sea cSAC Site Integrity Plan which accords with the principles set out in the In Principle East Anglia THREE Project Southern North Sea pSAC Site Integrity Plan has been submitted to the MMO and the MMO is satisfied that the plan, provides such mitigation as is necessary to avoid adversely affecting the integrity (within the meaning of the 2007 Regulations) of a relevant site, to the extent that harbour porpoise are a protected feature of that site.*”

¹⁴ For detail on all the parameters and assumptions used for this assessment, the reader is invited to refer to REP6-021.

- 11.36 It is noted that the final SoCG between the Applicant and NE states [REP7-023]: *“It is agreed by both parties that condition 13(2) in the DMLs (schedules 10 to 13) secures mitigation to avoid AEOL [“Adverse Effect on Integrity] and that the SIP also provides a framework to secure the development and implementation of specific mitigation measures (if required) to avoid AEOL.”*
- 11.37 It is also noted that in a SoCG with the MMO [REP7-021], it was agreed that *“condition 13(2) of the relevant DMLs, provide an appropriate framework for approving and securing any mitigation required”*.
- 11.38 Whilst the MMO was content with the drafting of Condition 13(2), it did not agree that Condition 13(3) of the Applicant’s draft DCO was necessary. Condition 13(3) stated:
- “(3) For the purpose of paragraph (2) –*
- (a) the Southern North Sea possible Special Area of Conservation must be treated as a European offshore marine site until:*
- (i) that Area (or any part of it) becomes a European offshore marine site or a European site; or*
- (ii) it is decided that no part of that Area should be a European offshore marine site or a European site; and*
- (b) harbour porpoise must be treated as a protected feature of the Southern North Sea possible Special Area of Conservation.”*
- 11.39 The Secretary of State acknowledges that the ExA recommended that this condition should be retained in the final DCO. However, as the status of the site has since changed, and the cSAC is now included in the Register for Offshore Marine Sites, the Secretary of State has concluded that Condition 13(3) is no longer necessary. On this basis, he has removed Condition 13(3) from the final DCO.
- 11.40 In general, WDC [REP7-025] and TWT [REP7-012] welcomed the dSIP as an approach to the delivery of mitigation and management measures. It is noted, however, that both TWT and WDC raised concerns regarding the adequacy of the possible mitigation measures and, as such, both Interested Parties made a request to be named consultees on the final SIP and this request also extended to the MMMP and European Protected Species licence. In response, the MMO did not object in principle, but it considered that it is not necessary to name such bodies within a condition. In its recommendation, the ExA noted assurances given by the Applicant and the MMO during the Examination to continue consultation with Interested Parties up to finalisation of the SIP and MMMP, which gave the ExA *“confidence that a specific requirement or condition in the DCO/DMLs is not required”*. Since the Applicant confirmed that it intends to consult TWT and WDC on drafts of the SIP and MMMP, in agreement with the ExA and MMO, the Secretary of State does not consider it necessary to provide further securities on the matter.
- 11.41 In its concluding recommendation the ExA stated that it *“is satisfied that, when considering the draft conservation objectives for harbour porpoise, AEOL from the Proposed Development alone can be excluded, provided that, once formal guidance is provided by the SNCBs, appropriate mitigation measures are implemented”*.

11.42 The Secretary of State has considered this recommendation along with the representations made by the Applicant, NE, MMO, WDC and TWT. The Secretary of State is satisfied that, the potential disturbance and displacement of harbour porpoise as a result of increased noise levels during construction and operation as a result of the Project alone, would not represent an adverse effect upon the integrity of the SNS cSAC. For this conclusion he places particular weight on the mitigation secured in Condition 13(2) of the dMLs in Schedules 10 to 13, which allows for mitigation to be developed, where necessary, in view of confirmed construction methods and finalised guidance from the SNCBs.

Changes in prey availability during construction and operation

11.43 The Applicant identified the potential for there to be an increased risk of changes to harbour porpoise prey species from development of the Project [REP6-021; REP6-022].

11.44 The Applicant's ES assessed the impact of construction on fish prey species. Increased suspended sediment concentrations, sediment re-deposition and underwater noise were all assessed to have minor adverse impacts on fish receptors [APP-119].

11.45 For construction, the Applicant's Revision B SNS pSAC HRA report [REP6-021] focused on the effects of underwater noise generated from piling activities. The Applicant considered that potential traumatic damage to fish in close proximity would generally be avoided using soft-start procedures. Consequently, the Applicant considered displacement to be the most likely impact on harbour porpoise prey resource. However, this impact was considered to be temporary in nature. Furthermore, it was the Applicant's view that harbour porpoise are either likely to follow displaced prey or be displaced further by the direct effect of piling on harbour porpoise. On this basis, the Applicant questioned whether the possible effects upon prey resource would have the potential to indirectly affect harbour porpoise.

11.46 Potential impacts on fish species during operation and maintenance can include physical disturbance and loss or changes of seabed habitat, operational noise, and electromagnetic field (EMF) effects. However, the Applicant considered these impacts to be highly localised around project infrastructure, and any maintenance impacts would be intermittent and temporary. The Applicant estimated that approximately 257.5 harbour porpoise would be present in the footprint of the operation and maintenance activities, but noted that impacts could result in a positive effect (e.g. due to aggregation of prey around seabed structures).

11.47 In light of this, the Applicant concluded that: *"with regard to the third draft Conservation Objective, to maintain the supporting habitats and processes relevant to harbour porpoise, disturbance to prey species at the assessed level is unlikely to lead to displacement significantly above natural variation. Therefore, risk at this level will not impact the species viability of the pSAC and there would be no potential LSE."*

11.48 In a SoCG between the Applicant and NE, NE agreed that *"the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC is adequate and robust and that the conclusions are valid."*

11.49 The Secretary of State notes that the Applicant’s assessment of changes in prey availability during construction and operation was not disputed by any Interested Party. He is satisfied that, the potential changes to prey availability during construction and operation as a result of the Project alone, would not represent an adverse effect upon the integrity of the SNS cSAC.

Collision risk with vessels during construction and operation

11.50 The Applicant identified the potential for there to be an increased risk of harbour porpoise collisions with vessels during construction and operation of the Project [REP6-021; REP6-022].

11.51 The Applicant presented a worse-case scenario for vessel movements on site. During construction, it was estimated that approximately 5,685 (based on a Single Phase approach) or 7,636 two-way vessel movements (for a Two Phased approach) would take place over 41 and 45 months respectively. During the operation and maintenance phase of the Project an average of 4,000 two-way support vessel trips was estimated to take place per year.

11.52 In the absence of a harbour porpoise population estimate for the cSAC, the Applicant used the North Sea Management Unit (MU) population estimate to understand the effect of this vessel activity on the areas affected.

11.53 Using a range of avoidance rates, the Applicant modelled collisions risk and presented each estimate as a percentage of the North Sea MU potentially at risk (Table 10).

Table 10 Maximum number of harbour porpoise and percentage of the North Sea MU potentially at risk from direct impacts with vessels, with avoidance rates of 0%, 50%, 90%, 95%, 98% and 99% [REP6-021].

Maximum number of animals and percentage of North Sea MU potentially at risk from direct impacts with vessels					
0% avoidance	50% avoidance	90% avoidance	95% avoidance	98% avoidance	99% avoidance
258 (0.11%)	138 (0.06%)	26 (0.01%)	13 (0.006%)	5 (0.002%)	3 (0.001%)

11.54 It has been estimated from post mortem examinations within the Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic (ASCOBANS) area that approximately 4% of deaths recorded could be as a result of vessel strikes, based on evidence of physical trauma (blunt trauma or propeller cuts) (Evans et al. 2011). On this basis, the Applicant considered the risk of collision is likely to be low.

11.55 In the Applicant’s view, 95% was a precautionary avoidance rate to use. The Applicant considered that within this scenario the potential numbers of harbour porpoise that could be exposed to collision risk with vessels associated with the Project is very low and unlikely to have any significant impact on the North Sea MU reference population ($\leq 0.01\%$ of the North Sea MU population). In light of this, the Applicant concluded “*that risk at this level will not impact the species*

viability of the pSAC and therefore with regard to the first draft Conservation Objective there would be no potential LSE.”

11.56 In a SoCG between the Applicant and NE, NE agreed that *“the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC is adequate and robust and that the conclusions are valid.”*

11.57 The Secretary of State notes that the Applicant’s assessment of collision risk with vessels during construction and operation was not disputed by any Interested Party. He is satisfied that, the potential collision risk with vessels during construction and operation as a result of the Project alone, would not represent an adverse effect upon the integrity of the SNS cSAC.

In-combination assessment

11.58 The Applicant provided a complete list of plans or projects screened into the in-combination assessment in Appendix B of the Revision B SNS pSAC HRA report [REP6-021]. The approach used for screening was agreed with NE during the Evidence Plan process [App-164; App-168] and projects were grouped into the following tiers:

- Tier 1 Built and operational projects;
- Tier 2 Projects that are under construction;
- Tier 3 Consented application(s) not yet implemented;
- Tier 4 Submitted application(s) not yet determined; and
- Tier 5 Future projects (e.g. pre-scoping stage).

Disturbance and displacement of harbour porpoise as a result of increased noise levels

11.59 The Applicant identified the potential for there to be an increased risk of disturbance and displacement due to increased noise levels during construction and operation [REP6-021; REP6-022]. It is noted that noise generated from piling operations took up much of the focus during the Examination, but other noise generating activities were also considered.

11.60 In line with the assessment undertaken for the Project alone, the Applicant produced different in-combination assessments to address North Sea MU impacts and impacts at the pSAC site level.

11.61 Whilst the Applicant used a worst case construction scenario for its assessments, separate assessments were also carried out to understand the effect of a range of more realistic scenarios. The more realistic scenarios took into account limitations and constraints to project delivery such as supply chain limitations and Contracts for Difference (CfD) auctions. The more realistic scenarios also considered the number of piling vessels available to each project and the number of projects piling per year in a development zone.

11.62 For the North Sea MU the Applicant used modelled behavioural disturbance (where available) to calculate that pile driving could affect between a minimum of 12,564 (5.5% of MU) and a maximum of 54,992 (24.2% of the MU) harbour porpoise. For the pSAC site level assessment the Applicant used a 26km disturbance radius to calculate that pile driving could affect between

11.84% and 46.2% of the summer area and between 2.32% and 46.5% of the winter area at any one time. The Applicant also calculated that the seasonal average effect could be between 8.33% and 12.8% for the summer area and 3.51% and 16.1% of the winter area.

11.63 In addition to piling, the Applicant also assessed the potential contribution of other noise producing activities, such as geophysical surveys and UXO operations, to the overall in-combination total. Assuming a 26km disturbance radius per detonation, the Applicant predicted that, in-combination with piling, a single detonation would take the daily in-combination spatial impact above the 20% threshold in the majority of scenarios (if not already exceeded). For some scenarios the inclusion of UXO detonations also saw the average seasonal spatial impact exceed the 10% threshold.

11.64 In coming to a conclusion on the in-combination assessment the Applicant stated that, *“there is a potential for LSE”* under some scenarios. In light of this, the Applicant acknowledged that *“additional mitigation measures may need to be secured in relation to disturbance from pile driving noise. In the absence of final Conservation Objectives or management measures for the pSAC, a level below which any disturbance would be deemed not significant has not been defined, neither has a population threshold that would ensure that the site remains viable. Both of these parameters would need to be defined in order to allow the in-combination assessment to define and quantify any required additional mitigation measures”*.

