The Planning Inspectorate

REPORT on the IMPLICATIONS for EUROPEAN SITES Proposed Hornsea Offshore Wind Farm (Zone 4) - Project One

An Examining Authority report prepared with the support of the Environmental Services Team

May 2014

CONTENTS

1.0 INTRODUCTION

Background

1.1 SMart Wind Ltd (the applicant) has applied to the Secretary of State for a development consent order (DCO) under section 37 of the Planning Act 2008 (as amended) for the proposed Hornsea Offshore Wind Farm (Zone 4) – Project One which comprises of up to 332 wind turbine generators with capacities ranging from 3.6 MW up to 8 MW, together with on and offshore infrastructure. It is intended that there will be three development zones. The Secretary of State has appointed an Examining Authority (ExA) to conduct an examination of the application, to report its findings and conclusions, and to make a recommendation to the Secretary of State as to the decision to be made on the application.

1.2 The Hornsea Zone is located in the southern region of the North Sea, covering an area of 4,735 km^2. The western boundary of the Hornsea Zone is 31 km from the coastline of the East Riding of Yorkshire and the eastern boundary is 1 km from the median line between United Kingdom (UK) and Dutch waters.

1.3 Subzone 1 is situated within the centre of the Hornsea Zone with a total area of 407 km^2. The term Subzone 1 is used to describe the area within the Hornsea Zone containing the offshore array, comprising wind turbine generators and foundations, inter-array cabling, offshore converter stations, offshore collector stations, offshore accommodation platforms, and all associated infrastructure.

1.4 Project One consists of the infrastructure contained in Subzone 1, offshore export cable route, offshore reactive compensation substation, and landfall as well as the onshore cabling, onshore HVAC substation or HVDC converter station, and associated infrastructure and works.

1.5 The western boundary of Subzone 1 lies 103 km off the East Riding of Yorkshire coast and the eastern boundary of Subzone 1 is 43.6 km from the median line between UK and Dutch waters.

1.6 The relevant Secretary of State is the competent authority for the purposes of the Habitats Directive[1] and the 2010 Habitats Regulations[2] for applications submitted under the Planning Act regime (as amended). The findings and conclusions on nature conservation issues reported by the ExA will assist the Secretary of State in performing their duties under the Habitats Regulations.

1.7 This report compiles, documents and signposts information provided within the DCO application, and the information submitted throughout the examination by both the applicant and interested parties. It is issued to ensure that interested parties including the Statutory Nature Conservation Bodies (SNCB's): Joint Nature Conservation Committee (JNCC) and Natural England (NE) are consulted formally on habitats regulations matters. This process may be relied on by the Secretary of State for the purposes of Regulation 61(3) of the Habitats Regulations.

Documents Used to Inform this Report

1.8 The applicant completed the screening and integrity matrices in response to the first round of ExA questions (submitted to the ExA on 13 December 2013).

1.9 These matrices presented the applicant's evidence on whether the project, alone or in-combination with other projects, potentially affects a European site[3], and whether it is likely to have a significant effect on key features of each European site.

1.10 The matrices presented within this report have been updated by the Examining Authority, with the support of the Environmental Services Team of the Planning Inspectorate, throughout the examination using the examination documents including the following:

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[1] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (as codified) (the 'Habitats Directive')

[2] The Conservation of Habitats and Species Regulations 2010 (as amended) (the 2010 Habitats Regulations). The Offshore Marine Conservation (Natural Habitats, &c) Regulations 2007 (as amended) (Offshore Marine Regulations) will apply beyond UK territorial waters (12 nautical miles). These regulations are relevant when an application is submitted for an energy project in a renewable energy zone (except any part in relation to which the Scottish Ministers have functions).

[3] European sites include Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) which are protected under the Habitats Regulations. As a matter of policy, the Government also applies the procedures of the Habitats Regulations to potential SPAs (pSPAs), Ramsar sites, and (in England) proposed Ramsar sites and sites identified, or required, as compensatory measures for adverse effects on any of the above sites.

Application Documents

- Hornsea Offshore Wind Farm Project 1 Habitats Regulations Assessment Report. July 2013. Document 12.6 (Doc Ref: APP-171)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Chapter 2 Benthic Subtidal and Intertidal Ecology. July 2013. Document 7.2.2 (Doc Ref: APP-031)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Benthic Ecology Technical Report. July 2013. Document 7.5.2.1 (Doc Ref: APP-081)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Chapter 3 Fish and Shellfish Ecology. July 2013. Document 7.2.3 (Doc Ref: APP-032)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Fish and Shellfish Technical Report. July 2013. Document 7.5.3.1 (Doc Ref: APP-092)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Chapter 4 Marine Mammals. July 2013. Document 7.2.4 (Doc Ref: APP-033)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Marine Mammal Technical Report. July 2013. Document 7.5.4.1 (Doc Ref: APP-085)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Chapter 5 Ornithology. July 2013. Document 7.2.5 (Doc Ref: APP-034)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Ornithology Technical Report. July 2013. Document 7.5.5.1 (Doc Ref: APP-086)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Chapter 6 Nature Conservation. July 2013. Document 7.2.6 (Doc Ref: APP-035)
- Hornsea Offshore Wind Farm Project 1 Environmental Statement. Annex 4.5.3 Cumulative, Transboundary and Inter-related Effects Document. July 2013. Document 7.4.5.1 (Doc Ref: APP-071)

