



**SCOTTISHPOWER
RENEWABLES**

East Anglia ONE North Windfarm

Habitat Regulations Assessment Appendix 3

Habitat Regulations Assessment – Integrity Matrices

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Glossary of Acronyms

AFL	Agreement for lease
AONB	Area of Outstanding Natural Beauty
DCO	Development Consent Order
EAOW	East Anglia Offshore Wind
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
IEMA	Institute of Environmental Management and Assessment
MW	Megawatt
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
PEIR	Preliminary Environmental Information Report
SPR	ScottishPower Renewables
UK	United Kingdom
VWPL	Vattenfall Wind Power Limited
ZDA	Zone Development Agreement

Glossary of Terminology

Applicant	East Anglia ONE North Limited.
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.
Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms, these cables will include fibre optic cables.
Jointing bay	Underground structures constructed at intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Meteorological mast	An offshore structure which contains metrological instruments used for wind data acquisition.
Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia ONE North project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the neONE Southrk of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Offshore cable corridor	This is the area which will contain the offshore export cables between offshore electrical platforms and landfall.
Offshore development area	The East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs).

Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall. These cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the construction, operation and maintenance platform and the offshore electrical platforms.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to ONE South fibre optic cables and up to ONE South distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia ONE North project from landfall to the connection to the national electricity grid.
Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre-planting of landscaping works, archaeological investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.
Onshore substation	The East Anglia ONE North substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia ONE North project.
Platform link cable	Electrical cable which links one or more offshore platforms. These cables will include fibre optic cables.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

1 Introduction

1. This document provides the Habitats Regulations Assessment (HRA) integrity matrices for the proposed East Anglia ONE North project. The matrices summarise information provided in the Information to Support Appropriate Assessment report (document reference 5.3).

2 Integrity Matrices

2. Following screening of potential impacts of East Anglia ONE North on European designated sites (as presented in Appendix 5.1 and Appendix 5.2 of the Information to Support Appropriate Assessment (AA) Report (document reference 5.3)), the following features (**Table 2.1**) of European Sites were assessed to determine if there was a risk of Adverse Effects on the Integrity (AEOI) of their qualifying features in the Information to Support AA Report (document reference 5.3).

Table 2.1 European designated sites and qualifying features screened in

Site	Qualifying feature
Sandlings SPA	Breeding populations of nightjar <i>Caprimulgus europaeus</i> and woodlark <i>Lullula arborea</i>
Outer Thames Estuary SPA	Red throated diver <i>Gavia stellata</i>
Greater Wash SPA	Red throated diver <i>Gavia stellata</i> Little gull <i>Hydrocoloeus minutus</i>
Alde-Ore Estuary SPA	Breeding lesser black-backed gulls <i>Larus fuscus</i>
Alde-Ore Estuary Ramsar	Notable assemblage of breeding and wintering wetland birds.
Breydon Water SPA and Ramsar	Wintering and passage waterbird assemblage including: Bewick's swan <i>Cygnus columbianus bewickii</i> European golden plover <i>Pluvialis apricaria</i> pied avocet <i>Recurvirostra avosetta</i> northern lapwing <i>Vanellus vanellus</i>
Broadland SPA and Ramsar	Wintering and passage waterbird assemblage including: Bewick's swan Eurasian wigeon <i>Anas Penelope</i> Gadwall <i>Anas Strepera</i> Northern shoveller <i>Anas clypeata</i> marsh harrier <i>Circus aeruginosus</i> .
North Norfolk Coast SPA and Ramsar	Wintering and passage waterbird assemblage including: Eurasian wigeon pink-footed goose dark-bellied brent goose <i>Branta bernicla bernicla</i> , red knot <i>Calidris canutus</i> ,

Site	Qualifying feature
	<p>pieb avocet</p> <p>marsh harrier</p>
Flamborough and Filey Coast SPA	<p>Breeding seabirds:</p> <p>Gannet <i>Morus bassanus</i></p> <p>Kittiwake <i>Rissa tridactyla</i></p> <p>Razorbill <i>Alca torda</i></p> <p>Guillemot <i>Uria aalge</i></p>
Southern North Sea SAC	Harbour porpoise <i>Phocoena phocoena</i>
The Wash and North Norfolk SAC	Harbour seal <i>Phoca vitulina</i>
Humber Estuary SAC	Grey seal <i>Halichoerus grypus</i>
Vlaamse Banken SAC	Grey seal <i>Halichoerus grypus</i>
Voordelta SAC and SPA	Grey seal <i>Halichoerus grypus</i>

3. A summary of the evidence presented in the determination of the risk of AEOI on the relevant qualifying features is detailed within the footnotes to the integrity matrices below.
4. The following abbreviations are used within the integrity matrices:
 - Y – AEOI **cannot** be excluded
 - N - AEOI **can** be excluded
 - C = construction
 - O = operation
 - D = decommissioning
5. Where effects are not applicable to a particular feature they are greyed out.

1.1 Sandlings SPA

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>a) The results of the Extended Phase 1 Habitat Survey (ES Figure 22.3.3) found no suitable nightjar habitat (taken to be heath, coniferous woodland or scattered trees) within the onshore development area, apart from a small amount of scrub in the part where it overlaps with the northernmost part of the Sandlings SPA, which is dominated in parts by bracken. The proposed East Anglia ONE North project design has minimised the overlap of the onshore cable route with the SPA, choosing a crossing at the narrowest point. Where the onshore cable corridor crosses this part of the SPA, an open cut crossing technique is the preferred crossing methodology. When using an open cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) within the Sandlings SPA for a length up to 300m depending on the detailed design when crossing the Sandlings SPA. This would be microsituated to minimise the risk of impacts on SPA qualifying features, based on results of baseline and pre-construction surveys.</p> <p>Open trench works associated with crossing the SPA (including works within 200m of the SPA boundary) will be undertaken within approximately three months of excavation works commencing (comprising approximately one month within the boundary of the SPA and approximately two months within 200m of the boundary of the SPA). The Applicant has further committed to conducting this estimated one month of open cut trenching through the SPA outside of the breeding bird season, therefore minimising potential impacts to the features of the SPA. The breeding bird season is considered to be mid-February to August inclusive. This will be confirmed through the Environmental Monitoring Plan. HDD works associated with crossing the SPA (including the establishment and subsequent removal of HDD entry pit and exit pit working areas) will be undertaken over a two year period with works restricted to up to six months per year due to the seasonal restriction.</p> <p>Based on the information provided above, and the distribution of nightjars within the main SPA extent only, it is therefore considered unlikely that any important habitat for nesting or foraging nightjars would be affected during the construction of infrastructure associated with the proposed East Anglia ONE North project. This would be the conclusion for open-cut trenching methods, or if HDD techniques are used. As such it can be reasonably</p>									

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to habitat loss on nightjar (section 3.3.2.3.1 of Information to Support Appropriate Assessment Report (document reference 5.3)).</p> <p>b) Following construction, all habitats along the onshore cable corridor will be fully re-instated, including any affected habitats within the SPA. During the operational period, the onshore substation and National Grid infrastructure would be present. These would however be in unsuitable habitat over 2km from the SPA, meaning there will be no permanent SPA habitat loss. No habitat for nesting or foraging nightjars would be lost due to the operation of the onshore infrastructure associated with the proposed East Anglia ONE North project. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational habitat loss on nightjar (see section 3.3.2.3.2 of Information to Support Appropriate Assessment Report (document reference 5.3)).</p> <p>c) No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, secured under the requirements of the draft DCO. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left in situ or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase (see Table 3.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>d) Given the seasonal and spatial restrictions associated with the SPA crossing, it is considered unlikely that any nesting nightjars would be subject to disturbance during the construction period. Although works along the remainder of the onshore cable corridor (beyond 200m from the SPA crossing) could take place within the nightjar breeding season, it is considered unlikely that any breeding nightjars would be disturbed by this, occurring beyond 200m from any probable nest site locations, in unsuitable foraging habitat. It is therefore predicted that there would be no loss of any nightjar breeding</p>									

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>territories under either the open-cut trenching or HDD scenarios (see section 3.3.2.4.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>e) During the operational period, routine maintenance is not anticipated for the onshore cable route. Emergency repairs are expected to be infrequent and short-term in duration. Temporary task lighting may be used in any area in which maintenance or repair works are being undertaken, but due to the distance from the nearest territories within the SPA (likely to be over 200m), this would be unlikely to affect any nightjars, even over a short-term period. Operational lighting will be required for maintenance activities at the onshore substation and National Grid substation only, and under normal conditions the onshore and National Grid substations would not be permanently lit. An Artificial Light Emissions Management Plan will be developed for the final design for the permanent infrastructure, as secured under the requirements of the draft DCO, which will include measures to minimise light spill. As the infrastructure is over 2km from the SPA, no nightjars would be affected by this lighting. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational effects on nightjar (see section 3.3.2.4.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>f) Where the onshore cable corridor crosses the northernmost part of the SPA, an open cut crossing technique is the preferred crossing methodology. When using an open cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) within the Sandlings SPA for a length up to 300m depending on the detailed design when crossing the Sandlings SPA. This would be microsituated to minimise the risk of impacts on SPA qualifying features, based on the results of baseline and pre-construction surveys. Some habitat within the northern part of the SPA would therefore be lost during the construction phase should open-cut trenching be conducted. However from 2018 baseline survey data, and historic RSPB data since 2008, woodlarks were not recorded in this area of the SPA, showing that it is not likely to be part of any territories. The habitat here mainly comprises dense scrub, dominated by bracken in places, which is less suited to woodlarks. If an HDD technique were to be employed to cross the SPA, the HDD entrance and exit pit temporary working areas would be located outside of the SPA. No SPA habitat would therefore be lost, with any non-SPA habitats affected by HDD works likely to be unsuitable for woodlark. No habitat loss impact from within the SPA is therefore predicted,</p>									