11.65 As described above, the Applicant has secured the provision of a SIP in Condition 13(2) of the dMLs in Schedules 10 to 13. The final SIP will be produced prior to construction to reflect any further guidance received from JNCC and NE with regards to the site’s conservation objectives and management measures and once final construction methods have been confirmed [REP4-013]. As already described, the Applicant provided a dSIP during the Examination, the purpose of which is to set out the Applicant’s approach to delivering any mitigation or management measures to ensure the avoidance of significant disturbance of harbour porpoise according to the site’s conservation objectives, and therefore allow the conclusion of *“no adverse effect beyond reasonable scientific doubt”* on the site [REP4-013]. The dSIP puts forward a number of potential mitigation measures such: as a schedule to control piling events; the use of alternative foundation methodologies; and noise mitigation systems.

11.66 In the SoCG with the Applicant, NE noted that *“that condition 13(2) in the DMLs (schedules 10 to 13) secures mitigation to avoid AEOL and that the SIP also provides a framework to secure the development and implementation of specific mitigation measures (if required) to avoid AEOL.”* [REP7-023].

11.67 In general WDC [REP7-025] and TWT [REP7-012] welcomed this approach to the delivery of mitigation and management measures. However, as described above, both TWT and WDC raised concerns regarding consultation on the final versions of the key marine mammal mitigation documents (SIP, MMMP and European Protected Species licence).

11.68 In the Applicant’s SoCG with the MMO [REP7-021], it was agreed that *“condition 13(2) of the relevant DMLs, provide an appropriate framework for approving and securing any mitigation*

required". However, when making specific comments on the form of mitigation required for in-combination impacts, the MMO expressed concern over who would be best placed to regulate scheduled piling across multiple offshore wind farm developments, and suggested that this was a decision to be made by the Secretary of State [REP5-008]. It was the ExA's view, that the MMO, as the regulatory body for marine activities in the seas around England, is the most appropriate body to regulate scheduled piling activities across multiple developments. The Secretary of State agrees with the ExA that the MMO would be the most appropriate body for to regulate scheduled piling activities across multiple developments, should this mitigation measure be required.

11.69 Based on the evidence presented by all parties, the ExA was satisfied that an AEoI, from the Project in-combination with other plans or projects, could be excluded. This recommendation relied upon the implementation of the MMMP and the SIP post-consent.

11.70 The Secretary of State has considered the representations made by the Applicant, NE, WDC, TWTs and the recommendation as made by the ExA. The Secretary of State is satisfied that, the potential disturbance and displacement of harbour porpoise as a result of increased noise levels during construction and operation as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the SNS cSAC. For this conclusion he places particular weight on the mitigation secured in Condition 13(2) of the dMLs in Schedules 10 to 13, which allows for mitigation to be developed, where necessary, in view of confirmed construction methods and finalised guidance from the SNCBs.

Changes in prey availability during construction and operation

11.71 The Applicant identified the potential for there to be an increased risk of changes in prey availability during construction and operation of the Project in-combination with other plans or projects [REP6-021; REP6-022]. This could come from vessels associated with the construction, operation, maintenance and decommissioning of offshore windfarms and wave and tidal projects; aggregate extraction and dredging noise; operational noise from disposal sites and possible exploration / commission and / or production activities of oil and gas Licence areas.

11.72 The Applicant stated that for many of the plans or projects screened into the in-combination assessment, the potential effects have not been quantified, and there is also a high level of uncertainty around the potential effects on harbour porpoise. It is therefore, not possible to make a quantified in-combination assessment of the potential magnitude of effect associated with changes to prey availability during the construction phase and the operation and maintenance phase of the Project. However, the Applicant considered that given the distance of the majority of the projects screened in to the in-combination assessment from the Project site, there would be few pathways for any in-combination impact on prey within the Project site.

11.73 In the Applicant's view, the impacts on prey species are likely to be intermittent, temporary and highly localised, with potential for recovery following cessation of the disturbance activity. Any permanent loss or changes of prey habitat will typically represent a small percentage of the potential habitat in the surrounding area.

11.74 As described above, the Applicant considered the effects of the Project alone to be minimal. In the Applicant's view, therefore, the contribution of the Project to the in-combination effect can also be considered to be minimal.

11.75 In light of this, the Applicant concluded that *"with regard to the third draft Conservation Objective, to maintain the supporting habitats and processes relevant to harbour porpoise, disturbance to prey species at the assessed level is unlikely to lead to displacement significantly above natural variation. Therefore, risk at this level will not impact the species viability of the pSAC and there would be no potential LSE."*

11.76 In a SoCG between the Applicant and NE, NE agreed that *"the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC is adequate and robust and that the conclusions are valid."*

11.77 The Secretary of State notes that the Applicant's assessment of prey effects during construction and operation was not disputed by any Interested Party. The Secretary of State also notes that the ExA recommended that an adverse effect on the integrity of the site can be excluded when considering the project alone and in-combination with other plans or projects.

11.78 The Secretary of State is satisfied that, the potential effect on prey during construction and operation as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the SNS cSAC. For this conclusion he places particular weight on the advice of NE and the recommendation of the ExA.

Collision risk with vessels during construction and operation

11.79 The Applicant identified the potential for there to be an increased risk of harbour porpoise collisions with vessels during construction and operation of the Project in-combination with other plans or projects [REP6-021; REP6-022]. This could come from vessels associated with the construction, operation, maintenance and decommissioning of offshore windfarms and wave and tidal projects; aggregate extraction and dredging noise; operational noise from disposal sites and possible exploration / commission and / or production activities of oil and gas Licence areas.

11.80 The Applicant stated that for many of the plans or projects screened into the in-combination assessment, the potential effects have not been quantified, and there is also a high level of uncertainty around the potential effects on harbour porpoise. It is therefore, not possible to make a quantified in-combination assessment of the potential magnitude of effect associated with collision risk for harbour porpoise throughout the North Sea MU area during the construction, operation and maintenance of the Project.

11.81 However, in the Applicant's view, the Project only makes a small contribution to this potential in-combination effect. Based on a precautionary 95% avoidance rate, the potential numbers of harbour porpoise that could be exposed to collision risk with vessels associated with the Project is very low and unlikely to have any significant impact on the North Sea MU reference population ($\leq 0.01\%$ of the North Sea MU)

11.82 In light of this, the Applicant concluded “*that risk at this level will not impact the species viability of the pSAC and therefore with regard to the first draft Conservation Objective there would be no potential LSE.*”

11.83 In a SoCG between the Applicant and NE, NE agreed that “*the Information for the Habitats Regulations Assessment: Marine Mammal Assessment Southern North Sea pSAC is adequate and robust and that the conclusions are valid.*”

11.84 The Secretary of State notes that the Applicant’s assessment of collision risk with vessels during construction and operation was not disputed by any Interested Party. The Secretary of State also notes that the ExA recommended that an adverse effect on the integrity of the site can be excluded when considering the project alone and in-combination with other plans or projects.

11.85 The Secretary of State is satisfied that, the potential collision risk with vessels during construction and operation as a result of the Project in-combination with other plans or projects, would not represent an adverse effect upon the integrity of the SNS cSAC. For this conclusion he places particular weight on the advice of NE and the recommendation of the ExA.

Overall Conclusion on the SNS cSAC

11.86 The Secretary of State is satisfied that the Project alone and in-combination with other plans or projects would not represent an adverse effect upon the integrity of the SNS cSAC.

Habitats Regulations Assessment Conclusions

12.1 The Secretary of State has carefully considered all of the information presented before and during the Examination, including the RIES, the ES, representations made by Interested Parties, and the ExA's report itself. He considers that the Project has the potential to have an LSE on 8 European sites when considered alone and in-combination with other plans or projects. These sites are listed below.

- Alde-Ore Estuary SPA and Ramsar site
- Deben Estuary SPA
- Deben Estuary Ramsar site
- Flamborough and Filey Coast pSPA
- Flamborough Head and Bempton Cliffs SPA
- Outer Thames SPA
- Outer Thames Estuary pSPA
- Southern North Sea cSAC

12.2 The Secretary of State has undertaken an AA in respect of those six European sites' Conservation Objectives to determine whether the Project, either alone or in-combination with other plans or projects, will result in an adverse effect on integrity.

12.3 **The Secretary of State has undertaken a robust assessment using all of the information available to him, not least the advice from the SNCBs, the recommendations of the ExA and the views of Interested Parties including the Applicant. Having considered all of the information available to him and the mitigation measures secured through the DCO and dMLs, the Secretary of State has concluded that the Project will not have an adverse effect on integrity on any European Site, either alone or in-combination with other plans or projects.**

12.4 The mitigation for the Project referred to in this HRA will be secured and delivered through the DCO within:

Requirements:

- Requirement 2 (2)
- Requirement 21(3)

dML Conditions

- Condition 6(c)(iii) in Schedules 14-15
- Condition 6(d)(vi) in Schedules 14-15
- Condition 13(1)(f) in Schedules 10-13
- Condition 13(1)(d)(vi) in Schedules 10-13
- Condition 13(2) in Schedules 10-13

- Condition 1(2) in Schedules 10-11
- Condition 13(1)(c)(v) in Schedules 10-11
- Condition 13(1)(c)(vi) in Schedules 12-13

Transboundary Assessment

- 13.1 Given the potential for this Project to affect mobile features across a wide geographical area; the Secretary of State believes it important to consider the potential impacts on European sites in other European Economic Area (“EEA”) states, known as transboundary sites, in further detail. The ExA also considered the implications for these sites, in the context of looking at the wider EIA considerations. The results of the ExA’s considerations and the Secretary of State’s own views on this matter are presented below
- 13.2 During the pre-application stage, and under the EIA Regulation 24 process, the Planning Inspectorate undertook a transboundary screening, on behalf of the Secretary of State for the Department for Communities and Local Government, of the proposed development in January 2013 [OD-001]. As a result, transboundary issues notification under Regulation 24 of the EIA Regulations was considered necessary for the EEA States of Belgium, Denmark, France, Germany, Norway and the Netherlands. All were notified in January 2013, and a notice was placed in the London Gazette on 23 January 2013 [OD-004].
- 13.3 Following acceptance of the DCO application, as part of the ongoing EIA Regulation 24 process, the Secretary of State for the Department for Communities and Local Government reconsidered the pre-application transboundary screening decision [OD-001] and all of the other EEA States identified above were re-notified, with Sweden and Ireland additionally notified. A notice was placed in the London Gazette on 16 March 2016 [OD-006].
- 13.4 Of the countries notified, the Netherlands registered as an IP to the Examination [RR-016]. However, representations made by the Netherlands (the Ministry of Infrastructure and Environment (Rijkswaterstaat)) did not relate to HRA matters.
- 13.5 The Secretary of State notes that the Applicant considered non-UK European sites in its Application and it concluded that there would be no likely significant effect from the Project alone and in-combination for all non-UK European sites. The ExA did not note any objections to this conclusion in its recommendation report.