Relevant Representations

- Relevant Representation Natural England. 11 October 2013. (Doc Ref: REP-035)
- Relevant Representation Royal Society for the Protection of Birds. 11 October 2013. (Doc Ref: REP-037)

Written Representations

- Written Representation Natural England. 20 January 2014. (Doc Ref: REP-054)
- Summary of Written Representation Natural England. 23 January 2014. (Doc Ref: REP-055)
- Written Representation Royal Society for the Protection of Birds. 20 January 2014. (Doc Ref: REP-057)

Statements of Common Ground

- SMart Wind Ltd. SoCG with Natural England (Offshore Ornithology). 20 January 2014. Appendix SSS (Doc Ref: REP 237)
- SMart Wind Ltd. SoCG with Natural England (Terrestrial Ornithology). 20 January 2014. Appendix EEE (Doc Ref: REP -223)
- SMart Wind Ltd. SoCG with Natural England (All Other Matters). 20 January 2014. Appendix FFF (Doc Ref: REP-224)
- SMart Wind Ltd. Appendix QQQ SoCG with Environment Agency 20 January 2014 (Doc Ref: REP-235)
- SMart Wind Ltd. Appendix RRR Draft SoCG with Marine Management Organisation 20 January 2014 (Doc Ref: REP-236)
- SMart Wind Ltd. SoCG with Marine Management Organisation. 24 February 2014. Appendix N (Doc Ref: REP-269)
- SMart Wind Ltd. SoCG Yorkshire and Lincolnshire Wildlife Trusts. 24 February 2014. Appendix O (Doc Ref: REP-270)

Responses to ExA's First Questions

- SMart Wind Ltd Part 2 of the First Written Response Responses to the Examining Authority's Rule 8 Questions. 20 January 2014 (Doc Ref: REP-189)
- SMart Wind Ltd. - Appendix K Response to Natural England's Written Representation. 24 February 2014 (Doc Ref: REP-266)
- SMart Wind Ltd. - Appendix L Memorandum of Understanding with Natural England. 24 February 2014 (Doc Ref: REP-267)
- Response to First Questions Environment Agency. 20 January 2014 (Doc Ref: REP-184)
- Response to First Questions. Natural England. 20 January 2014 (Doc Ref: REP-188)

Responses to ExA's Second Questions

- SMart Wind Ltd Response to Deadline IV. 22 April 2014 (Doc Ref: REP-307)

- SMart Wind Ltd. Appendix R - Gull collision risk assessment. 22 April 2014 (Doc Ref: REP-325)
- SMart Wind Ltd. Appendix S - Updated collision risk assessment note. 22 April 2014 (Doc Ref: REP-326)
- SMart Wind Ltd. Appendix U - Clarification Note on cumulative and in-combination collision assessments. 22 April 2014 (Doc Ref: REP-328)
- SMart Wind Ltd. Appendix W - Auk Displacement Note. 22 April 2014 (Doc Ref: REP-330)
- SMart Wind Ltd. Appendix X - PVA Note. 22 April 2014 (Doc Ref: REP-331)
- Response to Second Questions Natural England. 22 April 2014 (Doc Ref: REP-304)
- Response to Second Questions Royal Society for the Protection of Birds. 22 April 2014 (Doc Ref: REP-305)

Documents for Deadline III

- Natural England. Written submission Section B of submission for Deadline III. 24 February 2014 (Doc Ref: REP-286)

Issue Specific Hearings

- Issue Specific Hearing – Ornithology. 29 April 2014 (Doc Ref: H-024)

Structure of this Report

1.11 The remainder of this report is in three parts:

Section 2 identifies the European sites, potential impacts, mitigation measures and the main issues that were considered within the Habitat Regulations Assessment (HRA) process.

1.12 Section 3 comprises screening matrices for the European sites that might potentially be affected by the project (Stage 1 of the HRA process). These matrices collate evidence on whether the project is likely to have significant effects on the key features of each European site alone, or in-combination with other projects. The European sites for which a likely significant effect (LSE) is identified on one or more of its key features are taken forward to Section 3 of this report, and

1.13 Section 4 comprises matrices for the European sites identified in Section 2 for which a likely significant effect cannot be excluded. The matrices summarise the anticipated effects on the integrity of the European sites, in the context of its/their conservation objectives (Stage 2 of the HRA process).