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>regardless of whether open-cut trenching or HDD techniques are used to cross the SPA. (see section 3.3.3.3.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>g) Of the three territories identified in proximity to the onshore development area in 2018, one was within 200m of the northernmost part of the SPA where a crossing of the cable corridor is required. The likelihood and extent of this territory being affected would depend on the seasonal and spatial restrictions of open-cut trenching or HDD crossing techniques. Works associated with open-cut trenching of the SPA crossing would take an estimated one month to complete, and occur outside of the woodlark breeding season. The closest breeding territory would therefore be unaffected by any disturbance impacts. Disturbance to any woodlarks present within the SPA during the non-breeding season when open-cut trenching would take place, are considered to be unlikely due to the low suitability of habitat, and would not impact on an individual's fitness or survival. If an HDD technique is used to cross the SPA, associated works within 200m of the SPA crossing area would also take place outside of the breeding season, although the phases of construction may be undertaken over ONE South years to comply with the seasonal restriction. No breeding woodlarks would be disturbed by this work.</p> <p>Although construction activity may take place outside the area of seasonal open-cut trenching/ HDD restrictions during the breeding season, because the other ONE South territories potentially overlapping with the onshore development area are located beside the area demarcated for turtle dove mitigation, which would be free of any cable installation infrastructure, it is considered unlikely that these territories would be affected by construction disturbance, which would occur beyond potential disturbance distances (likely over 200m from any nest sites). It is therefore predicted that there would be no loss of any woodlark breeding territories under either the open-cut trenching or HDD scenarios. Therefore, there would be no adverse effect on the integrity of the SPA due to disturbance of woodlark (see section 3.3.3.4.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>h) Habitat loss</p>									

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>No additional in-combination habitat loss effects are therefore predicted, over and above those predicted for the proposed East Anglia ONE North project alone, or when also including the proposed East Anglia TWO project. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to construction effects on nightjar (see section 3.3.2.5.2.1 of Information to Support Appropriate Assessment (document reference 5.3))</p> <p>Disturbance</p> <p>No in-combination operational impacts are predicted due to the lack of likely disturbance impacts arising from the operational phase associated with the proposed East Anglia TWO and East Anglia ONE North projects. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational effects on nightjar ((see section 3.3.2.5.2.2 of Information to Support Appropriate Assessment (document reference 5.3))</p> <p>i) Habitat loss</p> <p>No in-combination operational impacts are predicted because there would be no habitat loss associated with the operational phase of the proposed East Anglia ONE North and East Anglia TWO project. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational effects on nightjar (see section 3.3.2.5.2.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p><i>Disturbance</i></p> <p>No in-combination operational impacts are predicted due to the lack of likely disturbance impacts arising from the operational phase associated with the proposed East Anglia TWO and East Anglia ONE North projects. As such it can be reasonably concluded that the SPA's Conservation Objectives would</p>									

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational effects on nightjar (see section 3.3.2.5.2.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>j) Habitat loss</p> <p>No additional in-combination habitat loss effects are predicted, over and above those predicted for the proposed East Anglia ONE North project alone, or when also including the proposed East Anglia TWO project. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to construction effects on woodlark (see section 3.3.3.5.2.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>Disturbance</p> <p>According to the Sizewell C PEIR (EDF Energy 2019), there was no evidence to suggest that woodlark is currently breeding within the Sizewell C New Nuclear Power Station study area. As part of the ornithology assessment, a number of mitigation measures have been explored for Sizewell C New Nuclear Power Station, including the maintenance of habitat corridors, the management of public access to sensitive sites (including the SPA), and the inclusion of environmental buffers and acoustic fencing to help protect neighbouring habitats and species from light, noise and visual disturbance. With the closest woodlark territory within the SPA likely to be well outside of foraging range from the Sizewell B Power Station Complex and Sizewell C New Nuclear Power Station projects, and potential mitigation measures described above implemented, no additional in-combination disturbance impacts are predicted over and above any associated with the proposed East Anglia TWO and East Anglia ONE North projects. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to disturbance effects on nightjar (see section 3.3.3.5.2.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p>									

Name of European Site: Sandlings SPA (UK)									
Distance to East Anglia ONE North Onshore Development Area: Within onshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Habitat loss			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Breeding nightjar <i>Caprimulgus europaeus</i>	N (a)	N (b)	N(c)	N (d)	N(e)	N(c)	N (h)	N (i)	
Breeding woodlark <i>Lullula arborea</i>	N (f)	N (b)	N(c)	N (g)	N(b)	N(c)	N (j)	N (k)	
<p>k) Habitat loss</p> <p>No cumulative operational impacts are predicted because there would be no habitat loss associated with the operational phase of the proposed East Anglia TWO and East Anglia ONE North projects. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational effects on woodlark (see section 3.3.3.5.2.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p><i>Disturbance</i></p> <p>No cumulative operational impacts are predicted due to the lack of likely disturbance impacts arising from the operational phase associated with the proposed East Anglia TWO and East Anglia ONE North projects. As such it can be reasonably concluded that the SPA's Conservation Objectives would not be compromised and that there would be no adverse effect on the integrity of the SPA due to operational effects on woodlark (see section 3.3.3.5.2.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p>									

1.2 Outer Thames Estuary SPA

Name of European Site: Outer Thames Estuary SPA and pSPA extension (UK)

Distance to East Anglia ONE North Offshore Development Area: 0.15km from windfarm site and overlaps with cable corridor

Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Barrier effects and collision risk			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Migrating red throated diver <i>Gavia stellata</i>		N (a)		N (b)	(c)		N (d)	N (d)	

- a) The additional distances travelled by birds avoiding windfarms whilst on migration (i.e. up to twice per year) have been found to be negligible when compared to the total migration distances. Therefore, the energetic costs of such diversions are also negligible. Red-throated divers fly very low to the water and consequently collision risks on migration will also be very small (total annual collision prediction <1 individual). Consequently, the risks of a likely significant effect due to either barriers to movement or collision risk are sufficiently small that they can be ruled out (see **section 4.2.1.3 of Information to Support Appropriate Assessment** (document reference 5.3).
- b) The 'worst case' area from which birds could be displaced was defined as a circle with a 2km radius around each cable laying vessel, which is 25.2km² (area round each vessel being 12.6km²). Assuming a worst case of 100% displacement around each vessel with the range of densities between 0.62 and 3.77 birds per km², between 15.6 and 95.0 divers could be displaced at any given time (but only if both vessels are within the SPA at the same time and this also coincides with the late winter peak in diver density). Assuming that displacement was local so that birds remained within the SPA, which seems likely, this would lead to a maximum 2.1% increase in diver density in the portion of the SPA the cable route traverses (i.e. the section between Great Yarmouth and Felixstowe). As the vessels move it is assumed that displaced birds return and therefore any individual will be subjected to only a brief period of effect.

Baseline annual mortality ranges from about 12% for adults, up to about 40% for juveniles. With an assumed proportion of juveniles of 30%, the estimated natural mortality for the designated SPA population (6,466), would be approximately 1,319 while for the 2018 population estimate of 22,000 would be approximately 4,500 (calculated using a composite all age class mortality rate of 0.2). The addition of a maximum of 1 individual to these totals during a single year would increase the mortality rate in that year by approximately 0.02 to 0.07%. Natural England advised that they did not consider the above assumptions to be sufficiently precautionary and that assessment should also consider their advised rates of 100% displacement and 10% mortality. At these rates, up to 9.5 individuals would be at risk of mortality (if two vessels are operating within the SPA at the same time) in a single year. This would increase the background mortality in that year by a maximum of 0.21 to 0.72%. Thus, even using these highly precautionary rates, this

Name of European Site: Outer Thames Estuary SPA and pSPA extension (UK)									
Distance to East Anglia ONE North Offshore Development Area: 0.15km from windfarm site and overlaps with cable corridor									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Barrier effects and collision risk			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Migrating red throated diver <i>Gavia stellata</i>		N (a)		N (b)	(c)		N (d)	N (d)	
<p>magnitude of effect is less than the SNCB advised 1% threshold of detectable change in mortality. Therefore, it is reasonable to conclude that there will be no adverse effect on the integrity of the Outer Thames Estuary SPA as a result of red-throated diver displacement due to cable laying for the proposed East Anglia ONE North project alone (see section 4.2.1.4 of Information to Support Appropriate Assessment Report (document reference 5.3)).</p> <p>c) There is potential for disturbance and displacement of non-breeding red-throated divers within the SPA resulting from the presence and operation of the turbines in the East Anglia ONE North windfarm acting within the overlap of the 4km buffer around the windfarm and the SPA. This effect would start during construction with the installation of any infrastructure above the sea-surface and would continue throughout the operational life of the proposed East Anglia ONE North project. Assuming displacement rates of 90% to 100% of birds in the 4km buffer between 17 and 33 individuals could be displaced. If these individuals remain in the SPA this would increase the overall density of red-throated divers in the SPA by 0.9%. This leads to a highly precautionary assumption that displacement will result in between 0.15 (at 90% displaced and 1% mortality) and 3.3 (at 100% displaced and 10% mortality) individuals being expected to die across the entire winter period (September to April) as a result of potential displacement from the 4km buffer overlap with the SPA.</p> <p>The addition of a maximum of 3.3 individuals to these totals would increase the mortality rate by approximately 0.25% (designated population) and 0.07% (2018 estimate). Thus, even using these highly precautionary rates, these magnitudes of effect are less than the SNCB advised 1% threshold of detectable change in mortality. Therefore, it is reasonable to conclude that there will be no adverse effect on the integrity of the Outer Thames Estuary SPA</p> <p>There is a requirement to maintain the extent and distribution of supporting habitats for the designated species. This requirement is not strictly at risk, since the habitat within the 4km buffer will not be directly affected, but rather the red-throated divers may avoid the area due to behavioural responses leading to avoidance of the wind turbines. However, as demonstrated above, the population level effect is below the threshold of detectability alone (see section 4.3.1.2.3 of Information to Support Appropriate Assessment Report (document reference 5.3)).</p>									