Conclusions

- 13.6 The Secretary of State has considered the potential for the Project to affect transboundary European sites in Belgium, Denmark, France, Germany, Norway, the Netherlands, Sweden and Ireland.
- 13.7 The Secretary of State notes the lack of objections from any of the EEA states potentially affected by the development. No evidence was submitted to the examination of any specific likely significant effects on these sites, either from the EEA States where the European sites are located or interested parties.
- 13.8 **The Secretary of State is satisfied that the Project, either alone or in-combination with other plans or projects, will not adversely affect the integrity of any transboundary European sites.**

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Norfolk Boreas Offshore Wind Farm

Appendix 3

East Anglia THREE Revised Collision Risk Model

Applicant: Norfolk Boreas Limited
Document Reference: ExA.ASR-NE.D8.V1
Deadline 8
Date: April 2020
Revision: Version 1

East Anglia THREE
Offshore Windfarm

East Anglia THREE

Revised CRM

Document Reference – Deadline 5/ Second
Written Questions/ Revised CRM/ ECO17 &
HRA16

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Erratum Note

The previous version of this document (Offshore Ornithology: East Anglia ONE CRM Revised for Final Wind Farm Design) submitted at Deadline 4 contained a reporting error in the assignment of mortality estimates to great black-backed gull and herring gull in Tables 6 and 7. It should be noted that the calculations as presented in Tables 4 and 5 were correct and it was only the summary Tables 6 and 7 and associated text which included this error. This has been corrected in the current document.

1 East Anglia THREE Collision Risk Update

1. The wind farm design submitted for East Anglia THREE (EATL 2015b) included turbines with a minimum draft height (the distance between lower rotor tip height and mean high water springs, MHWS) of 22m. The collision risk estimates were calculated using models and parameters agreed with Natural England through the Evidence Plan process.
2. In their Relevant Representation, the RSPB advised that the potential for adverse effects on gannets and kittiwakes arising from the East Anglia THREE wind farm could be reduced through an increase in draft height. They presented an illustration of how increasing the draft height would reduce collisions, although it should be noted that the RSPB used more conservative parameter values for several of the collision modelling inputs than the agreed ones used in EATL (2015). This had the effect of both increasing the number of collisions predicted by the RSPB and also the subsequent reductions following an increase in draft height.
3. Nonetheless, EATL does not dispute the rationale for the RSPB's position, which is that increasing turbine draft heights reduces the risk of collisions, since the density of flying seabirds decreases with increasing altitude.
4. However, increasing draft height has potentially significant technical and commercial implications affecting, and most likely reducing, the range of options available to the project. In addition, for the purposes of maintaining air defence radar coverage requirements, significant restrictions have been placed on turbine height as set out in requirement 33 of the draft Order. This requires that mitigation will be required in agreement with the MOD should EATL wish to construct turbines of a height greater than that permitted in each of the areas identified. Therefore the commercial and defence implications must be balanced against East Anglia THREE's small contribution to the cumulative collision totals and the small overall effect an increase in draft height would have on the total collision figures (using the modelling parameters advocated by Natural England).
5. Nonetheless, following careful consideration of the options available for increasing draft heights and balancing this against risk to the project, EATL has identified that an increase in draft height of 2m to 24m will be possible across 70% of the wind farm site. It is straightforward to recalculate the collision mortality for this design revision and it is not necessary to rerun the collision models. The update collision predictions have been calculated using the following steps:
 - a. The percentage of flights at collision height (PCH) for both turbine heights was calculated for each species. Prior to submission of the ES, Natural

England advised that site specific data should be used for gannet and kittiwake as there were sufficient height observations for these species to generate robust estimates (251 and 208, respectively). There were fewer observations of lesser black-backed gull, great black-backed gull and herring gull (11, 38 and 29, respectively). Therefore generic flight height data were used for these species (Johnston et al. 2014).

- b. To calculate PCH for gannet and kittiwake at the two draft heights, the observed numbers of birds recorded flying at 22m or higher and 24m or higher were divided by the total number of birds for which flight height was estimated.
- c. For lesser black-backed gull, great black-backed gull and herring gull the PCH for the two draft heights were extracted from the generic height data in Johnston et al. (2014).
- d. The original collision mortality estimates (EATL 2015) were split to represent the 30:70 ratio of differential turbine heights. The smaller number (30%) is the predicted mortality for the lower draft height turbines as per the original modelling. The larger number (70%) was multiplied by the ratio of the two PCH values (i.e. the PCH at 24m divided by the PCH at 22m) to obtain the revised collision risk for the higher turbines. The two mortality values were then summed to give the overall collision mortality for the wind farm with 30% of turbines with a draft height of 22m and 70% with a draft height of 24m.

6. The calculations for the updated collision risk estimates are presented in Table 1.

Table 1. Updated collision risk calculations for increased draft height for 70% of turbines at East Anglia THREE.

Species	Band model option	PCH @ 22m	PCH @ 24m	Ratio of PCH	ES annual CRM	30% ES CRM	70% ES CRM x PCH ratio	Summed CRM (30% @ 22m + 70% @ 24m)	Reduction in annual CRM
Gannet	1	6.77	5.58	0.824	56	17	32	49	7
Kittiwake	1	10.10	6.73	0.667	146	44	68	112	34
Lesser black-backed gull	2	23.91	21.05	0.880	10	3	6	9	1
Herring gull	2	27.73	24.76	0.893	26	8	16	24	2
Great black-backed gull	2	29.97	26.93	0.898	42	13	26	39	3

7. Increasing the draft height by 2m across 70% of the wind farm reduces the predicted annual collisions at East Anglia THREE by the following amounts: gannet – 7, kittiwake – 34, lesser black-backed gull – 1, great black-backed gull – 3, herring gull - 2. These updated estimates have been included in the cumulative

totals presented in subsequent sections of this document (Tables 7, 8, 9, A2.1, A2.2, A2.3, A2.4 and A2.5).

2 East Anglia ONE Collision Risk Update

8. Offshore wind farm collision risk assessments presented in Environmental Statements (ES) use the worst case scenario (WCS) wind farm design parameters in order to ensure that the highest mortality estimates are assessed. Following planning consent, offshore wind farm developers often take advantage of technological progress in turbine design which enables the same generating capacity to be achieved with fewer installed turbines. This typically results in a reduction in the number of predicted collisions, although the magnitude of reduction is dependent on both the change in number of turbines and also their specification (i.e. rotor diameter, etc.).
9. Since cumulative collision mortality has become a key consenting challenge for offshore wind farms, it is clearly beneficial to the assessment process if the collision mortality estimates for wind farms included in the cumulative totals reflect final wind farm designs rather than the WCSs presented in the respective assessments.
10. The challenge to updating the collision assessments for other wind farms to account for these design changes, particularly for wind farms which have been consented but not constructed, is in obtaining the necessary turbine parameter information (for the modelling) and also commitment from the developers that these represent the final designs. In the absence of these commitments statutory nature conservation advisors (SNCA's e.g. Natural England) consider the WCS estimates to be the only reliable figures which can be used (whilst acknowledging that this is a precautionary approach).
11. The East Anglia THREE cumulative collision risk assessment used consented (WCS) estimates for other North Sea wind farms, as agreed with Natural England. One of the other sites included in the assessment was East Anglia ONE, which is located to the south of East Anglia THREE and was consented in 2014. The consented wind farm was for up to 240 turbines and a generating capacity of 1,200MW. Following successful award of a Contract for Difference (CfD) from the UK Government for an installed capacity of 714MW the number of turbines has been reduced to 102. Because this wind farm is also being developed by ScottishPower Renewables, both the turbine design specifications and a commitment that this will be the final design and no further development will occur within the East Anglia ONE site (under this consent) are available to inform the East Anglia THREE cumulative collision assessment.
12. This note provides updated collision risk estimates for the East Anglia ONE wind farm for the following five species: gannet, kittiwake, lesser black-backed gull, great black-backed gull and herring gull. The updated East Anglia ONE estimates

are presented alongside the previous values (Band model outputs are provided in Appendix 1). Cumulative totals up to and including East Anglia THREE are also included to show how the update affects the estimated cumulative mortality (full cumulative tables including the East Anglia ONE update are provided in Appendix 2).

13. Following a request from the Examining Authority (second written questions, ECO17), collision estimates have also been calculated for East Anglia ONE for the non-material change consented by the Secretary of State decision which reduced the consented EA ONE turbine number to 150. Apart from the number of turbines, all other model parameters were the same as those presented in Tables 2, 3 and 4 (note 'final' turbine values were used). These estimates are presented in Appendix 3.
14. Note that East Anglia ONE Ltd (EAOL) intends to construct the East Anglia ONE project commencing in 2017. EAOL wrote to the SoS for Business, Energy and Industrial Strategy on 16th September 2016 to confirm that the project would be constructed using High Voltage Alternating Current technology based on 102 x 7 megawatt turbines. On providing this notification EAOL loses the right to construct the project using HVDC technology at up to 1200 megawatts in capacity. This officially confirms the project will be 714 megawatts in capacity using 7 megawatt turbines. Based on this, installation of 150 turbines could never be realised within the terms of the East Anglia ONE Order. It is also worthy of note that EAOL has a Contract for Difference for 714 megawatts, so there is no incentive to seek to install turbines beyond this capacity.

2.1 Methods

15. Turbine specifications were provided by East Anglia ONE (Table 2). The seabird input data for the collision modelling (Tables 3 and 4) were taken from APEM (2015) which was included in Appendix 13.1 of the East Anglia THREE Ornithology Assessment (EATL 2015a; document reference 6.3.13 (1)). The collision risk tables (Tables 5 and 6) present the East Anglia ONE collision risks obtained using Band Options 1 and 2. Copies of the CRM spreadsheets showing the calculations are supplied for the Option 1 outputs (Appendix 1) as these are the estimates used in the East Anglia THREE cumulative assessment.

Table 2. East Anglia ONE turbine specifications used in the collision risk modelling: consented and final.

Parameter	Consented value	Final value
No. of turbines	240	102
RPM	11	10.3
Rotor radius (m)	67.5	77
Max blade width (m)	4.8	5
Blade pitch (degrees)	15	15

Table 3. Species biometrics used in the East Anglia ONE collision risk modelling (from APEM 2015).

Species	Body length (m)	Wingspan (m)	Flight speed (ms ⁻¹)	Nocturnal activity factor (1 to 5)	Flight type	Proportion of flights at potential collision height
Gannet	0.94	1.72	14.9	2	Gliding	25.17
Kittiwake	0.39	1.08	13.1	3	Flapping	21.27
Lesser black-backed gull	0.58	1.42	13.1	3	Flapping	26.30
Herring gull	0.60	1.44	12.8	3	Flapping	29.38
Great black-backed gull	0.71	1.58	13.7	3	Flapping	23.33

Table 4. Seabird monthly density estimates (birds per km²) used in the East Anglia ONE collision risk modelling and predicted monthly wind farm operational percentage.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gannet	0.01611	0	0.0183	0	0	0	0	0.036111	0.057778	0.285584	1.451732	0.054583
Kittiwake	0.34643	0.20967	0.2594	0	0	0	0.019412	0	0	0.031974	1.628344	1.204574
Lesser black-backed gull	0.23464	0.0287	0.0114	0	0.014821	0	0.111784	0	0.073323	0.206373	0.392022	0.005461
Herring gull	0.04241	0.04475	0.0264	0	0.00974	0	0	0	0.023203	0	0.42306	0.112566
Great black-backed gull	0	0.022	0.0825	0	0	0.024167	0.000833	0	0.018626	0.000755	1.165847	0.0275
Wind Farm Operational time	95.23	93.65	92.30	91.04	91.78	88.86	90.00	89.60	92.20	94.29	95.40	95.03

2.2 Results

16. The monthly and annual collision mortality for the five species modelled at East Anglia ONE, estimated with species specific avoidance rates (and ranges as advised by Natural England) using Band Model Options 1 and 2 are provided in Tables 5 and 6.