2.0 KEY POINTS

European Sites

2.1 The project is not connected with or necessary to the management for nature conservation of any of the European sites considered within the assessment.

2.2 The applicant's HRA Report identified the following 65 UK Special Protection Area (SPA) sites for inclusion within the assessment:

- Alde-Ore Estuary SPA;
- Abberton Reservoir SPA;
- Auskerry SPA;
- Benfleet and Southend Marshes SPA;
- Blackwater estuary SPA;
- Breydon Water SPA;
- Broadland SPA;
- Buchan Ness to Collieston Coast SPA;
- Calf of Eday SPA;
- Colne Estuary SPA;
- Copinsay SPA;
- Cromarty Firth SPA;
- Coquet Island SPA;
- Dengie Marshes SPA;
- Dornoch Firth and Loch Fleet SPA;
- East Caithness Cliffs SPA;
- East Sanday Coast SPA;
- Fair Isle SPA;
- Farne Islands SPA;
- Fetlar SPA;
- Firth of Forth SPA;
- Firth of Tay & Eden Estuary SPA;
- Flamborough Head and Bempton Cliffs SPA;
- Forth Islands SPA;
- Foula SPA;
- Foulness SPA;
- Fowlsheugh SPA;

- Gibraltar Point SPA;
- Great Yarmouth and North Denes SPA;
- Hamford Water SPA;
- Hermaness, Saxa Vord and Valla Field SPA;
- Hornsea Mere SPA;
- Hoy SPA;
- Humber Estuary SPA;
- Imperial Dock Lock, Leith SPA;
- Inner Moray Firth SPA;
- Lindisfarne SPA
- Loch of Strathbeg SPA;
- Marwick Head SPA;
- Medway Estuary & Marshes SPA;
- Minsmere - Walberswick SPA;
- Montrose Basin SPA;
- Moray and Nairn Coast SPA;
- Mousa SPA;
- North Caithness Cliffs SPA;
- North Norfolk Coast SPA;
- Northumbria Coast SPA;
- Noss SPA;
- Orkney Mainland Moors SPA;
- Outer Thames Estuary SPA;
- Papa Stour SPA;
- Papa Westray (North Hill and Holm) SPA;
- Pentland Firth Islands SPA;
- Ronas Hill - North Roe and Tingon SPA;
- Rousay SPA;
- St Abb's Head to Fast Castle SPA;
- Stour and Orwell Estuaries SPA;
- Sumburgh Head SPA;
- Teesmouth and Cleveland Coast SPA;
- Thames Estuary and Marshes SPA;
- Thanet Coast and Sandwich Bay SPA;
- The Swale SPA;

- The Wash SPA;
- Troup, Pennan and Lions Heads SPA;
- West Westray SPA; and
- Ythan Estuary, Sands of Forvie and Meikle Loch SPA.

2.3 In addition to the above UK sites the applicant's HRA Report identified, 11 designated non-UK SPAs were included in the assessment.

- Ramsar-Gebiet S-H Wattenmeer und angrenzende Küstengebiete SPA;
- Östliche Deutsche Bucht SPA;
- Sylter Außenriff SPA;
- Seevogelschutzgebiet Helgoland SPA;
- Borkum-Riffgrund SPA;
- Littoral Seino-Marin SPA;
- Baie de Seine Occidentale SPA;
- Falaise du Bessin Occidental SPA;
- Frisian Front SPA;
- Waddenzee (Wadden Sea) SPA; and
- Voordelta SPA.

2.4 The following 24 Ramsar sites identified in the applicant's HRA Report are considered in this assessment:

- Abberton Reservoir Ramsar;
- Alde Ore Estuary Ramsar;
- Benfleet and Southend Marshes Ramsar;
- Blackwater Estuary Ramsar;
- Breydon Water Ramsar;
- Broadland Ramsar;
- Colne Estuary Ramsar;
- Crouch and Roach Estuaries Ramsar;
- Deben Estuary Ramsar;
- Dengie Ramsar;
- Foulness Ramsar;
- Gibraltar Point Ramsar;
- Hamford Water Ramsar;
- Humber Estuary Ramsar;

- Lindisfarne Ramsar;
- Medway Estuary and Marshes Ramsar;
- Minsmere Walberswick Ramsar;
- North Norfolk Coast Ramsar;
- Northumbria Coast Ramsar;
- Stour and Orwell Estuaries Ramsar;
- Teesmouth and Cleveland Coast Ramsar;
- Thames Estuary and Marshes Ramsar;
- Thanet Coast and Sandwich Bay Ramsar; and
- The Wash Ramsar.