Name of European Site: Outer Thames Estuary SPA and pSPA extension (UK)									
Distance to East Anglia ONE North Offshore Development Area: 0.15km from windfarm site and overlaps with cable corridor									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Barrier effects and collision risk			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Migrating red throated diver <i>Gavia stellata</i>		N (a)		N (b)	(c)		N (d)	N (d)	
<p>d) Red-throated divers show strong avoidance of offshore windfarms, and so the construction of, or operation of, further offshore windfarms would also represent an in-combination effect on divers. There do not appear to be data in the public domain indicating the likely disturbance effect of Sizewell C power station construction activity on red-throated divers. The offshore cable corridor for the proposed East Anglia TWO project will pass through the Outer Thames estuary SPA (potentially using exactly the same offshore cable corridor). However, for any in-combination impact to occur, installation of cables would need to be simultaneous. This is highly unlikely, and even in this case would not represent a significant effect unless the most precautionary mortality assumptions were used. While any increase in shipping activity will constitute an in-combination impact on divers, the low level of project alone risk, absence of other developments in the vicinity of the East Anglia ONE North offshore cable corridor and lower level of existing shipping traffic in this section of the SPA indicate that the likelihood of an in-combination disturbance effect is extremely small. Therefore, the in-combination effect on the red-throated diver population due to East Anglia ONE North and other plans and projects can be assessed as negligible. There is potential for offshore windfarms in the southern North Sea to present a combined barrier to movement of red-throated divers whilst on migration to and from the SPA. However, whilst such a situation appears to be a possibility from an overview of windfarm lease areas it is important to remember the large scale of such maps, and that the gaps between many of the windfarms are in excess of 10km in most cases. Furthermore, GPS tracking of red-throated divers indicates that individuals tend to migrate to the SPA area to the north or south of the majority of the windfarm sites (almost all of which are not currently constructed). It is thus very unlikely that the proposed East Anglia ONE North project would contribute to an in-combination barrier or collision effect on the Outer Thames Estuary SPA red-throated diver population. At a predicted maximum mortality level of one (using evidence based methods) or 9.5 (using Natural England’s precautionary methods), the potential for the proposed East Anglia ONE North project to contribute to an in-combination effect on the red-throated diver population of the Outer Thames Estuary SPA is considered to be negligible. Hence, no adverse effect on the integrity of the SPA as a result of in-combination effects is predicted (see sections 4.2.1.5 and 4.2.1.6 of Information to Support Appropriate Assessment (document reference 5.3)).</p>									

1.3 Greater Wash SPA

Name of European Site: Greater Wash SPA (UK)									
Distance to East Anglia ONE North Offshore Development Area: 39km from windfarm site and 32km from offshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Barrier effects and collision risk			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Migrating red throated diver <i>Gavia stellata</i>		N (a)					N (b)	N (b)	
Little gull <i>Hydrocoloeus minutus</i>		N (c)		N (d)	N (d)	N (d)		N (e)	

a) Red-throated divers are sensitive to disturbance due to vessel movements, windfarm construction and windfarm operation. The proposed East Anglia ONE North project is outside the Greater Wash SPA, and the offshore cable corridor does not cross any part of the SPA. The East Anglia ONE North site is also beyond the range at which any construction or operation activities could affect divers within the SPA, and the port likely to be used for operations and maintenance vessels is not within the SPA. Consequently, the potential effect would be on birds passing through the windfarm on migration to and from the SPA. This could include barrier effects and collision risk. The additional distances travelled by birds avoiding windfarms whilst on migration (i.e. up to twice per year) have been found to be negligible when compared to the total migration distances. Therefore, the energetic costs of such diversions are also negligible. Red-throated divers fly very low to the water and consequently collision risks on migration will also be very small (total annual collision prediction <1 individual). Consequently, no significant effect can be concluded from effects of this magnitude (see **section 4.3.1.3 of Information to Support Appropriate Assessment** (document reference 5.3)).

b) The very low risk of effects to red-throated divers whilst on migration due to the proposed East Anglia ONE North project means the potential for the project to contribute to an in-combination effect on the red-throated diver population of the Greater Wash SPA is also considered to be negligible. Hence, no adverse effect on the integrity of the SPA as a result of in-combination effects is predicted (see **sections 4.3.1.4 and 4.3.1.5 of Information to Inform Appropriate Assessment** (document reference 5.3)).

c) The Greater Wash SPA designated population of little gull is 1,255, which is 13% of a population of 10,000 or 6.5% of a population of 20,000. On this basis, and assuming collisions would be distributed uniformly throughout the population, this would imply that a maximum of 0.14 individuals from the Greater Wash SPA population of little gull could be killed by collisions (13% of 1.1), which would be even reduced further on the basis of the more realistic wider population (of 20,000). Thus, it can be concluded that the maximum additional mortality from the SPA population will be undetectable and

Name of European Site: Greater Wash SPA (UK)									
Distance to East Anglia ONE North Offshore Development Area: 39km from windfarm site and 32km from offshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Barrier effects and collision risk			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Migrating red throated diver <i>Gavia stellata</i>		N (a)					N (b)	N (b)	
Little gull <i>Hydrocoloeus minutus</i>		N (c)		N (d)	N (d)	N (d)		N (e)	
<p>there will be no adverse effect on the integrity of the Greater Wash SPA as a result of collisions at the East Anglia ONE North windfarm site alone (section 4.3.2.3 of Information to Inform Appropriate Assessment Report (document reference 5.3)).</p> <p>d) Displacement of little gulls by offshore windfarms is deemed to be negligible (see section 4.3.2.4 of Information to Inform Appropriate Assessment (document reference 5.3)).</p> <p>e) The predicted mortality of little gull at East Anglia ONE North in-combination with other windfarms with potential connectivity to the Greater Wash SPA little gull population was estimated to be 69.9. Given a regional little gull population of between 10,000 and 20,000 this figure (69.9) represents an increase in background mortality of between 1.7% and 3.5% (although as noted above the population may be as large as 75,000, further reducing the magnitude of potential impact, to an increase in mortality of less than 0.5%). The Greater Wash SPA designated population of little gull is 1,255, which is 12.6% of a population of 10,000 or 6.3% of a population of 20,000. On this basis, and assuming collisions would be distributed uniformly throughout the population, this would imply that a maximum of 8.8 individuals from the Greater Wash SPA population would be at risk of in-combination collisions (12.6% of 69.9), although adjusting impact magnitude for the actual built projects (or planned designs, for example Triton Knoll has reduced its capacity from 288 turbines to 90) this would reduce to 6.0 individuals. Furthermore, the in-combination collisions would be reduced to 3.0 individuals on the basis of the more realistic wider population (of 20,000). These would give rise to increases in mortality for the SPA population of between 1.2% (for built projects and the realistic population of 20,000) and 3.5% using the most precautionary combination of consented development predictions and the smallest regional population estimate of 10,000. A very slightly lower total collision estimate of 7 individuals (cf. 8.8) was assessed by the Secretary of State (SoS) for the in-combination assessment for the Triton Knoll non-material change application. In relation to this estimate the SoS stated “<i>Assuming collisions are attributed evenly amongst the regional population, this equates to 7 individuals from the Greater Wash population. Such a small impact would also be undetectable in the SPA population.</i>” And also “<i>in view of the small impacts quantified above, the Secretary of State considers that an Appropriate Assessment is not required in this case.</i>” Thus, on the basis of an SPA in-combination mortality of 8.8, for the most precautionary</p>									

Name of European Site: Greater Wash SPA (UK)									
Distance to East Anglia ONE North Offshore Development Area: 39km from windfarm site and 32km from offshore cable corridor route									
Site Features	Adverse Effect on Integrity due to East Anglia ONE North								
	Barrier effects and collision risk			Displacement/Disturbance			In combination		
	C	O	D	C	O	D	C	O	D
Migrating red throated diver <i>Gavia stellata</i>		N (a)					N (b)	N (b)	
Little gull <i>Hydrocoloeus minutus</i>		N (c)		N (d)	N (d)	N (d)		N (e)	
interpretation of the potential risk to the population or a more realistic total of 3.0, the likelihood of an adverse effect on the integrity of the Greater Wash SPA population of little gull can be ruled out for the proposed East Anglia ONE North project in-combination with other plans and projects (see section 4.3.2.5 and 4.3.2.6 of Information to Support Appropriate Assessment (document reference 5.3)).									

1.4 Alde-Ore Estuary SPA and Ramsar

Name of European Site: Alde-Ore Estuary SPA and Ramsar (UK)

Distance to East Anglia ONE North Windfarm Site: 3.2km

Site Features	Adverse Effect on Integrity due to East Anglia ONE North					
	Collision Mortality (Project Alone)			Collision Mortality (In Combination)		
	C	O	D	C	O	D
Breeding lesser black-backed gulls <i>Larus fuscus</i>		N (a)			N (b)	
<p>a) The predicted monthly numbers of lesser black-backed gull collision mortalities, and an avoidance rate of 99.5% for the proposed East Anglia ONE North project, are shown in Table 4.5 of Information to Support Appropriate Assessment (document reference 5.3). The annual average mortality is estimated to be between 0.07 and 0.17 within a combined 95% confidence interval range of 0 to 0.52. Natural mortality for the SPA population (assuming approximately 4,000 adults) would be around 460 individuals at an average adult mortality rate of 11.5%. A total additional worst case mortality of up to 0.17 birds due to collisions at the East Anglia ONE North windfarm site would increase the mortality rate by 0.04%. Following SNCB recommendations, an increase in mortality of less than 1% is considered to be undetectable against the range of background variation. Therefore, this increase, which is below the threshold at which increases in mortality are detectable, means that no significant effect can be attributed to this level of effect arising from the proposed East Anglia ONE North project alone. 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 ONE North project alone (see section 4.4.1.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>b) Taking the modelled adult mortality of 40 (as the worst case), the population growth rate was predicted to be 1.0% lower (0.990) than the baseline using the density independent model, and 0.2% lower (0.998) using the density dependent model. At the lower modelled adult mortality of 25, the reduction in growth rate was 0.6% for the density independent model and 0.1% for the density dependent model. Even with the most precautionary in-combination estimates these reductions in growth rate are small (no more than 1.0%) and therefore are not considered likely to result in a population decline. The more realistic collision estimates, accounting for the reduced impacts from built windfarms compared with the consented designs, predict a growth rate reduction of no more than 0.6% (density independent), which further reduces any concerns about the impact on the SPA population. Given the degree of precaution in collision assessments, including the use of the much higher mortality predictions estimated for consented windfarm designs rather than for the as-built windfarm designs, there will be no adverse effect on integrity due to in-combination collisions (see section 4.4.1.4 of Information to Support Appropriate Assessment Report (document reference 5.3)).</p>						