Table 5. Seabird collision mortality at East Anglia ONE using Band Option 1. Monthly and annual values calculated for the updated wind farm design (Table 2) with annual total for the consented design included for comparison. Bird densities and biometrics from Tables 3 and 4.

Species	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual total	Original annual total
Gannet	98.7	1	0	1	0	0	0	0	3	4	19	83	3	113	251
	98.9	1	0	1	0	0	0	0	2	3	16	70	3	96	213
	99.1	1	0	1	0	0	0	0	2	3	13	57	2	78	174
Kittiwake	98.7	16	9	13	0	0	0	1	0	0	2	73	54	166	371
	98.9	13	8	11	0	0	0	1	0	0	1	62	45	141	314
	99.1	11	6	9	0	0	0	1	0	0	1	50	37	115	257
Lesser black-backed gull	99.4	7	1	0	0	1	0	4	0	2	6	11	0	33	73
	99.5	6	1	0	0	0	0	3	0	2	5	9	0	27	61
	99.6	5	1	0	0	0	0	3	0	2	4	8	0	22	49
Herring gull	99.4	1	1	1	0	0	0	0	0	1	0	14	4	22	49
	99.5	1	1	1	0	0	0	0	0	1	0	11	3	18	41
	99.6	1	1	1	0	0	0	0	0	1	0	9	2	15	33
Great black-backed gull	99.4	0	1	3	0	0	1	0	0	1	0	33	1	38	85
	99.5	0	0	2	0	0	1	0	0	0	0	27	1	32	71
	99.6	0	0	2	0	0	1	0	0	0	0	22	1	25	57

Table 6. Seabird collision mortality at East Anglia ONE using Band Option 2. Monthly and annual values calculated for the updated wind farm design (Table 2) with annual total for the consented design included for comparison. Bird densities and biometrics from Tables 3 and 4.

Species	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual total	Original annual total
Gannet	98.7	0	0	0	0	0	0	0	0	0	3	11	0	15	35
	98.9	0	0	0	0	0	0	0	0	0	2	9	0	13	29
	99.1	0	0	0	0	0	0	0	0	0	2	8	0	11	24
Kittiwake	98.7	3	2	3	0	0	0	0	0	0	0	16	12	36	79
	98.9	3	2	2	0	0	0	0	0	0	0	13	10	30	67
	99.1	2	1	2	0	0	0	0	0	0	0	11	8	25	55
Lesser black-backed gull	99.4	3	0	0	0	0	0	2	0	1	3	5	0	15	35
	99.5	3	0	0	0	0	0	1	0	1	3	4	0	13	29
	99.6	2	0	0	0	0	0	1	0	1	2	4	0	11	23
Herring gull	99.4	1	1	0	0	0	0	0	0	0	0	7	2	12	26
	99.5	0	0	0	0	0	0	0	0	0	0	6	2	10	22
	99.6	0	0	0	0	0	0	0	0	0	0	5	1	8	18
Great black-backed gull	99.4	0	0	2	0	0	0	0	0	0	0	25	0	28	64
	99.5	0	0	2	0	0	0	0	0	0	0	21	0	24	54
	99.6	0	0	1	0	0	0	0	0	0	0	17	0	20	43

17. For all species except herring gull, the reductions at East Anglia ONE exceed or match the mortalities estimated for the revised East Anglia THREE wind farm (including the reductions due to increasing draft height discussed in section 1 above; Note for herring gull the reduction at East Anglia ONE is one (1) less than the prediction at East Anglia THREE). Consequently this design update offsets the contributions from East Anglia THREE for these species (Table 7).

Table 7: Comparison of the consented and updated collision risk mortalities for East Anglia ONE with the collisions predicted for East Anglia THREE (ES estimates and revised estimates for the increase in draft height discussed above). Figures for East Anglia ONE were derived using Band model Option 1 and agreed avoidance rates. For all species the reduction in mortality at East Anglia ONE is greater than or the same as the mortality for the revised East Anglia THREE predictions (see section 1 above).

Species	East Anglia ONE			East Anglia THREE	
	Consented	Updated	Reduction	ES design	Updated design (see section 1 above)
Gannet	213	96	-117	56	49
Kittiwake	314	141	-173	146	112
Lesser black-backed gull	61	27	-34	10	9
Herring gull	41	18	-23	26	24
Great black-backed gull	71	32	-39	42	39

18. The cumulative annual totals for consented wind farms (i.e. up to and including Hornsea Project 2), using the original and updated East Anglia ONE mortality estimates are presented in Table 8, alongside the updated cumulative total including the revised East Anglia THREE estimates. Complete cumulative collision mortality tables for each species incorporating the updated East Anglia ONE estimates are provided in Appendix 2. Note that these tables are an update of the ones submitted at Deadline 2 (EATL 2016), with the addition of herring gull.

Table 8: Comparison of the cumulative collision risk for consented projects (up to and including Hornsea Project 2) with the consented mortality for East Anglia ONE, the updated mortality for East Anglia ONE and the updated cumulative total including the revised East Anglia THREE estimates (see section 1 above). See Appendix 2 for individual wind farm estimates.

Species	Cumulative consented total up to Hornsea Project 2		Updated cumulative total including revised East Anglia THREE estimates
	With consented East Anglia ONE estimates	With updated East Anglia ONE estimates	
Gannet	2942	2825	2874
Kittiwake	3507	3334	3447
Lesser black-backed gull	499	465	475
Great black-backed gull	840	801	840
Herring gull	701	678	701

19. For gannet, kittiwake and lesser black-backed gull the updated cumulative totals including East Anglia THREE are lower than the most recent previously consented cumulative totals (for the Hornsea Project 2 Wind Farm), despite the additional wind farm. For herring gull and great black-backed gull the updated cumulative totals are the same as the previously consented totals.
20. A similar situation can be seen for the in-combination mortality of gannet and kittiwake from the Flamborough and Filey Coast pSPA (FFC; Table 9). The updated in-combination gannet mortality is unchanged from the previously consented total, while that for kittiwake is slightly reduced (by 2) from the consented total.

Table 9: Comparison of the in-combination collision risk for the FFC pSPA populations of gannet and kittiwake for consented projects (up to and including Hornsea Project 2) with the consented mortality for East Anglia ONE, the updated mortality for East Anglia ONE and the updated in-combination total up to and including the revised East Anglia THREE estimates (see section 1 above). East Anglia THREE mortalities at FFC have been updated for the increase in draft height as detailed in section 1 above.

Species	In-combination consented total up to Hornsea Project 2		In-combination consented total up to and including revised East Anglia THREE estimates
	With consented East Anglia ONE estimates	With updated East Anglia ONE estimates	
Gannet	173	165	173
Kittiwake	322	312	320

2.3 Note on cumulative collision totals in relation to previous estimates

21. Natural England (2016) provided comments on a previous version of this report (EATL 2016) in which they accepted the key point that the collision mortality for East Anglia THREE was largely offset by the reductions at East Anglia ONE (subject to the design changes on which it is based being legally binding). However, in Natural England (2016) it was also noted that there were differences between the cumulative totals presented in EATL (2016) compared with those in previous assessments. The following sections provide an explanation of the source of these differences.
22. Firstly, in Natural England (2016) it was noted that there were differences in the totals presented in the previous iteration of this document when compared with those in the East Anglia THREE ES (EATL 2015b). However, the ES figures to which this refers were superseded in a project update (EATL 2016; for gannet, kittiwake, lesser black-backed gull and great black-backed gull). This update was required to take into account revisions to the Hornsea Project Two Wind Farm which were reported after the East Anglia THREE ES was submitted. Thus, this discrepancy noted by Natural England (2016) related to out of date values which had been revised. Furthermore, aside from the updates to East Anglia ONE and East Anglia THREE collision estimates discussed in the current note, there are no discrepancies between the cumulative totals in EATL (2016) and those provided in the current document (and the previous iteration of this note which Natural England reviewed).
23. It should be noted that the current note also provides an update of the cumulative mortality presented for herring gull in EATL (2015b). It was not necessary to update this species in EATL (2016) because there was no update to the Hornsea Project Two figures. Following the design updates for East Anglia ONE and East Anglia THREE discussed in this note, the cumulative totals for this species have been updated (Appendix 2, Table A2.5). This table replaces Table 13.48 – Cumulative Collision Risk for Herring Gull in the ES.
24. The second discrepancy noted by Natural England (2016) was between the cumulative totals in the previous iteration of this note and those accepted by Natural England at the end of the Hornsea Project Two examination. As noted in Natural England (2016), it is difficult to determine the source of differences because a full list of individual projects was not presented in the Memorandum of Understanding at the end of the Hornsea Project Two examination (or the previous iteration of the current note). However, if it is assumed that the list of projects assessed for Hornsea Project Two remained the same at the conclusion of the examination as was used in the project's ES (SmartWind 2015b), the following projects which are included in the East Anglia THREE assessment were not included for Hornsea Project Two:

- Beatrice Demonstrator
 - Gunfleet Sands
 - Lynn and Inner Dowsing
 - Scroby Sands
 - Rampion
25. For the first four of these wind farms (i.e. all except Rampion) the mortality estimates for all species are small (<5) or zero and thus this creates minimal differences. However, the collision estimates for Rampion are much larger for most species (e.g. annual mortalities for gannet: 102; kittiwake: 121; lesser black-backed gull: 8; great black-backed gull: 26; herring gull: 155). Therefore this is likely to account for at least some of the difference referred to by Natural England.
26. There also appear to be other differences in the cumulative figures presented for the two projects which are harder to identify. For example, the Hornsea Project Two cumulative assessment included attempts to account for revised wind farm designs in their assessment, but it is not always straightforward to determine if these estimated values were used in the assessment or provided for information.
27. In order that the values used for the East Anglia THREE cumulative assessment can be fully scrutinised, the full tables and source references are included in Appendix 2 of this note (including the updated East Anglia ONE and East Anglia THREE values). These tables should also provide the starting point for subsequent cumulative assessments.
28. The same comment (about discrepancies) was made in Natural England (2016) in relation to the in-combination totals attributed to the Flamborough and Filey Coast pSPA populations of gannet and kittiwake. The causes for these differences are the same as for the cumulative totals discussed above (i.e. revised cumulative tables and different selections of wind farms for inclusion).

2.4 Conclusion

29. This note presents updated collision mortality estimates for the East Anglia ONE wind farm derived using parameters for the final wind farm design and East Anglia THREE for an increase in draft height. The change in the design at East Anglia ONE, compared with the consented project, has considerably reduced the project's collision risk and hence also the cumulative total. The consequence of this is that for three out of the five species considered most at risk of collisions at the East Anglia THREE wind farm (gannet, kittiwake and lesser black-backed gull) the updated cumulative mortality totals are now lower than those assessed for the most recently consented wind farm (Hornsea Project 2) even with the inclusion of East Anglia THREE. For herring

gull and great black-backed gull the reductions are not quite as large, however the cumulative totals with the inclusion of East Anglia THREE have remained unchanged from the previously consented totals (for Hornsea Project 2).

