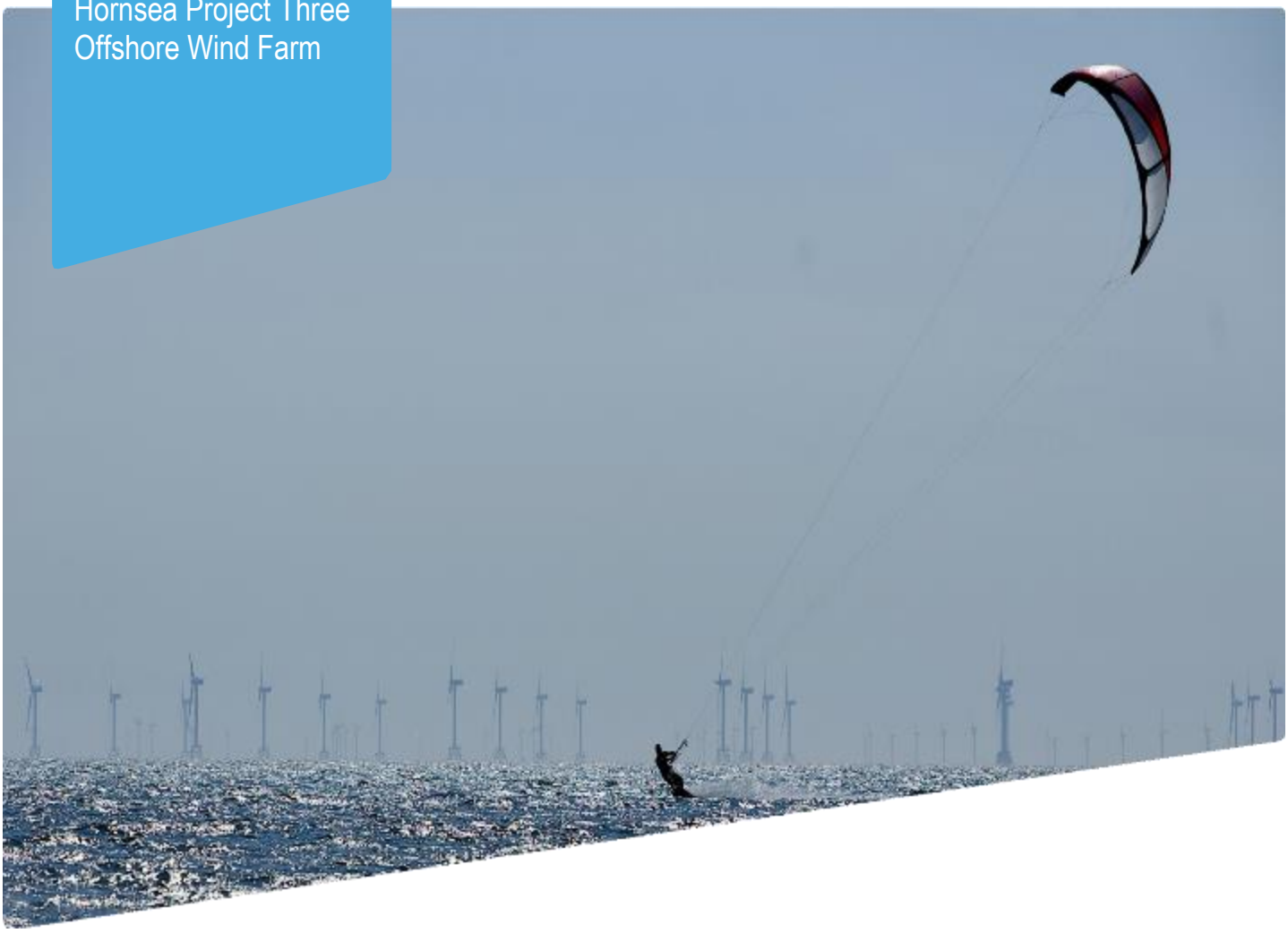
Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three

Offshore Wind Farm

Appendix 37 to Deadline 7 submission – East Anglia Three HRA

Date: 14th March 2019

Hornsea 3
Offshore Wind Farm

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Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2019.