1.5 Breydon Water SPA and Ramsar

Name of European Site: Breydon Water SPA and Ramsar (UK)												
Distance to East Anglia ONE North Windfarm Site: 34km												
Site Features	Adverse Effect on Integrity due to East Anglia ONE North											
	Collision mortality (Project Alone)			Collision mortality (In Combination)			Displacement / Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D	C	O	D
Bewick's swan <i>Cygnus columbianus bewickii</i>		N (a)			N (b)							
Pied avocet <i>Recurvirostra avosetta</i>		N (a)			N (b)							
European golden plover <i>Pluvialis apricaria</i>		N (a)			N (b)							
Northern lapwing <i>Vanellus vanellus</i>		N (a)			N (b)							

Name of European Site: Breydon Water SPA and Ramsar (UK)												
Distance to East Anglia ONE North Windfarm Site: 34km												
Site Features	Adverse Effect on Integrity due to East Anglia ONE North											
	Collision mortality (Project Alone)			Collision mortality (In Combination)			Displacement / Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D	C	O	D
a)	Migrant collision risk modelling was undertaken for all the species with potential for connectivity to East Anglia ONE North (i.e. Bewick's swan, avocet, golden plover and lapwing) on passage using the methods developed for the Strategic Ornithological Support Services programme (Wright et al. 2012). The annual collision estimates are presented in ES Appendix 12.2 Annex 7 Table 4 . The assessment found that predicted collisions apportioned to this SPA and Ramsar were very small, with none exceeding 1 individual per year. These levels of additional mortality would not increase the background mortality rate by more than 1% and would therefore be undetectable against natural variations. It can therefore be concluded that there would be no adverse effect on the integrity of Breydon Water SPA and Ramsar as a result of collisions at East Anglia ONE North alone.											
b)	In-combination collision mortality with the nearby Norfolk Vanguard, Norfolk Boreas, East Anglia THREE and East Anglia TWO projects were similarly very small (increases in background mortality rates remained less than 1% (East Anglia ONE North ES Appendix 12.2 Annex 8 Table 6) leading to the same conclusion of no adverse effect on the integrity of Breydon Water SPA and Ramsar as a result of collisions at East Anglia ONE North in-combination with other plans and projects (East Anglia ONE North ES Appendix 12.2 Annex 8).											

1.6 Broadland SPA and Ramsar

Name of European Site: Broadland SPA and Ramsar (UK)												
Distance to East Anglia ONE North Windfarm Site: 22km												
Site Features	Adverse Effect on Integrity due to East Anglia ONE North											
	Collision Mortality (Project Alone)			Collision Mortality (In Combination)			Displacement / Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D	C	O	D
Bewick's swan <i>Cygnus columbianus bewick</i>		N (a)			N (b)							
Eurasian wigeon <i>Anas penelope</i>		N (a)			N (b)							
Gadwall <i>Anas strepera</i>		N (a)			N (b)							
Northern shoveller <i>Anas clypeata</i>		N (a)			N (b)							
Eurasian marsh harrier <i>Circus aeruginosus</i>		N (a)			N (b)							

Name of European Site: Broadland SPA and Ramsar (UK)												
Distance to East Anglia ONE North Windfarm Site: 22km												
Site Features	Adverse Effect on Integrity due to East Anglia ONE North											
	Collision Mortality (Project Alone)			Collision Mortality (In Combination)			Displacement / Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D	C	O	D
<p>a) Migrant collision risk modelling was undertaken for all the species with potential for connectivity to East Anglia ONE North (i.e. Bewick's swan, wigeon, gadwall, shoveler and marsh harrier) on passage using the methods developed for the Strategic Ornithological Support Services programme (Wright et al. 2012). This assessment found that predicted collisions apportioned to this SPA and Ramsar were very small, with none exceeding 1 individual per year (East Anglia ONE North ES Technical Appendix 12.2 Annex 8). These levels of additional mortality would not increase the background mortality rate by more than 1% and would therefore be undetectable against natural variations. It can therefore be concluded that there would be no adverse effect on the integrity of Broadland Water SPA and Ramsar as a result of collisions at East Anglia ONE North alone.</p> <p>b) In-combination collision mortality with the nearby Norfolk Vanguard, Norfolk Boreas, East Anglia THREE and East Anglia TWO projects were similarly very small (increases in background mortality rates remained less than 1%, East Anglia ONE North ES Technical Appendix 12.2 Annex 8 Table 6) leading to the same conclusion of no adverse effect on the integrity of Broadland Water SPA and Ramsar as a result of collisions at East Anglia ONE North in-combination with other plans and projects (East Anglia ONE North ES Technical Appendix 12.2 Annex 8 Table 6).</p>												

1.7 North Norfolk Coast SPA and Ramsar

Name of European Site: North Norfolk Coast SPA and Ramsar (UK)												
Distance to East Anglia ONE North Windfarm Site: 93km												
Site Features	Adverse Effect on Integrity due to East Anglia ONE North											
	Collision Mortality (Project Alone)			Collision Mortality (In Combination)			Displacement / Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied brent goose <i>Branta bernicla bernicla</i>		N (a)			N (b)							
Eurasian wigeon <i>Anas penelope</i>		N (a)			N (b)							
Eurasian marsh harrier <i>Circus aeruginosus</i>		N (a)			N (b)							
Pied avocet <i>Recurvirostra avosetta</i>		N (a)			N (b)							
Red knot <i>Calidris canutus</i>		N (a)			N (b)							

Name of European Site: North Norfolk Coast SPA and Ramsar (UK)

Distance to East Anglia ONE North Windfarm Site: 93km

Site Features	Adverse Effect on Integrity due to East Anglia ONE North											
	Collision Mortality (Project Alone)			Collision Mortality (In Combination)			Displacement / Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D	C	O	D
<p>a) Migrant collision risk modelling was undertaken for all the species with potential for connectivity to East Anglia ONE North on passage (i.e. dark-bellied brent goose, wigeon, marsh harrier, pied avocet and knot) using the methods developed for the Strategic Ornithological Support Services programme (Wright et al. 2012). This assessment found that predicted collisions apportioned to this SPA and Ramsar were very small, with none exceeding 1 individual per year (East Anglia ONE North ES Technical Appendix 12.2 Annex 8). These levels of additional mortality would not increase the background mortality rate by more than 1% and would therefore be undetectable against natural variations. It can therefore be concluded that there would be no adverse effect on the integrity of North Norfolk Coast SPA and Ramsar as a result of collisions at East Anglia ONE North alone.</p> <p>b) In-combination collision mortality with the nearby Norfolk Vanguard, Norfolk Boreas, East Anglia THREE and East Anglia TWO projects were similarly very small (increases in background mortality rates remained less than 1%, East Anglia ONE North ES Technical Appendix 12.2 Annex 8) leading to the same conclusion of no adverse effect on the integrity of North Norfolk Coast SPA and Ramsar as a result of collisions at East Anglia ONE North in-combination with other plans and projects (East Anglia ONE North ES Technical Appendix 12.2 Annex 8).</p>												

1.8 Flamborough and Filey Coast SPA

Name of European Site: Flamborough & Filey Coast SPA (UK)

Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor

Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										

a) The worst case annual displacement mortality prediction is 1.1 individuals (of all ages). The addition of up to 1.1 individuals would increase the mortality rate by a maximum of 0.01% (designated population). Increases in mortality of less than 1% are considered to be undetectable against natural variation and therefore there is no risk of an Adverse Effect on the Integrity of the SPA population due to displacement from the proposed East Anglia ONE North project alone (see section 4.5.1.3 of **Information to Support Appropriate Assessment** (document reference 5.3)).

b) Of the total annual displacement mortality (285-380), the number apportioned to the Flamborough and Filey Coast SPA was between 54 and 72 (Table 4.10 of Information to Support Appropriate Assessment Report (document reference 5.3)). The percentage increase in background mortality of the Flamborough and Filey Coast SPA all age class population (40,222 for the designated population and 48,700 for the 2017 population) is between 0.94%