30. It is also informative to note that similar reductions in collision mortality are likely to result from changes in wind farm design at other consented but not constructed wind farms in the North Sea which are included in the cumulative and in-combination totals. This could include up to 12 sites (Firth of Forth Alpha and Bravo, Hornsea Project One and Two, Inch Cape, Moray Firth, Neart na Gaoithe, Beatrice, Race Bank, Rampion, Dogger Bank Creyke Beck A & B and Teesside A & B and Triton Knoll). Together these wind farms are predicted to cause 2,400 gannet collisions per year, 80% of the cumulative total. If mortality at these wind farms was halved (i.e. as seen at East Anglia ONE) the cumulative total would be reduced from 2,874 to 1,674, which is less than 60% of the current total.

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Appendix 1 - Band CRM outputs for the updated East Anglia ONE wind farm

East Anglia THREE Offshore Windfarm.....September 2016

Gannet

COLLISION RISK ASSESSMENT		used in overall collision risk sheet	used in available hours sheet
Sheet 1 - Input data		used in migrant collision risk sheet	used in large array correction sheet
		used in single transit collision risk sheet or extended model	not used in calculation but stated for reference
	Units	Value	Data sources
Bird data			
Species name		Gannet	
Bird length	m	0.94	
Wingspan	m	1.72	
Flight speed	m/sec	14.9	
Nocturnal activity factor (1-5)		2	
Flight type, flapping or gliding		gliding	
Data sources			
Bird survey data		Jan	Feb
Daytime bird density	birds/sq km	0.01611	0
Proportion at rotor height	%	25.2%	0.0183
Proportion of flights upwind	%	50.0%	0
Data sources			
Birds on migration data		Jan	Feb
Migration passages	birds	0	0
Width of migration corridor	km	8	0
Proportion at rotor height	%	25%	0
Proportion of flights upwind	%	50.0%	0
Data sources			
Windfarm data		Jan	Feb
Name of windfarm site		EA ONE	0
Latitude	degrees	52.67	0
Number of turbines		102	0
Width of windfarm	km	33.25	0
Tidal offset	m	0	0
Data sources			
Turbine data		Jan	Feb
Turbine model		7MW turbine	0
No of blades		3	0
Rotation speed	rpm	10.3	0
Rotor radius	m	77	0
Hub height	m	99.65	0
Monthly proportion of time operational	%	95%	94%
Max blade width	m	5.000	92%
Pitch	degrees	15	91%
Data sources			
Avoidance rates used in presenting results		Jan	Feb
		95%	94%
		92%	91%
		92%	89%
		90%	90%
		92%	94%
		95%	95%
		95%	95%
Data sources (if applicable)			

East Anglia THREE Offshore Windfarm.....September 2016

COLLISION RISK ASSESSMENT		All data input on Sheet 1: no data entry needed on this sheet!												from Sheet 1 - input data	
Sheet 2 - Overall collision risk														from Sheet 6 - available hours	
Bird details:														from Sheet 3 - single transit collision risk	
														from survey data	
														calculated field	
Species		Gannet													
Flight speed	m/sec	14.9													
Nocturnal activity factor (1-5)		2													
Nocturnal activity (% of daytime)		25%													
Windfarm data:															
Latitude	degrees	52.7													
Number of turbines		102													
Rotor radius	m	77													
Minimum height of rotor	m	99.65													
Total rotor frontal area	sq m	1899903													
Proportion of time operational	%	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year average	
		95%	94%	92%	91%	92%	89%	90%	90%	92%	94%	95%	95%	92.4%	
Stage A - flight activity															
Daytime areal bird density	birds/sq km	0.01611													
Proportion at rotor height	%	25.2%													
Total daylight hours per month	hrs	255	275	367	417	488	503	506	457	382	331	264	240		
Total night hours per month	hrs	489	397	377	303	256	217	238	287	338	413	456	504		
Flux factor		4022	0	5582	0	0	0	0	12630	17839	82049	363020	13212		
Option 1 -Basic model - Stages B, C and D														per annum	
Potential bird transits through rotors		1012	0	1405	0	0	0	0	3179	4490	20652	91372	3325	125435	
Collision risk for single rotor transit	(from sheet 3)	7.3%													
Collisions for entire windfarm, allowing for non-op time, assuming no avoidance	birds per month or year	71	0	95	0	0	0	0	208	303	1424	6376	231	8708	
Option 2-Basic model using proportion from flight distribution		0												0	
Option 3-Extended model using flight height distribution															
Proportion at rotor height	(from sheet 4)	0.0%													
Potential bird transits through rotors	Flux integral	0.0457	184	0	255	0	0	0	577	815	3748	16583	604	22766	
Collisions assuming no avoidance	Collision integral	0.00212	8	0	11	0	0	0	24	35	164	733	27	1001	
Average collision risk for single rotor transit		4.6%													
Stage E - applying avoidance rates															
Using which of above options?	Option 1	0.00%	71	0	95	0	0	0	0	208	303	1424	6376	231	8708
Collisions assuming avoidance rate	birds per month or year	0.00%	71	0	95	0	0	0	0	208	303	1424	6376	231	8708
		98.70%	1	0	1	0	0	0	0	3	4	19	83	3	113
		98.90%	1	0	1	0	0	0	0	2	3	16	70	3	96
		99.10%	1	0	1	0	0	0	0	2	3	13	57	2	78
Collisions after applying large array correction		0.00%	70	0	94	0	0	0	0	206	299	1408	6304	229	8610
		98.70%	1	0	1	0	0	0	0	3	4	19	83	3	113
		98.90%	0.8	0.0	1.0	0.0	0.0	0.0	0.0	2.3	3.3	15.7	70.1	2.5	96
		99.10%	1	0	1	0	0	0	0	2	3	13	57	2	78

East Anglia THREE Offshore Windfarm.....September 2016

Kittiwake

COLLISION RISK ASSESSMENT		used in overall collision risk sheet	used in available hours sheet
Sheet 1 - Input data		used in migrant collision risk sheet	used in large array correction sheet
		used in single transit collision risk sheet or extended model	not used in calculation but stated for reference
	Units	Value	Data sources
Bird data			
Species name		Kittiwake	
Bird length	m	0.39	
Wingspan	m	1.08	
Flight speed	m/sec	13.1	
Nocturnal activity factor (1-5)		3	
Flight type, flapping or gliding		flapping	
Data sources			
Bird survey data		Jan	Feb
Daytime bird density	birds/sq km	0.34643	0.20967
Proportion at rotor height	%	21.3%	
Proportion of flights upwind	%	50.0%	
Data sources			
Birds on migration data		Jan	Feb
Migration passages	birds	0	0
Width of migration corridor	km	8	
Proportion at rotor height	%	25%	
Proportion of flights upwind	%	50.0%	
Data sources			
Windfarm data			
Name of windfarm site		EA ONE	
Latitude	degrees	52.67	
Number of turbines		102	
Width of windfarm	km	33.25	
Tidal offset	m	0	
Data sources			
Turbine data		Jan	Feb
Turbine model		7MW turbine	
No of blades		3	
Rotation speed	rpm	10.3	
Rotor radius	m	77	
Hub height	m	99.65	
Monthly proportion of time operational	%	95%	94%
Max blade width	m	5.000	
Pitch	degrees	15	
Data sources			
Avoidance rates used in presenting results			
		98.70%	
		98.90%	
		99.10%	
Data sources (if applicable)			

East Anglia THREE Offshore Windfarm.....September 2016

COLLISION RISK ASSESSMENT																
Sheet 2 - Overall collision risk		All data input on Sheet 1: no data entry needed on this sheet!														
Bird details:		from Sheet 1 - input data														
Species		Kittiwake														
Flight speed		13.1														
Nocturnal activity factor (1-5)		3														
Nocturnal activity (% of daytime)		50%														
Windfarm data:		from Sheet 6 - available hours														
Latitude		52.7														
Number of turbines		102														
Rotor radius		77														
Minimum height of rotor		99.65														
Total rotor frontal area		1899903														
Proportion of time operational		from Sheet 3 - single transit collision risk														
		from survey data														
		calculated field														
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year average		
		95%	94%	92%	91%	92%	89%	90%	90%	92%	94%	95%	95%	92.4%		
Stage A - flight activity																
Daytime areal bird density		0.34643	0.20967	0.2594	0	0	0	0.019412	0	0	0.031974	1.628344	1.204574			
Proportion at rotor height		21.3%														
Total daylight hours per month		255	275	367	417	488	503	506	457	382	331	264	240			
Total night hours per month		489	397	377	303	256	217	238	287	338	413	456	504			
Flux factor		100682	57786	83803	0	0	0	7060	0	0	9998	466037	344705			
Option 1 -Basic model - Stages B, C and D																
Potential bird transits through rotors		21415	12291	17825	0	0	0	1502	0	0	2127	99126	73319	per annum		
Collision risk for single rotor transit		(from sheet 3)	5.9%											227604		
Collisions for entire windfarm, allowing for non-op time, assuming no avoidance		1209	682	975	0	0	0	80	0	0	119	5606	4130	12802		
Option 2-Basic model using proportion from flight distribution																
		0	0	0	0	0	0	0	0	0	0	0	0	0		
Option 3-Extended model using flight height distribution																
Proportion at rotor height		(from sheet 4)	0.0%													
Potential bird transits through rotors		Flux integral	0.0457	4599	2640	3828	0	0	323	0	0	457	21289	15747	48883	
Collisions assuming no avoidance		Collision integral	0.00141	135	76	109	0	0	9	0	0	13	627	462	1431	
Average collision risk for single rotor transit			3.1%													
Stage E - applying avoidance rates																
Using which of above options?		Option 1	0.00%	1209	682	975	0	0	0	80	0	0	119	5606	4130	12802
Collisions assuming avoidance rate		birds per month or year	0.00%	1209	682	975	0	0	0	80	0	0	119	5606	4130	12802
			98.70%	16	9	13	0	0	0	1	0	0	2	73	54	166
			98.90%	13	8	11	0	0	0	1	0	0	1	62	45	141
			99.10%	11	6	9	0	0	0	1	0	0	1	50	37	115
Collisions after applying large array correction			0.00%	1198	676	966	0	0	0	79	0	0	118	5555	4093	12685
			98.70%	16	9	13	0	0	0	1	0	0	2	73	54	166
			98.90%	13.3	7.5	10.7	0.0	0.0	0.0	0.9	0.0	0.0	1.3	61.7	45.4	140.8
			99.10%	11	6	9	0	0	0	1	0	0	1	50	37	115