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

CONTENTS

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 website[1] 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]

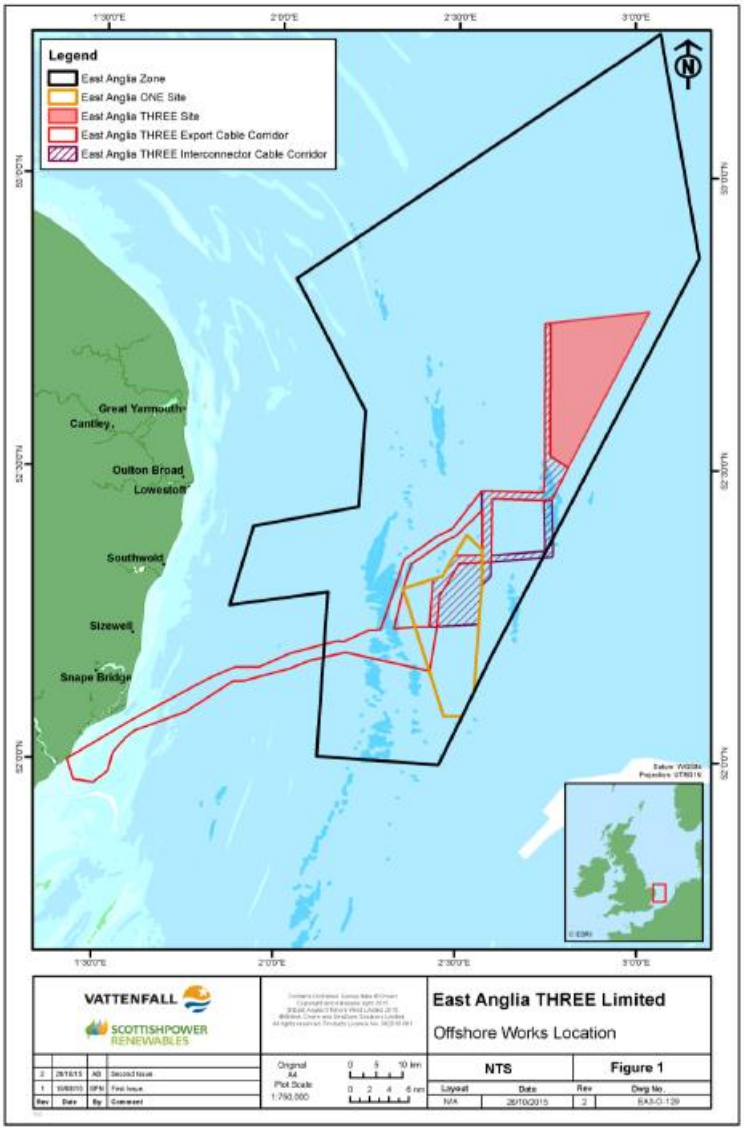
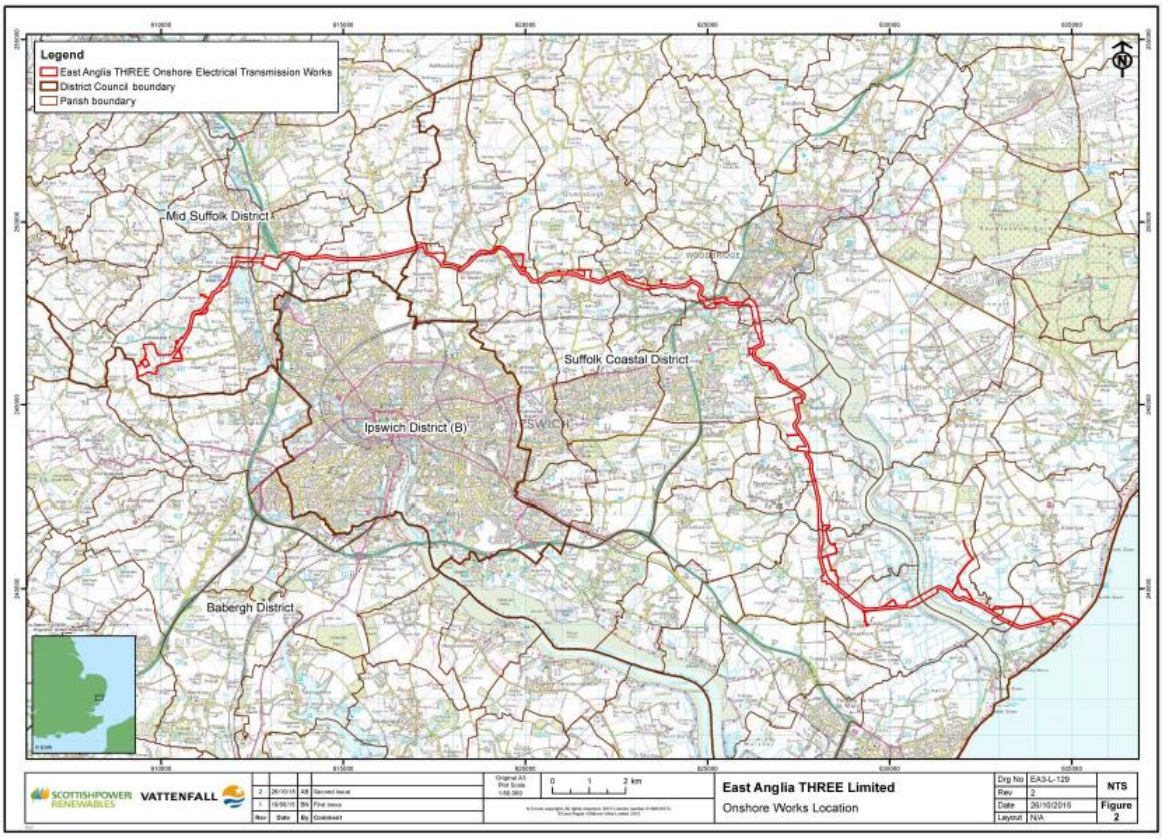