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>(designated) and 0.77% (2017 population). These increases are below the 1% threshold of detectability and therefore no Adverse Effect on Integrity is predicted for the Flamborough and Filey Coast SPA gannet population due to in-combination displacement mortality (see section 4.5.1.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>c) Collision mortality of gannets at the East Anglia ONE North windfarm site based on Band Option 2 and an avoidance rate of 98.9% (as recommended by Natural England and other SNCBs) was estimated at 27.3 birds per year, with approximately 40% occurring in autumn (ES Chapter 12 Offshore Ornithology). For the breeding season, a precautionary approach has been adopted with the assumption that all birds present on the East Anglia ONE North windfarm site originate from Flamborough and Filey Coast SPA. During migration in autumn and spring, 4.8% and 6.2% (respectively) of the birds observed are predicted to originate from Flamborough and Filey Coast SPA (Natural England’s preferred rates). The addition of between 11.8 and 14.5 individuals would increase the mortality rate by 0.7% to 0.8% (designated) and 0.6% to 0.7% (2017 count). If the estimate for the upper 95% confidence</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>estimate and the full breeding season (29) is used, the maximum increase would be between 1.6% and 1.3% (designated and recent counts, respectively). While if the lower 95% confidence estimate is used (3.5) these rates are 0.2% and 0.16%. While the upper 95% confidence estimates are slightly above the 1% threshold for detection the mean and lower 95% estimates are all below the 1% threshold of detectability. It is therefore reasonable to conclude that there will be no adverse effect on the integrity of the Flamborough and Filey Coast SPA as a result of gannet collisions at the East Anglia ONE North site alone (see section 4.5.1.5 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>d) In autumn, the cumulative gannet collisions were estimated to be 800, in spring 328 and in the breeding season 1,479 (Table 4.12 of Information to Support Appropriate Assessment (document reference 5.3)). Using the Flamborough and Filey Coast SPA proportions (as advised by Natural England) for all the windfarms with potential connectivity to the SPA, the proportions of the mortality attributed to the Flamborough and Filey Coast SPA population were 20 (spring), 298 (breeding) and 38 (autumn), an annual total of 357. The increase in the background mortality for the estimated in combination</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>collision mortality exceeded 1% therefore further assessment was conducted. Outputs from the gannet PVA model for this population for adult mortality levels of 325 and 350 (the nearest values to this impact prediction) are provided in Table 4.13 in Information to Support Appropriate Assessment (document reference 5.3). The maximum reduction in the population growth rate, at a mortality of 375, using the more precautionary density independent model was 1.7% (0.983). Using the more realistic density dependent model the maximum reduction in growth rate was 1.1% (0.989). On the basis of the observed rate at which this population has grown over the last 25 years, which has been at least 10% per year, a maximum reduction of 1.7% to this rate represents a negligible risk for the population. The in-combination mortality of up to 357 individuals predicted for the Flamborough and Filey Coast SPA is less than the previously accepted threshold for collisions (for East Anglia ONE this was defined as 286-361; Natural England, 2013) and in the interim the population has almost doubled in size (see section 4.5.1.6 of Information to Support Appropriate Assessment (document reference 5.3)).</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>e) Adding the in-combination annual gannet collision estimate of 357 (adults; estimated using Natural England’s preferred methods) to the in-combination annual displacement prediction of 54 to 72 (using Natural England’s preferred rates, but converted to adults), gives a combined SPA mortality estimate of 409 to 429. The increase in the background mortality of the SPA population due to this combined in-combination collision and displacement risk exceeded 1%. Simulations were conducted with and without density dependence and were summarised as the counterfactual of population size and population growth rate. The outputs from these models for a mortality levels of 400 and 425 (the nearest value to this impact prediction) are provided in Table 4.14 in Information to Support Appropriate Assessment (document reference 5.3). The maximum reduction in the population growth rate, at a mortality of 425, using the more precautionary density independent model was 1.9% (0.981). Using the more realistic density dependent model the maximum reduction in growth rate was 1.3% (0.987). On the basis of the observed rate at which this population has grown over the last 25 years, which has been at least 10% per year, a maximum reduction of 1.9% to this rate represents a negligible risk for the population. Therefore, it can be concluded</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>that there will be no adverse effect on the integrity of Flamborough and Filey Coast SPA from impacts on gannet due to the proposed East Anglia ONE North project in-combination with other plans and projects (see section 4.5.1.7 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>f) Collision mortality of kittiwakes at the East Anglia ONE North windfarm site was estimated as 3.8 in spring, 44.5 in summer and 9.7 in autumn, giving an annual total of 58 birds (ES Chapter 12 Offshore Ornithology; note that there is no mid-winter BDMPS defined for kittiwake, with the spring migration period following immediately after autumn migration). Annual total maximum adult collision mortality was predicted at 21.3 individuals using the migration-free breeding season and 45.3 using the extended breeding season, from a population of approximately 89,040 (44,520 pairs multiplied by 2). The addition of a maximum of 45.3 individuals to this would increase the mortality rate by 0.34%. Using the upper 95% confidence estimate (70.7) the increase in mortality rate would be 0.5% and using the lower 95% confidence interval (24.3) this would be 0.2%. Following SNCB recommendations, an</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>increase in mortality of less than 1% is considered undetectable against the range of background variation. It is, therefore, reasonable to conclude that there will be no adverse effect on the integrity of the Flamborough and Filey Coast SPA as a result of kittiwake collisions at the proposed East Anglia ONE North project alone (see section 4.5.2.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>g) In autumn, the cumulative kittiwake collisions were estimated to be 1,100, in spring 1,071 and in the breeding season 1,041. Using the Flamborough and Filey Coast SPA proportions (as advised by Natural England) for all the windfarms with potential connectivity to the SPA, the proportions of the mortality attributed to the Flamborough and Filey Coast SPA population were 77 (spring), 251 (breeding) and 59 (autumn), an annual total of 387. The increase in the background mortality for the estimated in combination collision mortality exceeded 1% therefore further assessment is provided below. Outputs from the kittiwake PVA model for this population (MacArthur Green 2018) for adult mortality levels of 350 and 400 (the nearest values to this impact prediction) are provided in Table 4.17 of Information to Support Appropriate Assessment (document reference 5.3). The maximum reduction in the population</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>growth rate, at a mortality of 400, using the more precautionary density independent model was 0.05% (0.995). Using the more realistic density dependent model the maximum reduction in growth rate was 0.01% (0.999). This growth rate reduction represents a very small risk to the population's conservation status. On the basis of the precautionary in-combination collision estimate (including over-estimates for consented vs. built designs and over-estimated nocturnal activity) and the precautionary density independent model predictions for the total adult mortality of 387, there may be a small risk that further population growth will occur at a slower rate. However, the much more realistic density dependent model suggests that this level of mortality will have a much smaller effect on the population, with only a very slight reduction in the growth rate, and that the population's conservation status will not be affected. It is, therefore, reasonable to assess that there will be no adverse effect on the integrity of Flamborough and Filey Coast SPA as a result of kittiwake collisions at the proposed East Anglia ONE North project in-combination with other projects (see section 4.5.2.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>h) Natural England considered that a likely significant effect on the razorbill population of the Flamborough and Filey Coast SPA due to displacement from the East Anglia ONE North windfarm site could not be ruled out. Apportioning the East Anglia ONE North windfarm site displacement mortality to the SPA on the basis of no connectivity in the breeding season (as the windfarm site is located more than five times the mean maximum foraging range for this species from the SPA) and an even distribution in the nonbreeding season (on the assumption that the SPA population is evenly distributed within the nonbreeding BDMPS population) the worst case mortality due to the proposed East Anglia ONE North project was 0.8 individuals. This would increase the baseline mortality by 0.03%, which would be undetectable. Therefore, displacement of razorbill from the East Anglia ONE North windfarm site would not have an Adverse Effect on the Integrity of the SPA (see section 4.5.3.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)

Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor

Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>i) It is clear from the project alone assessment that the proposed East Anglia ONE North project will make an extremely small contribution to an in-combination impact. Nonetheless, on the basis of the totals in Table 4.19 of Information to Support Appropriate Assessment (document reference 5.3), the combined displacement mortality across the whole year was estimated to be in the range 18 to 421 individuals. These would increase the baseline mortality rate of the population (all ages) by 0.8% to 19%, while assessed using the evidence-based displacement and mortality rates, the increase would be 1.3%. On the basis of the most precautionary rates preferred by Natural England, there is potential for an adverse effect on the razorbill population due to in-combination displacement effects. However, using the evidence-based prediction, which is below the 1% threshold for detecting increases in mortality, the conclusion would be no adverse effect on the integrity of this SPA for the in-combination with other plans and projects. Furthermore, the contribution to this from the proposed East Anglia ONE North project is very small, estimated to comprise 0.2% (0.8 individuals from a total of 421) (see section 4.5.3.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)

Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor

Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>j) Natural England considered that a likely significant effect on the guillemot population of the Flamborough and Filey Coast SPA due to displacement from the East Anglia ONE North windfarm site could not be ruled out. Apportioning the East Anglia ONE North windfarm site displacement mortality to the SPA on the basis of no connectivity in the breeding season (as the windfarm is located more than three times the mean maximum foraging range for this species from the SPA) and an even distribution in the nonbreeding season (on the assumption that the SPA population is evenly distributed within the nonbreeding BDMPS population) the worst case mortality due to the proposed East Anglia ONE North project was 5.2 individuals. This would increase the baseline mortality by 0.1%, which would be undetectable. Therefore, displacement of guillemot from East Anglia ONE North windfarm site would not have an adverse effect on the integrity of the SPA (see section 4.5.4.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p>															

Name of European Site: Flamborough & Filey Coast SPA (UK)															
Distance to East Anglia ONE North Offshore Development Area: 246km from windfarm site and 239 from offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Displacement			Displacement (in combination)			Collision mortality			Collision mortality (in-combination)			Displacement (in combination) and Collision mortality (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Breeding Gannet <i>Morus bassanus</i>		N (a)			N (b)			N (c)			N (d)			N (e)	
Breeding Kittiwake <i>Rissa tridactyla</i>								N (f)			N (g)				
Breeding Razorbill <i>Alca torda</i>		N (h)			N (i)										
Breeding Guillemot <i>Uria aalge</i>		N (j)			N (k)										
<p>k) Given the extremely small mortality due to East Anglia ONE North it is clear that the project will make an extremely small contribution to an in-combination impact. Nonetheless, on the basis of the totals in Table 4.22 of the Information to Support Appropriate Assessment (document reference 5.3), the combined displacement mortality across the whole year was estimated to be in the range 77 to 1,796 individuals. These would increase the baseline mortality rate of the population (all ages) by 1.5% to 35%, while assessed using the evidence-based displacement and mortality rates, the increase would be 2.5%. On the basis of the most precautionary rates preferred by Natural England, there is potential for an adverse effect on the guillemot population due to in-combination displacement effects. However, the contribution to this from East Anglia ONE North is very small, estimated to comprise 0.2% (see section 4.5.4.4 of Information to Support Appropriate Assessment (document reference 5.3)). .</p>															