East Anglia THREE Offshore Windfarm.....September 2016

Lesser black-backed gull

COLLISION RISK ASSESSMENT		used in overall collision risk sheet	used in available hours sheet
Sheet 1 - Input data		used in migrant collision risk sheet	used in large array correction sheet
		used in single transit collision risk sheet or extended model	not used in calculation but stated for reference
	Units	Value	Data sources
Bird data			
Species name		Lesser black-backed gull	
Bird length	m	0.58	
Wingspan	m	1.42	
Flight speed	m/sec	13.1	
Nocturnal activity factor (1-5)		3	
Flight type, flapping or gliding		flapping	
Data sources			
Bird survey data		Jan	Feb
Daytime bird density	birds/sq km	0.23464	0.0287
Proportion at rotor height	%	26.3%	0.0114
Proportion of flights upwind	%	50.0%	0
Data sources			
Birds on migration data		Mar	Apr
Migration passages	birds	0	0
Width of migration corridor	km	8	0
Proportion at rotor height	%	25%	0
Proportion of flights upwind	%	50.0%	0
Data sources			
Windfarm data		May	Jun
Name of windfarm site		EA ONE	0
Latitude	degrees	52.67	0
Number of turbines		102	0
Width of windfarm	km	33.25	0
Tidal offset	m	0	0
Data sources			
Turbine data		Jul	Aug
Turbine model		7MW turbine	0
No of blades		3	0
Rotation speed	rpm	10.3	0
Rotor radius	m	77	0
Hub height	m	99.65	0
Monthly proportion of time operational	%	95%	92%
Max blade width	m	5.000	94%
Pitch	degrees	15	95%
Data sources			
Avoidance rates used in presenting results		99.40%	
		99.50%	
		99.60%	
Data sources (if applicable)			

East Anglia THREE Offshore Windfarm.....September 2016

COLLISION RISK ASSESSMENT																
Sheet 2 - Overall collision risk		All data input on Sheet 1: no data entry needed on this sheet!														
Bird details:														from Sheet 1 - input data		
Species		Lesser black-backed gull												from Sheet 6 - available hours		
Flight speed		m/sec 13.1												from Sheet 3 - single transit collision risk		
Nocturnal activity factor (1-5)		3												from survey data		
Nocturnal activity (% of daytime)		50%												calculated field		
Windfarm data:																
Latitude		degrees 52.7														
Number of turbines		102														
Rotor radius		m 77														
Minimum height of rotor		m 99.65														
Total rotor frontal area		sq m 1899903														
Proportion of time operational		%												year average		
		Jan 95% Feb 94% Mar 92% Apr 91% May 92% Jun 89% Jul 90% Aug 90% Sep 92% Oct 94% Nov 95% Dec 95%												92.4%		
Stage A - flight activity																
Daytime areal bird density		birds/sq km 0.23464 0.0287 0.0114 0 0.014821 0 0.111784 0 0.073323 0.206373 0.392022 0.005461														
Proportion at rotor height		% 26.3%														
Total daylight hours per month		hrs 255 275 367 417 488 503 506 457 382 331 264 240														
Total night hours per month		hrs 489 397 377 303 256 217 238 287 338 413 456 504														
Flux factor		68193 7910 3683 0 5312 0 40656 0 23507 64530 112198 1563														
Option 1 -Basic model - Stages B, C and D																
Potential bird transits through rotors		17935 2080 969 0 1397 0 10693 0 6182 16971 29508 411												per annum 86146		
Collision risk for single rotor transit		(from sheet 3) 6.7%														
Collisions for entire windfarm, allowing for non-op time, assuming no avoidance		birds per month or year 1146 131 60 0 86 0 646 0 383 1074 1890 26												5442		
Option 2-Basic model using proportion from flight distribution																
		0 0 0 0 0 0 0 0 0 0 0 0												0		
Option 3-Extended model using flight height distribution																
Proportion at rotor height		(from sheet 4) 0.0%														
Potential bird transits through rotors		Flux integral 0.0457 3115 361 168 0 243 0 1857 0 1074 2948 5125 71												14963		
Collisions assuming no avoidance		Collision integral 0.00141 92 10 5 0 7 0 52 0 31 86 151 2												434		
Average collision risk for single rotor transit		3.1%														
Stage E - applying avoidance rates																
Using which of above options?		Option 1 0.00% 1146 131 60 0 86 0 646 0 383 1074 1890 26												5442		
Collisions assuming avoidance rate		birds per month or year 0.00% 1146 131 60 0 86 0 646 0 383 1074 1890 26												5442		
		99.40% 7 1 0 0 1 0 4 0 2 6 11 0												33		
		99.50% 6 1 0 0 0 0 3 0 2 5 9 0												27		
		99.60% 5 1 0 0 0 0 3 0 2 4 8 0												22		
Collisions after applying large array correction																
		0.00% 1135 129 59 0 85 0 639 0 379 1063 1870 26												5386		
		99.40% 7 1 0 0 1 0 4 0 2 6 11 0												33		
		99.50% 5.7 0.7 0.3 0.0 0.4 0.0 3.2 0.0 1.9 5.4 9.4 0.1												27.2		
		99.60% 5 1 0 0 0 0 3 0 2 4 8 0												22		

East Anglia THREE Offshore Windfarm.....September 2016

Great black-backed gull

COLLISION RISK ASSESSMENT		used in overall collision risk sheet	used in available hours sheet
Sheet 1 - Input data		used in migrant collision risk sheet	used in large array correction sheet
		used in single transit collision risk sheet or extended model	not used in calculation but stated for re
	Units	Value	Data sources
Bird data			
Species name		Great black-backed gull	
Bird length	m	0.71	
Wingspan	m	1.58	
Flight speed	m/sec	13.7	
Nocturnal activity factor (1-5)		3	
Flight type, flapping or gliding		flapping	
Data sources			
Bird survey data		Jan	Feb
Daytime bird density	birds/sq km	0	0.022
Proportion at rotor height	%	23.3%	0.0825
Proportion of flights upwind	%	50.0%	0
Data sources			
Birds on migration data		Mar	Apr
Migration passages	birds	0	0
Width of migration corridor	km	0	0
Proportion at rotor height	%	0	0
Proportion of flights upwind	%	0	0
Data sources			
Windfarm data		May	Jun
Name of windfarm site		EA ONE	0.02417
Latitude	degrees	52.67	0.00083
Number of turbines		102	0
Width of windfarm	km	33.25	0
Tidal offset	m	0	0
Data sources			
Turbine data		Jul	Aug
Turbine model		7MW turbine	0
No of blades		3	0
Rotation speed	rpm	10.3	0
Rotor radius	m	77	0
Hub height	m	99.65	0
Monthly proportion of time operational	%	95%	94%
Max blade width	m	5.000	92%
Pitch	degrees	15	91%
Data sources			
Avoidance rates used in presenting results		May	Jun
		92%	89%
		92%	90%
		90%	92%
		94%	95%
		95%	95%
Data sources (if applicable)			

East Anglia THREE Offshore Windfarm.....September 2016

COLLISION RISK ASSESSMENT															
Sheet 2 - Overall collision risk															
All data input on Sheet 1:															
no data entry needed on this sheet!															
from Sheet 1 - input data															
from Sheet 6 - available hours															
from Sheet 3 - single transit collision risk															
from survey data															
calculated field															
Bird details:															
Species	Great black-backed gull														
Flight speed	m/sec	13.7													
Nocturnal activity factor (1-5)		3													
Nocturnal activity (% of daytime)		50%													
Windfarm data:															
Latitude	degrees	52.7													
Number of turbines		102													
Rotor radius	m	77													
Minimum height of rotor	m	99.65													
Total rotor frontal area	sq m	1899903													
Proportion of time operational	%		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year average
			95%	94%	92%	91%	92%	89%	90%	90%	92%	94%	95%	95%	92.4%
Stage A - flight activity															
Daytime areal bird density	birds/sq km		0	0.022	0.0825	0	0	0.024167	0.000833	0	0.018626	0.000755	1.165847	0.0275	
Proportion at rotor height	%	23.3%													
Total daylight hours per month	hrs		255	275	367	417	488	503	506	457	382	331	264	240	
Total night hours per month	hrs		489	397	377	303	256	217	238	287	338	413	456	504	
Flux factor			0	6341	27873	0	0	8992	317	0	6245	247	348952	8230	
Option 1 -Basic model - Stages B, C and D															
Potential bird transits through rotors			0	1479	6503	0	0	2098	74	0	1457	58	81410	1920	per annum
Collision risk for single rotor transit	(from sheet 3)	7.1%													94999
Collisions for entire windfarm, allowing for non-op time, assuming no avoidance	birds per month or year		0	98	424	0	0	132	5	0	95	4	5485	129	6371
Option 2-Basic model using proportion from flight distribution															
			0	0	0	0	0	0	0	0	0	0	0	0	0
Option 3-Extended model using flight height distribution															
Proportion at rotor height	(from sheet 4)	0.0%													
Potential bird transits through rotors	Flux integral	0.0457	0	290	1273	0	0	411	14	0	285	11	15941	376	18602
Collisions assuming no avoidance	Collision integral	0.00175	0	10	45	0	0	14	0	0	10	0	583	14	677
Average collision risk for single rotor transit		3.8%													
Stage E - applying avoidance rates															
Using which of above options?	Option 1	0.00%	0	98	424	0	0	132	5	0	95	4	5485	129	6371
Collisions assuming avoidance rate	birds per month or year														
	0.00%		0	98	424	0	0	132	5	0	95	4	5485	129	6371
	99.40%		0	1	3	0	0	1	0	0	1	0	33	1	38
	99.50%		0	0	2	0	0	1	0	0	0	0	27	1	32
	99.60%		0	0	2	0	0	1	0	0	0	0	22	1	25
Collisions after applying large array correction															
	0.00%		0	97	419	0	0	130	5	0	94	4	5426	127	6302
	99.40%		0	1	3	0	0	1	0	0	1	0	33	1	38
	99.50%		0.0	0.5	2.1	0.0	0.0	0.7	0.0	0.0	0.5	0.0	27.4	0.6	31.9
	99.60%		0	0	2	0	0	1	0	0	0	0	22	1	25

East Anglia THREE Offshore Windfarm.....September 2016

Herring gull

COLLISION RISK ASSESSMENT		used in overall collision risk sheet	used in available hours sheet
Sheet 1 - Input data		used in migrant collision risk sheet	used in large array correction sheet
		used in single transit collision risk sheet or extended model	not used in calculation but stated for re
	Units	Value	Data sources
Bird data			
Species name		Herring gull	
Bird length	m	0.60	
Wingspan	m	1.44	
Flight speed	m/sec	12.8	
Nocturnal activity factor (1-5)		3	
Flight type, flapping or gliding		flapping	
Data sources			
Bird survey data		Jan	Feb
Daytime bird density	birds/sq km	0.04241	0.04475
Proportion at rotor height	%	29.4%	
Proportion of flights upwind	%	50.0%	
Data sources			
Birds on migration data		Mar	Apr
Migration passages	birds	0	0
Width of migration corridor	km	8	
Proportion at rotor height	%	25%	
Proportion of flights upwind	%	50.0%	
Data sources			
Windfarm data		May	Jun
Name of windfarm site		EA ONE	
Latitude	degrees	52.67	
Number of turbines		102	
Width of windfarm	km	33.25	
Tidal offset	m	0	
Data sources			
Turbine data		Jul	Aug
Turbine model		7MW turbine	
No of blades		3	
Rotation speed	rpm	10.3	
Rotor radius	m	77	
Hub height	m	99.65	
Monthly proportion of time operational	%	95%	94%
Max blade width	m	5.000	
Pitch	degrees	15	
Data sources			
Avoidance rates used in presenting results		Oct	Nov
		92%	94%
		95%	95%
		99.40%	
		99.50%	
		99.60%	
Data sources (if applicable)			