Figure 2: Location of export cable landfall and route through Suffolk from the landfall at Bawdsey to the National Grid substation near Bramford [APP-274]



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 piling[23]. 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 2015[4]. These are set out in Table 2 below.

Table 2 Draft conservation Objectives for Flamborough and Filey Coast pSPA

Conservation Objectives	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; • 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.

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 Demonstator
- 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 precautious 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 precautious 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

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	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; • 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.

7.2. The Conservation Objectives available on the NE website lists breeding black-legged kittiwake *Rissa tridactyla* as the only feature[6].

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 cuspate 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 site[7].

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 are[8]:

- *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	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; • 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.

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 x 3.3% = 0.198 birds
- Winter (November-February): 2 x 10% = 0.2 birds
- Spring (March-April): 1 x 3.3% = 0.033 birds
- Migration-free breeding season (May-July): 2 x 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	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: • Intertidal mudflat communities • Saltmarsh communities

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 change'[9].

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 met[10]:

- 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 objectives[11] 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	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; • 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.

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 to 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 secures 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 951km^2. 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 document[12] 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	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: • 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.

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 281.6km^2. 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 13,469km^2, 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/km^2) 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 2,829.5km^2 (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 AEOI ["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 AEOI*."

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, AEoI 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 (≤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 the10% 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 AEOI and that the SIP also provides a framework to secure the development and implementation of specific mitigation measures (if required) to avoid AEOI*." [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 (≤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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