1.9 Southern North Sea SAC

Name of European Site: Southern North Sea cSAC (UK)																					
Distance to East Anglia ONE North Offshore Development Area: 0km (covers all of offshore cable corridor area)																					
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																				
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			Barrier effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise <i>Phocoena phocoena</i>	N (a)	N (b)	N (c)	N (d)	N (e)	N (d)	N (f)	N (f)	N (f)	N (g)	N (h)	N (g)	N (i)		N (i)	N (j)			N (k)	N (l)	N (l)
<p>a) Disturbance of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area at any one time during UXO clearance at East Anglia ONE North (alone), based on the worst-case scenario (Table 5.6 of Information to Support Appropriate Assessment (document reference 5.3)). Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise. The assessment indicates, less than 10% (approximately 5.36%) of the seasonal component of the SNS SAC over the duration of that season could be affected during any UXO clearance at East Anglia ONE North offshore development area (alone), based on the worst-case scenario of one detonation per day for 80 days in one season and maximum overlap (Table 5.7 of Information to Support Appropriate Assessment Report (document reference 5.3)). Therefore, under these circumstances, there would be no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.2.5.1.2.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>b) The East Anglia ONE North windfarm site (208km²) is approximately 1.6% overlap with the winter SNS SAC area and approximately 0.17% overlap with the summer area. The maximum area of potential PTS or TTS from cumulative exposure for 53 300m wind turbines is 1.3km². If all turbines were in the winter area of the site the maximum potential area of effect would be 0.8% of the winter area (with an area of 12,697km²); or if all turbines were in the summer area of the site the maximum potential area of effect would be 0.05% of the summer area (with an area of 27,018km²). The maximum area of possible behavioural response (0.84km²) for 53 300m wind turbines is approximately 0.007% of the winter area or 0.003% of the summer area.</p>																					

Name of European Site: Southern North Sea cSAC (UK)																					
Distance to East Anglia ONE North Offshore Development Area: 0km (covers all of offshore cable corridor area)																					
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																				
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			Barrier effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise <i>Phocoena phocoena</i>	N (a)	N (b)	N (c)	N (d)	N (e)	N (d)	N (f)	N (f)	N (f)	N (g)	N (h)	N (g)	N (i)		N (i)	N (j)			N (k)	N (l)	N (l)
<p>Any disturbance of harbour porpoise as a result of underwater noise from operational turbines at East Anglia ONE North (alone) would not exceed 20% (up to 1.6%) of the seasonal component of the SNS SAC at any one time. Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.3.5.2.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>c) It is not possible to provide details of the methods that will be used during decommissioning at this time. However, it is expected that the activity levels will be comparable to construction (with the exception of pile driving noise). A detailed decommissioning plan will be produced prior to decommissioning that will give details of the techniques to be employed and any relevant mitigation measures. For this assessment, it is assumed that the potential effects from underwater noise during decommissioning would be less than those assessed for piling and comparable to those assessed for non-piling construction activities. Therefore, under these circumstances, there is no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.2.5.3.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>d) The assessment for vessels assumes a very precautionary worst-case scenario, that harbour porpoise in the windfarm site and the offshore cable corridor could be disturbed. However, any disturbance is likely to be limited to the immediate vicinity around the vessel, as indicated by the noise modelling. The East Anglia ONE North total offshore development area (341km²) is approximately 2.7% of the SNS SAC winter area (12,697km²) and approximately 0.17% (47km²) of the SNS SAC summer area (27,028km²). Disturbance of harbour porpoise would not exceed 20% (up to 2.7%) of the seasonal component of the SNS SAC at any one time, based on the worst-case scenario of 100% disturbance from the offshore windfarm site and offshore cable corridor area. Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of</p>																					

Name of European Site: Southern North Sea cSAC (UK)																					
Distance to East Anglia ONE North Offshore Development Area: 0km (covers all of offshore cable corridor area)																					
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																				
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			Barrier effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise <i>Phocoena phocoena</i>	N (a)	N (b)	N (c)	N (d)	N (e)	N (d)	N (f)	N (f)	N (f)	N (g)	N (h)	N (g)	N (i)		N (ii)	N (j)			N (k)	N (l)	N (l)
<p>the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.2.5.1.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>e) The East Anglia ONE North offshore development area (341km²) is approximately 2.7% of the winter SNS SAC and approximately 0.17% of the summer area. The maximum area of possible behavioural response to vessels during operation and maintenance (0.142km²), based on the underwater noise modelling (Table 5.16 of Information to Support Appropriate Assessment (document reference 5.3)), is approximately 0.0011% of the winter SNS SAC or 0.00052% of the summer area. Disturbance of harbour porpoise from operation and maintenance vessels at East Anglia ONE North (alone), based on the worst-case scenario, would not exceed 20% (up to 2.7%) of the seasonal component of the SNS SAC at any one time. Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (section 5.2.5.2.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>f) As a precautionary worst-case scenario approach, the number of harbour porpoise that could be at increased collision risk with vessels during construction has been assessed based on 5-10% (taking the strandings data of 4-8% into account) of the number of animals that could be present in the East Anglia ONE North offshore development area (Table 5.17 of Information to Support Appropriate Assessment (document reference 5.3)). This is very precautionary, as it is highly unlikely that all harbour porpoise present in the offshore development area would be at increased collision risk with vessels during construction, especially taking into account the relatively small increase in number of vessel movements compared to existing vessel movements in the area. Vessel movements, where possible, will be incorporated into recognised vessel routes and hence to areas where harbour porpoise are accustomed to vessels, in order to reduce any increased collision risk. All vessel movements will be kept to the minimum number that is</p>																					

Name of European Site: Southern North Sea cSAC (UK)																					
Distance to East Anglia ONE North Offshore Development Area: 0km (covers all of offshore cable corridor area)																					
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																				
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			Barrier effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise <i>Phocoena phocoena</i>	N (a)	N (b)	N (c)	N (d)	N (e)	N (d)	N (f)	N (f)	N (f)	N (g)	N (h)	N (g)	N (i)		N (ii)	N (j)			N (k)	N (l)	N (l)
<p>required to reduce any potential collision risk. Additionally, vessel operators will use good practice to reduce any risk of collisions with harbour porpoise. In addition, based on the assumption that harbour porpoise would be disturbed from the offshore development area as a result of underwater noise from construction activities and vessels, there should be no potential for increased collision risk with vessels during the construction period. Therefore, under these circumstances, there is no anticipated adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.2.5.1.6 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>g) The East Anglia ONE North total offshore development area (341km²) is approximately 2.7% of the SNS SAC winter area. Any changes to prey availability at East Anglia ONE North (alone) resulting in the displacement of all harbour porpoise from the entire offshore development area would not exceed 20% of the seasonal component of the SNS SAC at any one time. Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.3.5.1.7 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>h) During operation, the worst-case total area of habitat loss has been estimated to be approximately 2km² in total at East Anglia ONE North (Table 5.1 of Information to Support Appropriate Assessment (document reference 5.3)). The total area that prey species could be displaced from (hard substrates including scour protection, noise from operational turbines and EMF from cables) is estimated to be up to 12.85km². As a worse-case scenario, the changes to prey resources during operation and maintenance have also been assessed based on the entire East Anglia ONE North offshore development area (341km²), approximately 2.7% of the winter SNS SAC. This is very precautionary, as it is highly unlikely that any changes in prey resources could occur over the entire windfarm area and the offshore cable corridor. It is more likely that effects would be restricted to any areas of</p>																					

East Anglia ONE North Offshore Windfarm
 Information to Support Appropriate Assessment Report - Integrity Matrices

Name of European Site: Southern North Sea cSAC (UK)																					
Distance to East Anglia ONE North Offshore Development Area: 0km (covers all of offshore cable corridor area)																					
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																				
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			Barrier effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise <i>Phocoena phocoena</i>	N (a)	N (b)	N (c)	N (d)	N (e)	N (d)	N (f)	N (f)	N (f)	N (g)	N (h)	N (g)	N (i)		N (ii)	N (j)			N (k)	N (l)	N (l)
<p>habitat loss (approximately 2km²), up to 0.02% of the SNS SAC winter area or 0.007% of the SNS SAC summer area. Any changes to prey availability resulting in the displacement of all harbour porpoise from the entire offshore development area would not on average exceed 10% (up to 2.7%) of the seasonal component of the SNS SAC. Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (see section 5.3.5.2.5 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>i) The East Anglia ONE North total offshore development area (341km²) is approximately 2.7% of the SNS SAC winter area and approximately 0.17% of the SNS SAC summer area. Any changes to water quality at East Anglia ONE North (alone) that could result in the displacement of all harbour porpoise from the entire windfarm site and cable corridor area would not exceed 20% (approximately 2.7%) of the seasonal component of the SNS SAC at any one time. Therefore, under these circumstances, there is no significant disturbance and no potential adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise. There is no anticipated adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (section 5.2.5.1.8 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>j) The spatial worst-case is the maximum area over which potential disturbance could occur at any one time based on single foundation installation (2,124km²) and UXO clearance (2,124km²). The estimated maximum number of harbour porpoise that may be temporarily disturbed as a result of underwater noise from single piling and UXO clearance is up to 0.4% of the reference population. The duration of potential disturbance based on the worst-case scenario could be up to 80 days (see section 5.2.5.1.5 of Information to Support Appropriate Assessment (document reference 5.3)).</p>																					