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COLLISION RISK ASSESSMENT															
Sheet 2 - Overall collision risk															
		All data input on Sheet 1:													
		no data entry needed on this sheet!													
Bird details:															
Species		Herring gull													
Flight speed		m/sec	12.8												
Nocturnal activity factor (1-5)		3													
Nocturnal activity (% of daytime)		50%													
Windfarm data:															
Latitude		degrees	52.7												
Number of turbines		102													
Rotor radius		m	77												
Minimum height of rotor		m	99.65												
Total rotor frontal area		sq m	1899903												
Proportion of time operational		%	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year average
			95%	94%	92%	91%	92%	89%	90%	90%	92%	94%	95%	95%	92.4%
Stage A - flight activity															
Daytime areal bird density		birds/sq km	0.04241	0.04475	0.0264	0	0.00974	0	0	0	0.023203	0	0.42306	0.112566	
Proportion at rotor height		%	29.4%												
Total daylight hours per month		hrs	255	275	367	417	488	503	506	457	382	331	264	240	
Total night hours per month		hrs	489	397	377	303	256	217	238	287	338	413	456	504	
Flux factor			12043	12051	8334	0	3411	0	0	0	7269	0	118308	31475	
Option 1 -Basic model - Stages B, C and D															
Potential bird transits through rotors			3538	3541	2448	0	1002	0	0	0	2135	0	34759	9247	per annum
Collision risk for single rotor transit		(from sheet 3)	6.9%												
Collisions for entire windfarm, allowing for non-op time, assuming no avoidance		birds per month or year	231	228	155	0	63	0	0	0	135	0	2277	603	3693
Option 2-Basic model using proportion from flight distribution															
			0	0	0	0	0	0	0	0	0	0	0	0	0
Option 3-Extended model using flight height distribution															
Proportion at rotor height		(from sheet 4)	0.0%												
Potential bird transits through rotors		Flux integral	0.0457	550	551	381	0	156	0	0	0	332	0	5405	1438
Collisions assuming no avoidance		Collision integral	0.00183	21	21	14	0	6	0	0	0	12	0	206	55
Average collision risk for single rotor transit			4.0%												
Stage E - applying avoidance rates															
Using which of above options?		Option 1	0.00%	231	228	155	0	63	0	0	0	135	0	2277	603
Collisions assuming avoidance rate		birds per month or year	0.00%	231	228	155	0	63	0	0	0	135	0	2277	603
			99.40%	1	1	1	0	0	0	0	0	1	0	14	4
			99.50%	1	1	1	0	0	0	0	0	1	0	11	3
			99.60%	1	1	1	0	0	0	0	0	1	0	9	2
Collisions after applying large array correction															
			0.00%	229	225	154	0	63	0	0	0	134	0	2253	597
			99.40%	1	1	1	0	0	0	0	0	1	0	14	4
			99.50%	1.2	1.1	0.8	0.0	0.3	0.0	0.0	0.0	0.7	0.0	11.4	3.0
			99.60%	1	1	1	0	0	0	0	0	1	0	9	2

Appendix 2 – Revised Cumulative and In-combination CRM for Gannet, Kittiwake, Lesser black-backed gull, Great black-backed gull and Herring gull

Table A2.1. Updated gannet collision risk. This table includes revised estimates for Hornsea Project Two and updated values for East Anglia ONE. Collisions have been apportioned to the Flamborough and Filey Coast pSPA in each season and summed for the year. The percentage apportioned in the breeding season has been calculated using the percentages presented in EATL (2015c).

Tier	Project	Breeding season			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
1	Beatrice Demonstrator	0.6	0	0.0	0.9	1.9	0.02	0.7	3.3	0.02	2.2	0.0	1
1	Greater Gabbard	14.0	0	0.0	8.8	4.2	0.37	4.8	5.6	0.27	27.5	0.6	2
1	Gunfleet Sands	0.0	0	0.0	0.0	4.2	0.00	0.0	5.6	0.00	0.0	0.0	1
1	Kentish Flats	1.4	0	0.0	0.8	4.2	0.03	1.1	5.6	0.06	3.3	0.1	1
1	Lincs	2.1	100	2.1	1.3	4.2	0.05	1.7	5.6	0.09	5.0	2.2	2
1	London Array	2.3	0	0.0	1.4	4.2	0.06	1.8	5.6	0.10	5.5	0.2	2
1	Lynn and Inner Dowsing	0.2	100	0.2	0.1	4.2	0.01	0.2	5.6	0.01	0.5	0.2	1
1	Scroby Sands	0.0	100	0.0	0.0	4.2	0.00	0.0	3.3	0.00	0.0	0.0	1
1	Sheringham Shoal	14.1	100	14.1	3.5	4.2	0.15	0.0	3.3	0.00	17.6	14.2	2
1	Teesside	4.9	50	2.4	1.7	1.5	0.03	0.0	5.6	0.00	6.7	2.5	2
1	Thanet	1.1	0	0.0	0.0	4.2	0.00	0.0	5.6	0.00	1.1	0.0	2
1	Humber Gateway	1.9	100	1.9	1.1	4.2	0.05	1.5	5.6	0.08	4.5	2.0	2
1	Westernmost Rough	0.2	100	0.2	0.1	1.5	0.00	0.2	5.6	0.01	0.5	0.2	2
3	Beatrice	37.4	0	0.0	48.8	1.9	0.93	9.5	3.3	0.31	95.7	1.2	3
3	Blyth Demonstration Project	3.5	0	0.0	2.1	1.5	0.03	2.8	5.6	0.16	8.4	0.2	2
3	Dogger Bank Creyke Beck Projects A and B	5.6	50	2.8	6.6	1.5	0.10	4.3	5.6	0.24	16.5	3.1	4
3	Dudgeon	22.3	100	22.3	38.9	4.2	1.64	19.1	5.6	1.07	80.3	25.0	1
3	East Anglia ONE	2.3	100	2.3	89.1	4.2	3.74	4.3	5.6	0.24	96.0	6.3	6
3	EOWDC	4.2	0	0.0	5.1	1.8	0.09	0.1	3.4	0.00	9.3	0.1	2
3	Firth of Forth Alpha and Bravo	800.8	0	0.0	49.3	1.8	0.89	65.8	3.4	2.24	915.9	3.1	1
3	Galloper	18.1	0	0.0	30.9	4.2	1.30	12.6	5.6	0.71	61.6	2.0	2
3	Hornsea Project One	11.5	100	11.5	32.0	4.2	1.34	22.5	5.6	1.26	66.0	14.1	4
3	Inch Cape	336.9	0	0.0	29.2	1.8	0.53	5.2	3.4	0.18	371.3	0.7	2
3	Moray Firth (EDA)	80.6	0	0.0	35.4	1.9	0.67	8.9	3.3	0.29	124.9	1.0	1
3	Near na Gaoithe	509.3	0	0.0	26.1	1.8	0.47	34.8	3.4	1.18	570.1	1.7	2
3	Race Bank	33.7	100	33.7	11.7	4.2	0.49	4.1	5.6	0.23	49.5	34.4	2
3	Rampion	36.2	0	0.0	63.5	4.2	2.67	2.1	5.6	0.12	101.8	2.8	1
3	Dogger Bank Teesside Projects A and B	14.8	50	7.4	10.1	1.5	0.15	10.8	5.6	0.61	35.7	8.1	4

Tier	Project	Breeding season			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
4	Triton Knoll	26.8	100	26.8	64.1	4.2	2.69	30.1	5.6	1.69	121.0	31.1	2
4	Hornsea Project Two	7.0	100	7.0	14.0	4.2	0.59	6.0	5.6	0.34	27.0	7.9	5
4	East Anglia THREE	6.1	100	6.1	33.3	4.2	1.40	9.6	5.6	0.54	49.0	8.1	6
	TOTAL	1999.6		140.8	610.1		20.5	264.5		12.0	2874.5	173.3	

*Data sources:

1. Natural England (2014)
2. SmartWind (2015c)
3. Beatrice Offshore Windfarm Ltd. (2013)
4. Forewind (2014)
5. SmartWind (2015a)
6. Current document

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Table A2.2. Updated kittiwake collision risk. This table includes revised estimates for Hornsea Project Two and updated values for East Anglia ONE. Collisions have been apportioned to the Flamborough and Filey Coast pSPA in each season and summed for the year. The percentage apportioned in the breeding season has been calculated using the percentages presented in EATL (2015b; EA3 method) and also using the method presented in NE (2015; NE method) to assist comparison with the previous assessment for both wind farms. The annual total for FFC includes the breeding season estimates calculated using the EA3 method.

Tier	Project	Breeding season – EA3 method			Breeding season – NE method			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
1	Beatrice Demonstrator	0	16.8	0.0			0.0	2.1	5.4	0.11	1.7	7.2	0.12	4.95	0.2	1
1	Greater Gabbard	1.1	16.8	0.2			0.0	15	5.4	0.81	11.4	7.2	0.82	27.5	1.8	1
1	Gunfleet Sands	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Kentish Flats	0	16.8	0.0			0.0	0.9	5.4	0.05	0.7	7.2	0.05	2.2	0.1	1
1	Lincs	0.70	16.8	0.1	0.92	100	0.9	1.16	5.4	0.06	0.69	7.2	0.05	2.75	0.2	1
1	London Array	1.4	16.8	0.2			0.0	2.3	5.4	0.12	1.8	7.2	0.13	5.5	0.5	1
1	Lynn and Inner Dowsing	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Scroby Sands	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Sheringham Shoal	0	16.8	0.0			0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	2
1	Teesside	38.4	16.8	6.5			0.0	24	5.4	1.30	2.5	7.2	0.18	77.08	7.9	1
1	Thanet	0.3	16.8	0.1			0.0	0.5	5.4	0.03	0.4	7.2	0.03	1.1	0.1	1
1	Humber Gateway	1.9	100	1.9	2.55	100	2.6	3.19	5.4	0.17	1.9	7.2	0.14	7.7	2.2	1
1	Westermost Rough	0.10	100	0.1	0.18	100	0.2	0.22	5.4	0.01	0.132	7.2	0.01	0.55	0.1	1
3	Beatrice	94.7	16.8	15.9			0.0	10.7	5.4	0.58	39.8	7.2	2.87	145.2	19.4	3
3	Blyth Demonstration Project	1.4	16.8	0.2			0.0	2.3	5.4	0.12	1.4	7.2	0.10	5.39	0.5	1
3	Dogger Bank Creyke Beck Projects A and B	288.0	16.8	48.4	288	19.3	55.6	135	5.4	7.29	295	7.2	21.24	718.85	76.9	1
3	Dudgeon	0.0	16.8	0.0	0	100	0.0	0	5.4	0.00	0	7.2	0.00	0	0.0	1
3	East Anglia ONE	0.9	16.8	0.2			0.0	108.4	5.4	5.85	31.5	7.2	2.27	140.8	8.3	5
3*	EOWDC	11.8	16.8	2.0			0.0	5.8	5.4	0.31	1.1	7.2	0.08	18.7	2.4	1
3	Firth of Forth Alpha and Bravo	153.1	16.8	25.7			0.0	313.1	5.4	16.91	247.6	7.2	17.83	715	60.5	1
3	Galloper	6.3	16.8	1.1			0.0	27.8	5.4	1.50	31.8	7.2	2.29	65.89	4.8	1

Tier	Project	Breeding season – EA3 method			Breeding season – NE method			Post-breeding			Pre-breeding			Annual		Ref.*
		Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	% FFC pSPA	FFC pSPA	Total	FFC pSPA	
3	Hornsea Project One	44.0	16.8	7.4	47.9	66.6	31.9	55.9	5.4	3.02	20.9	7.2	1.50	122	11.9	1
3	Inch Cape	13.1	16.8	2.2			0.0	224.8	5.4	12.14	63.5	7.2	4.57	301.42	18.9	1
3	Moray Firth (EDA)	43.6	16.8	7.3			0.0	2	5.4	0.11	19.3	7.2	1.39	45.4	8.8	1
3	Near na Gaoithe	32.9	16.8	5.5			0.0	56.1	5.4	3.03	4.4	7.2	0.32	93.39	8.9	1
3	Race Bank	1.90	16.8	0.3	1.86	100	1.9	23.9	5.4	1.29	5.59	7.2	0.40	31.35	2.0	1
3	Rampion	54.40	16.8	9.1			0.0	37.4	5.4	2.02	29.7	7.2	2.14	121	13.3	1
3	Dogger Bank Teesside Projects A and B	136.9	16.8	23.0	136.9	19.3	26.4	90.7	5.4	4.90	216.9	7.2	15.62	444.4	43.5	1
4	Triton Knoll	24.60	16.8	4.1	24.6	100	24.6	139	5.4	7.51	45.4	7.2	3.27	209	14.9	1
4	Hornsea Project Two	16.0	16.8	2.7	16	83	13.3	9	5.4	0.49	3	7.2	0.22	27	3.4	4
4	East Anglia THREE	6.14	16.8	1.0			0.0	69	5.4	3.73	37.6	8.2	3.08	112.74	7.8	5
	TOTAL			165.2			157.3			73.5			80.7	3446.9	319.4	

*Data sources:

1. Natural England (2015)
2. Natural England (2014)
3. Beatrice Offshore Windfarm Ltd. (2013)
4. SmartWind (2015a)
5. Current document

Table A2.3. Updated lesser black-backed gull collision risk and updated values for East Anglia ONE. This table includes revised estimates for Hornsea Project Two. All collisions during the breeding season at wind farms located within 141 km of the Alde-Ore SPA have been apportioned to that population.

Tier	Project	Breeding season			Nonbreeding season		Ref.*
		Total	% Alde-Ore SPA	Alde-Ore SPA	Total	Total	
1	Beatrice Demonstrator	0.0			0.0	0.0	1
1	Greater Gabbard	12.4	100	12.4	49.6	62.0	2
1	Gunfleet Sands	1.0			0.0	1.0	1
1	Kentish Flats	0.3	100	0.3	1.3	1.6	3
1	Lincs	1.7			6.8	8.5	2
1	London Array	0.0			0.0	0.0	NA
1	Lynn and Inner Dowsing	0.0			0.0	0.0	1
1	Scroby Sands	0.0			0.0	0.0	1
1	Sheringham Shoal	1.7	100	1.7	6.6	8.3	2
1	Teesside	0.0			0.0	0.0	NA
1	Thanet	3.2	100	3.2	12.8	16.0	2
1	Humber Gateway	0.3			1.1	1.3	2
1	Westermost Rough	0.1			0.3	0.3	2
3	Beatrice	0.0			0.0	0.0	NA
3	Blyth Demonstration Project	0.0			0.0	0.0	NA
3	Dogger Bank Creyke Beck Projects A and B	2.6			10.4	13.0	2
3	Dudgeon	7.7	100	7.7	30.6	38.3	1
3	East Anglia ONE	4.0	100	4.0	23.0	27.0	7
3	EOWDC	0.0			0.0	0.0	NA
3	Firth of Forth Alpha and Bravo	2.1			8.4	10.5	2
3	Galloper	27.8	100	27.8	111.0	138.8	4
3	Hornsea Project One	4.4			17.4	21.8	2
3	Inch Cape	0.0			0.0	0.0	NA
3	Moray Firth (EDA)	0.0			0.0	0.0	NA
3	Near na Gaoithe	0.3			1.2	1.5	1
3	Race Bank	43.2			10.8	54.0	2
3	Rampion	1.6			6.3	7.9	1
3	Dogger Bank Teesside Projects A and B	2.4			9.6	12.0	2
4	Triton Knoll	7.4			29.6	37.0	5
4	Hornsea Project Two	2.0			2.0	4.0	6
4	East Anglia THREE	1.8	100	1.8	8.2	10.0	7
	TOTAL	127.7		58.8	346.9	474.6	

*Data sources:

1. E.ON (2013a)
2. SmartWind (2015b)
3. KFWL (2011)
4. RWE (2011)
5. Kentish Flats Offshore Wind Farm Extension (2011)
6. SmartWind (2015a)
7. Current document

Table A2.4. Updated great black-backed gull collision risk and updated values for East Anglia ONE. This table includes revised estimates for Hornsea Project Two.

Tier	Project	Breeding season	Nonbreeding season	Annual	Ref.*
1	Beatrice Demonstrator	0.0	0.0	0.0	NA
1	Greater Gabbard	15.0	60.0	75.0	1
1	Gunfleet Sands	0.0	0.0	0.0	2
1	Kentish Flats	0.1	0.2	0.3	2
1	Lincs	0.0	0.0	0.0	2
1	London Array	0.0	0.0	0.0	2
1	Lynn and Inner Dowsing	0.0	0.0	0.0	NA
1	Scroby Sands	0.0	0.0	0.0	NA
1	Sheringham Shoal	0.0	0.0	0.0	NA
1	Teesside	8.7	34.8	43.6	3
1	Thanet	0.1	0.4	0.5	3
1	Humber Gateway	1.3	5.1	6.3	2
1	Westermost Rough	0.0	0.0	0.1	2
3	Beatrice	30.2	120.8	151.0	4
3	Blyth Demonstration Project	1.3	5.1	6.3	5
3	Dogger Bank Creyke Beck Projects A and B	5.8	23.3	29.1	3
3	Dudgeon	0.0	0.0	0.0	NA
3	East Anglia ONE	0.0	32.0	32.0	8
3	EOWDC	0.6	2.4	3.0	3
3	Firth of Forth Alpha and Bravo	13.4	53.4	66.8	3
3	Galloper	4.5	18.0	22.5	6
3	Hornsea Project One	17.2	68.6	85.8	2
3	Inch Cape	0.0	36.8	36.8	2
3	Moray Firth (EDA)	9.5	25.5	35.0	2
3	Nearr na Gaoithe	0.9	3.6	4.5	2
3	Race Bank	0.0	0.0	0.0	NA
3	Rampion	5.2	20.8	26.0	8
3	Dogger Bank Teesside Projects A and B	6.4	25.5	31.9	3
4	Triton Knoll	24.4	97.6	122.0	2
4	Hornsea Project Two	3.0	20.0	23.0	7
4	East Anglia THREE	4.6	34.4	39.0	8
	TOTAL	152.1	688.3	840.4	

*Data sources:

1. Banks et al. (2006)
2. SmartWind (2014)
3. SmartWind (2015b)
4. Beatrice Offshore Windfarm Ltd. (2013)
5. Engena (2007)
6. RWE (2011)
7. SmartWind (2015a)
8. Current document

Table A2.5. Updated herring gull collision risk and updated values for East Anglia ONE. This table includes revised estimates for Hornsea Project Two.

Tier	Project	Breeding season	Nonbreeding season	Annual	Ref.*
1	Beatrice Demonstrator	0.0		0.0	NA
1	Greater Gabbard	0.0		0.0	1
1	Gunfleet Sands	0.0		0.0	1
1	Kentish Flats	0.5	1.7	2.2	1
1	Lincs	0.0		0.0	1
1	London Array	0.0		0.0	1
1	Lynn and Inner Dowsing	0.0		0.0	NA
1	Scroby Sands	0.0		0.0	NA
1	Sheringham Shoal	0.0		0.0	NA
1	Teesside	8.7	34.5	43.2	1
1	Thanet	4.9	19.6	24.5	1
1	Humber Gateway	0.4	1.1	1.5	3
1	Westermost Rough	0.1	0.0	0.1	1
3	Beatrice	49.4	197.4	246.8	4
3	Blyth Demonstration Project	0.5	2.2	2.7	5
3	Dogger Bank Creyke Beck Projects A and B	0.0		0.0	NA
3	Dudgeon	0.0		0.0	1
3	East Anglia ONE	0.0	18.0	18.0	11
3	EOWDC	4.8		4.8	1
3	Firth of Forth Alpha and Bravo	10.0	21.0	31.0	6
3	Galloper	27.2		27.2	1
3	Hornsea Project One	2.9	11.6	14.5	1
3	Inch Cape	0.0	13.5	13.5	7
3	Moray Firth (EDA)	52.0		52.0	8
3	Near na Gaoithe	5.0	12.5	17.5	9
3	Race Bank	0.0		0.0	1
3	Rampion	155.0		155.0	10
3	Dogger Bank Teesside Projects A and B	0.0		0.0	1
4	Triton Knoll	0.0		0.0	1
4	Hornsea Project Two	23.8		23.8	2
4	East Anglia THREE	23.0		23.0	11
	TOTAL	368.0	333.1	701.1	

*Data sources:

1. SmartWind (2014)
2. SmartWind (2015b)
3. Institute of Estuarine and Coastal Studies (2007)
4. Beatrice Offshore Windfarm Ltd. (2013)
5. Engena (2007)
6. Seagreen (2012)
7. RPS (2013)
8. Natural Power (2013)
9. Bureau Wardenburg (2013)
10. E.ON (2013b)
11. Current document

Appendix 3 – East Anglia ONE updated collision risk estimates for 150 turbines

Table A3.1. Seabird collision mortality at East Anglia ONE using Band Option 1. Monthly and annual values calculated for the updated wind farm design (Table 2) but using 150 turbines. Bird densities and biometrics from Tables 3 and 4.

Species	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual total
Gannet	98.7	1	0	2	0	0	0	0	4	6	27	122	5	167
	98.9	1	0	1	0	0	0	0	3	5	23	104	4	141
	99.1	1	0	1	0	0	0	0	3	4	19	84	3	115
Kittiwake	98.7	23	13	19	0	0	0	1	0	0	2	108	79	246
	98.9	20	11	16	0	0	0	1	0	0	2	91	67	209
	99.1	16	9	13	0	0	0	1	0	0	1	75	55	171
Lesser black-backed gull	99.4	10	1	1	0	1	0	6	0	3	9	17	0	48
	99.5	9	1	1	0	1	0	5	0	3	8	14	0	40
	99.6	7	1	1	0	1	0	4	0	2	7	11	0	32
Herring gull	99.4	2	2	1	0	1	0	0	0	1	0	20	5	32
	99.5	2	2	1	0	1	0	0	0	1	0	17	5	28
	99.6	1	1	1	0	1	0	0	0	1	0	13	3	21
Great black-backed gull	99.4	0	1	4	0	0	1	0	0	1	0	48	1	56
	99.5	0	1	3	0	0	1	0	0	1	0	40	1	46
	99.6	0	1	3	0	0	1	0	0	1	0	32	1	38

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