Name of European Site: Southern North Sea cSAC (UK)																					
Distance to East Anglia ONE North Offshore Development Area: 0km (covers all of offshore cable corridor area)																					
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																				
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			Barrier effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise <i>Phocoena phocoena</i>	N (a)	N (b)	N (c)	N (d)	N (e)	N (d)	N (f)	N (f)	N (f)	N (g)	N (h)	N (g)	N (i)		N (i)	N (j)			N (k)	N (l)	N (l)
<p>k) The maximum number of harbour porpoise that could potentially be temporarily disturbed is 15,051 individuals, which represents approximately 4.4% of the North Sea MU reference population (Table 5.43 of Information to Support Appropriate Assessment (document reference 5.3)). Based on the worst-case scenarios, there is the potential for up to 43.1% of the winter area, with a seasonal average of 24.8% or up to 32.4% of the summer area, with a seasonal average of 27.4%, to be affected. With the development of the SIP to deliver the appropriate mitigation and management measures across projects and managed by the MMO, it is considered there would be no significant disturbance and no adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise (section 5.3.5.5.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>l) The in-combination impact of any of the above during operation and decommissioning would be no worse than the in-combination impacts assessed above for the construction period of the proposed East Anglia ONE North project. During times where there is limited or no construction in the North Sea, impacts will be intermittent, temporary and highly localised to the source project. Consequently, there would be no adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise arising from any of the in-combination impacts listed above during the operational life of the proposed East Anglia ONE North project (see section 5.3.6 of Information to Support Appropriate Assessment (document reference 5.3)).</p>																					

1.10 The Wash and North Norfolk Coast SAC

Name of European Site: The Wash and North Norfolk Coast SAC (UK)

Distance to East Anglia ONE North Offshore Development Area: 105km from windfarm site and 97km from offshore cable corridor route

Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea in combination			Vessel interaction (collision risk)			Vessel interaction (collision risk) in combination			Changes in prey availability			Changes in prey availability In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal <i>Phoca vitulina</i>	N (a)	N (b)	N (c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)	N (g)	N (g)	N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>(a) Potential overall effects during UXO disturbance – The maximum number of harbour seal that could potentially be disturbed is 34, based on 0.008/km² density in the offshore development area. This represents 0.7% of the South-East England MU population or, as a worst-case scenario, 0.94% of the population from The Wash and Blakeney Point in The Wash and North Norfolk Coast SAC. Disturbance from any UXO detonations would be temporary and for a short-duration. Taking into account the temporary disturbance and intermittent duration of underwater noise from piling, along with the relatively low and infrequent number of harbour seal in and around the offshore development area, there is unlikely to be any significant disturbance or barrier effects for foraging harbour seal. Therefore, under these circumstances, there is no potential adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal (see section 5.4.2.1.7.1 of the Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>Potential overall effects during piling – The maximum number of harbour seal that could potentially be disturbed is 18, based on 0.008/km² density in the offshore development area. This represents 0.36% of the South-East England MU or, as a worst-case scenario, 0.5% of the 3,609 harbour seal from The Wash and Blakeney Point in The Wash and North Norfolk Coast SAC. Taking into account the temporary disturbance and intermittent duration of underwater noise from piling, along with the relatively low and infrequent number of harbour seal in and around the offshore development area, there is unlikely to be any significant disturbance or barrier effects for foraging harbour seal. Therefore, under these circumstances, there is no anticipated adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal (see section 5.4.2.1.7.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p>																		

Name of European Site: The Wash and North Norfolk Coast SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 105km from windfarm site and 97km from offshore cable corridor route																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea in combination			Vessel interaction (collision risk)			Vessel interaction (collision risk) in combination			Changes in prey availability			Changes in prey availability In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal <i>Phoca vitulina</i>	N (a)	N (b)	N (c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)	N (g)	N (g)	N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>(b) There would be no further overall effects during operation and maintenance, as the potential disturbance from underwater noise from operational turbines, maintenance activities and vessels all been based on the entire offshore development area. Therefore, under these circumstances, there is no anticipated adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal (section 5.3.2.1.7.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(c) There would be no further overall effects during decommissioning, as the potential disturbance from underwater noise during foundation removal, disturbance from vessels and any changes to prey availability will be based on the entire offshore development area. Therefore, under these circumstances, there is no potential adverse effect on the integrity of The Wash and North Norfolk Coast in relation to the conservation objectives for harbour seal (section 5.3.2.1.7.5 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(d) UXO Detonation</p> <p>One UXO detonation could potentially disturb up to 42.5 harbour seal (0.1% of the in-combination reference population; or 0.9% of the South-East England MU; or 1.2% of the Wash and Blakeney Point count). However, it is highly unlikely that all harbour seal would be from the Wash and Blakeney Point. Disturbance from any UXO detonations would be temporary, for a short-duration and intermittent at different locations, therefore, there is unlikely to be any significant disturbance or barrier effects for foraging harbour seal. Under these circumstances, there is no potential adverse effect on the integrity of the Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal (section 5.4.2.1.8.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p>																		

Name of European Site: The Wash and North Norfolk Coast SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 105km from windfarm site and 97km from offshore cable corridor route																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea in combination			Vessel interaction (collision risk)			Vessel interaction (collision risk) in combination			Changes in prey availability			Changes in prey availability In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal <i>Phoca vitulina</i>	N (a)	N (b)	N (c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)	N (g)	N (g)	N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>Piling</p> <p>Based on the more likely single pile installation at each of the four offshore windfarms, the estimated maximum area of potential disturbance is 10,620km², without any overlap in the potential areas of disturbance between windfarms. The maximum number of harbour seal that could potentially be temporarily disturbed is 24 individuals, which represents 0.05% of the in-combination reference population (<i>Error! Reference source not found. of Information to Support Appropriate Assessment</i> (document reference 5.3)). Taking into account the temporary disturbance and intermittent duration of underwater noise from piling, along with the relatively low percentage of the reference populations that could be temporarily affected, there is no potential for any significant disturbance or barrier effects to foraging harbour seal. Therefore, there is no potential adverse effect on the integrity of the Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal.</p> <p>(e) The maximum number of harbour seal that could potentially be disturbed is 119.5 individuals, which represents approximately 0.3% of the in-combination reference population or 3.3% of The Wash and Blakeney Point count (<i>Error! Reference source not found. of Information to Support Appropriate Assessment</i> (document reference 5.3))). However, it is highly unlikely that all harbour seal would be from the Wash and Blakeney Point. There is the potential for seals to be from other haul-out sites outwith the SAC, which is why assessments have been made for the relevant in-combination reference population as well as SAC counts. Taking into account that seals have been recorded foraging in operational windfarm sites, along with the relatively low percentage of the reference populations that could be temporarily affected, there is no potential for any significant disturbance or barrier effects to foraging harbour seal. Therefore, under these circumstances, there is no potential adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal.</p>																		

Name of European Site: The Wash and North Norfolk Coast SAC (UK)

Distance to East Anglia ONE North Offshore Development Area: 105km from windfarm site and 97km from offshore cable corridor route

Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea in combination			Vessel interaction (collision risk)			Vessel interaction (collision risk) in combination			Changes in prey availability			Changes in prey availability In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal <i>Phoca vitulina</i>	N (a)	N (b)	N (c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)	N (g)	N (g)	N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>(f) As a precautionary worst-case scenario approach, the number of harbour seal that could be at increased collision risk with vessels during construction, operation, maintenance and decommissioning has been assessed based on 5% of the number of animals that could be present in the offshore development area. This is very precautionary, as it is highly unlikely that harbour seal present in the offshore development area would be at increased collision risk with vessels, especially taking into account the relatively small increase vessel movements compared to existing vessel movements in the area. Vessel movements, where possible, will be incorporated into recognised vessel routes and hence to areas where harbour seal are accustomed to vessels, in order to reduce any increased collision risk. All vessel movements will be kept to the minimum number that is required to reduce any potential collision risk. Additionally, vessel operators will use good practice to reduce any risk of collisions with harbour porpoise. In addition, based on the assumption that harbour seal would be disturbed from the offshore development area as a result of underwater noise from construction, maintenance and decommissioning activities and vessels, there should be no potential for increased collision risk within the offshore development area. Therefore, under these circumstances, there is no anticipated adverse effect on the integrity of the Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal (section 5.4.2.2.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(g) The precautionary in-combination assessment has determined that the number of harbour seal that could have a potential increased collision risk with vessels in offshore windfarm sites in the North Sea could be 0.5 harbour seal (0.001% of the in-combination reference population; or 0.01% of the South-East England MU; or 0.02% of the Wash and Blakeney Point count; (see section 5.4.2.2.2 of Information to Support Appropriate Assessment Report (document reference 5.3)).</p> <p>(h) The number of harbour seal that could be present in the area is 2.7 (based on 0.008/km² density). This represents 0.05% of the South-East England MU or, as a worst-case scenario, 0.07% of The Wash and Blakeney Point count in The Wash and North Norfolk Coast SAC. It is highly unlikely that all</p>																		

Name of European Site: The Wash and North Norfolk Coast SAC (UK)

Distance to East Anglia ONE North Offshore Development Area: 105km from windfarm site and 97km from offshore cable corridor route

Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea in combination			Vessel interaction (collision risk)			Vessel interaction (collision risk) in combination			Changes in prey availability			Changes in prey availability In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal <i>Phoca vitulina</i>	N (a)	N (b)	N (c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)	N (g)	N (g)	N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>harbour seal in the East Anglia ONE North offshore development area would be from The Wash and Blakeney Point. There would be no direct effect or overlap with the Wash and North Norfolk Coast SAC area. Any effects 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. Consequently, there would be no adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal arising from changes in prey resources (see section 5.3.2.3.1 of Information to Inform Appropriate Assessment Report (document reference 5.3)).</p> <p>(i) Any effects 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. Consequently, there would be no adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal arising from changes in prey resources (see sections 5.3.2.3.1 and 5.3.2.3.2 of Information to Inform Appropriate Assessment (document reference 5.3)).</p>																		

1.11 Humber Estuary SAC

Name of European Site: Humber Estuary SAC (UK)

Distance to East Anglia ONE North Offshore Development Area: 179km from windfarm site and 173km from offshore cable corridor

Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea (in combination)			Vessel interactions			Vessel interactions (in combination)			Indirect effects on prey			Indirect effects on prey (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N(a)	N(b)	N(c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)			N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>(a) Potential overall effects during UXO clearance – It is assumed that only one UXO could be detonated at a time during piling and there would be no concurrent piling. The maximum potential area of disturbance is 4,248km², based on 26km disturbance range around each pile location and UXO location, and assuming no overlap in the potential impact areas. The maximum number of grey seal that could potentially be disturbed is 127, based on 0.03/km² density in the offshore development area. This represents 1.46% of the South-East England MU or, as a worst-case scenario, 1.95% of the population from Donna Nook in the Humber Estuary SAC. It is highly unlikely that all grey seal in the offshore development area would be from the Donna Nook haul-out site. There would be no direct effect or overlap with the Humber Estuary SAC area. Disturbance from any UXO detonations would be temporary and for a short-duration. Taking into account the temporary disturbance and intermittent duration of underwater noise from piling, along with the relatively low and infrequent number of grey seal in and around the offshore development area, there is unlikely to be any significant disturbance or barrier effects for foraging grey seal. Therefore, under these circumstances, there is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.5.2.1.6.1 of Information to Inform Appropriate Assessment (document reference 5.3)).</p> <p>Potential overall effects during Piling – The assessment assumes piling in the East Anglia ONE North windfarm site at the same time as other construction activities, including vessels, in the offshore cable corridor. Disturbance from piling would be up to 2,124km² (based on 26km EDR) with 133km² of cable corridor not overlapped by piling impact area, giving a maximum potential area of disturbance of up to 2,257km². The maximum number of grey seal that could potentially be disturbed is 68, based on 0.03/km² density in the offshore development area. This represents 0.78% of the South-</p>																		

Name of European Site: Humber Estuary SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 179km from windfarm site and 173km from offshore cable corridor																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea (in combination)			Vessel interactions			Vessel interactions (in combination)			Indirect effects on prey			Indirect effects on prey (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N(a)	N(b)	N(c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)			N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>East England MU or, as a worst-case scenario, 1.04% of the grey seal count from the Donna Nook haul-out site within the Humber Estuary SAC. It is highly unlikely that all grey seal in the offshore development area would be from Donna Nook. There would be no direct effect or overlap with the Humber Estuary SAC area. Disturbance from construction activities and vessels would be temporary and for a short-duration. Taking into account the temporary disturbance and intermittent duration of underwater noise from piling, along with the relatively low and infrequent number of grey seal in and around the offshore development area, there is unlikely to be any significant disturbance or barrier effects for foraging grey seal. Therefore, under these circumstances, there is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.1.7.2 of Information to Inform Appropriate Assessment (document reference 5.3).</p> <p>(b) Any disturbance from construction and maintenance vessels would be temporary, localised, intermittent duration and at different locations within the offshore development area. Taking this into account, along with the relatively low and infrequent number of harbour seal in and around the offshore development area, there is unlikely to be any significant disturbance or barrier effects for foraging harbour seal. Therefore, under these circumstances, there is no potential adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal.</p> <p>Taking into account evidence of seal foraging in operational windfarms, along with the relatively low and infrequent number of harbour seal in and around the East Anglia ONE North windfarm site, there is unlikely to be any significant disturbance or barrier effects for foraging harbour seal. Therefore, under these circumstances, there is no potential adverse effect on the integrity of The Wash and North Norfolk Coast SAC in relation to the conservation objectives for harbour seal.</p>																		

Name of European Site: Humber Estuary SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 179km from windfarm site and 173km from offshore cable corridor																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea (in combination)			Vessel interactions			Vessel interactions (in combination)			Indirect effects on prey			Indirect effects on prey (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N(a)	N(b)	N(c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)			N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>(c) It is not possible to provide details of the methods that will be used during decommissioning at this time. However, it is expected that the activity levels will be comparable to construction (with the exception of pile driving noise and UXO clearance). A detailed decommissioning plan will be provided prior to decommissioning that will give details of the techniques to be employed and any relevant mitigation measures. For this assessment, it is assumed that the potential effects from underwater noise during decommissioning would be less than those assessed for piling and comparable to those assessed for other construction activities (as assessed above). Therefore, there is unlikely to be any significant disturbance or barrier effects for foraging grey seal. Under these circumstances, there is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.1.6 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(d) The maximum number of grey seal that could potentially be temporarily disturbed due to in-combination piling is 1,295 individuals. This represents 14.9% of the South-East England MU or, as a worst-case scenario, 19.8% of the 6,526 grey seal count from the Donna Nook haul-out site in the Humber Estuary SAC. However, it is highly unlikely that all grey seal in the windfarm sites would be from the Donna Nook site. To take into account the windfarm locations, movements and ranges of grey seal, it is more appropriate to use the in-combination reference population to cover the wider area (see section 5.4.1.1). Therefore, 5.9% of the in-combination reference population (45,061 grey seal) could potentially be temporarily disturbed. There is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.1.8.1 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>The maximum number of grey seal that could potentially be disturbed due to offshore windfarm construction activities other than piling is 36.5 individuals, which represents approximately 0.17% of the in-combination reference population. However, it is highly unlikely that all grey seal would be from the</p>																		

Name of European Site: Humber Estuary SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 179km from windfarm site and 173km from offshore cable corridor																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea (in combination)			Vessel interactions			Vessel interactions (in combination)			Indirect effects on prey			Indirect effects on prey (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N(a)	N(b)	N(c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)			N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>Donna Nook site within the Humber Estuary SAC. There is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.1.8.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>One UXO detonation could potentially disturb up to 212 grey seal (0.97% of the in-combination reference population; or 2.43% of the South-East England MU; or 3.25% of the Donna Nook count). However, it is highly unlikely that all grey seal would be from the Donna Nook haul-out site within the Humber Estuary SAC. There is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.1.8.4 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(e) The maximum number of grey seal that could potentially be disturbed during operation and maintenance is 271 individuals, which represents approximately 1.2% of the in-combination reference population. However, it is highly unlikely that all grey seal would be from the Humber Estuary SAC. There is no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.1.8.3 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(f) Estimated number of grey seal at potential collision risk based on 5% of the number of animals that could be present in the offshore development area = 0.5. This equates to 0.006% of the South-East England MU; or 0.008% of the Donna Nook count. No anticipated adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal (see section 5.4.2.2 of Information to Support Appropriate Assessment (document reference 5.3)).</p> <p>(g) The precautionary in-combination assessment has determined that the number of grey seal that could have a potential increased collision risk with vessels in offshore windfarm sites in the North Sea could be up to 10.4 grey seal (0.05% of the in-combination reference population; or 0.12% of the</p>																		

Name of European Site: Humber Estuary SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 179km from windfarm site and 173km from offshore cable corridor																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea (in combination)			Vessel interactions			Vessel interactions (in combination)			Indirect effects on prey			Indirect effects on prey (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N(a)	N(b)	N(c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)			N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
<p>South-East England MU; or 0.16% of the Donna Nook count. There is no anticipated adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal. See section 5.4.2.2.2 of Information to Support Appropriate Assessment (document reference 5.3).</p> <p>(h) The number of grey seal that could be present in the offshore development area is 10, (based on 0.03/km² density). This represents 0.11% of the South-East England MU or, as a worst-case scenario, 0.15% of the 6,526 grey seals from Donna Nook in the Humber Estuary SAC. However, it is highly unlikely that all grey seal in the East Anglia ONE North offshore development area would be from Donna Nook. There would be no direct effect or overlap with the Humber SAC area. Any effects 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. Consequently, there would be no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal arising from changes in prey resources.</p> <p>(i) The in-combination assessment on potential changes to prey availability has assumed that any potential effects on grey seal prey species from underwater noise, including piling, would be the same or less than those for grey seal. Therefore, there would be no additional effects other than those assessed grey seal, i.e. if prey are disturbed from an area as a result of underwater noise, grey seal will be disturbed from the same or greater area, therefore any changes to prey availability would not additionally affect grey seal as they would already be disturbed from the same area. There would be no direct effect or overlap with the Humber SAC area. Any effects 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</p>																		

Name of European Site: Humber Estuary SAC (UK)																		
Distance to East Anglia ONE North Offshore Development Area: 179km from windfarm site and 173km from offshore cable corridor																		
Site Features	Adverse Effect on Integrity due to East Anglia ONE North																	
	Disturbance of seals foraging at sea			Disturbance of seals foraging at sea (in combination)			Vessel interactions			Vessel interactions (in combination)			Indirect effects on prey			Indirect effects on prey (in combination)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N(a)	N(b)	N(c)	N (d)	N (e)		N (f)	N (f)	N (f)	N (g)			N (h)	N (h)	N (h)	N (i)	N (i)	N (i)
percentage of the potential habitat in the surrounding area. Consequently, there would be no potential adverse effect on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal arising from changes in prey resources.																		

1.12 Vlaamse Banken SAC

Name of European Site: Vlaamse Banken SAC (Belgium)															
Distance to East Anglia ONE North Offshore Development Area: 86km from the windfarm site and 89km from the offshore cable corridor															
Site Features	Adverse Effect on Integrity due to East Anglia ONE North														
	Underwater noise			Vessel Interactions and disturbance at seal haul outs			Indirect effects on prey			Changes to water quality			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)		N (a)	N (a)	N (a)	N (a)
a) 1,269.4 grey seal (5.9% of in-combination reference population). Not all from this site alone, therefore no adverse effect on site integrity (see section 5.6 of Information to Support Appropriate Assessment (document reference 5.3))															

1.13 Voordelta SAC and SPA

Name of European Site Voordelta SPA and SAC (Netherlands)															
Distance to East Anglia ONE North Offshore Development Area: 84km from windfarm site and 101km from offshore cable corridor															
Marine Mammals															
Site Features	Likely effect(s) of East Anglia ONE North														
	Underwater noise			Underwater noise			Underwater noise			Underwater noise			Underwater noise		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal <i>Halichoerus grypus</i>	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)	N (a)		N (a)	N (a)	N (a)	N (a)
a) 1,206.9 grey seal (5.5% of in-combination reference population). Not all from this site alone, therefore no adverse effect on site integrity (see <i>section 5.6 of Information to Support Appropriate Assessment</i> (document reference 5.3).															