2.5 A total of 11 UK Special Areas of Conservation (SAC's) identified in the applicant's HRA Report have been included in the assessment:

- Moray Firth SAC
- Firth of Tay and Eden SAC
- Berwickshire and North Northumberland Coast SAC
- Humber Estuary SAC
- Flamborough Head SAC
- Dogger Bank cSAC
- The Wash and North Norfolk Coast SAC
- River Derwent SAC
- Haisborough, Hammond and Winterton cSAC/SCI
- North Norfolk Sandbanks and Saturn Reef cSAC/SCI
- Inner Dowsing, Race Bank and North Ridges cSAC/SCI

2.6 A total of 37 non-UK SACs and SCIs sites identified in the applicant's HRA Report have been included in the assessment.

- SBZ 1 / ZPS 2 SCI
- SBZ 2 / ZPS 2 SCI
- SBZ 3 / ZPS 3 SCI
- Vlakte van de Raan pSCI
- NTP S-H Wattenmeer und angrenzende Küstengebiete SCI
- Doggerbank SCI
- Östliche Deutsche SCI
- Sylter Außenriff SCI
- Steingrund SCI

- Borkum-Riffgrund SAC
- Hamburgisches Wattenmeer SCI
- Unterelbe SCI
- Helgoland mit Helgoländer Felssockel SCI
- Nationalpark Niedersächsisches Wattenmeer SCI
- Venø, Venø Sund SAC
- Dråby Vig SAC
- Løgstør Bredning, Vejlerne og Bulbjerg SAC
- Gule Rev SAC
- Sydlige Nordsø SAC
- Estuaires et Littoral Picards (baies de Somme et d'Authie) pSCI
- Estuaire de la Seine pSCI
- Rècifs et marais arrière-littoraux du Cap Lèvi à la Pointe de Saire pSCI
- Rècifs et landes de la Hague pSCI
- Banc et rècifs de Surtainville pSCI
- Anse de Vauville pSCI
- Baie de Seine occidentale SCI
- Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI
- Bancs des Flandres pSCI
- Recifs Gris-nez Blanc-nez pSCI
- Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI
- Baie de canche et couloir des trois estuaires pSCI
- Doggersbank ('Dutch Dogger Bank') pSCI
- Klaverbank pSCI
- Vlakte van de Raan SAC
- Noordzeekustzone SAC
- Noordzeekustzone II pSCI
- Waddenze SCI

2.7 Within the HRA Report it is stated in paragraph 4.2.11 that SPA sites to be included in the assessment have been identified on the basis of JNCC advice. The European SAC and SCI sites identified above were agreed with the SNCB's (see paragraph 4.2.18).

2.8 The applicant has not stated clearly that the Ramsar sites identified above were agreed with JNCC or NE although no specific issues relating to Ramsar sites outside of the assessment have been raised.

2.9 The JNCC / NE relevant representation also identifies the following European site*s* as relevant to the proposed development which were not considered within the HRA Report:

- Flamborough and Filey Coast potential SPA (pSPA)[4]

2.10 The above European site was included within the matrices updated by the applicant in response to the first round of written questions submitted to the Planning Inspectorate on 20 January 2014.

Potential Impacts

2.11 The potential impact*s* upon the identified European site*s* which *are* considered within the applicant's HRA Report *are* provided in the table below.

2.12 Potential impacts considered within the screening (Stage 1) and effects on integrity (Stage 2) matrices.

Impacts in submission information	**Presented in screening matrices as**
Habitat extent: Temporary habitat loss due to cable laying operations in the intertidal zone and construction of HVDC converter/HVAC substation.	Habitat extent
Disturbance and displacement: Temporary noise, vibration and visual disturbance due to activities associated with cable laying and construction of HVDC converter/HVAC substation.	Disturbance and displacement

[4] In July 2013 the Minister for the Department of Environment, Food and Rural Affairs (Defra) gave approval for Natural England to initiate formal consultation on the extension of the Flamborough and Bempton Cliffs SPA. At that stage the extension became a potential SPA and was renamed Flamborough and Filey Coast pSPA. The pSPA is based on a revised site boundary, revised interest features and new reference populations. During the pre-application stages of this application Natural England advised the applicants of the proposed site alterations which they have subsequently included in their assessments.

Impacts in submission information	**Presented in screening matrices as**
Indirect effects: Temporary reduction or redistribution in prey items for marine mammals/birds due to disturbance caused by installation activities, or a change in water quality due to increased suspended sediment.	Indirect effects
Collisions with rotating turbine blades may result in direct mortality of birds.	Collision
Barrier effects caused by the physical presence of turbines may prevent clear transit of birds between foraging and breeding sites, or on migration routes.	Barrier
Displacement of birds from physical presence of wind turbines during the operational and maintenance phase may result in effective habitat loss and reduction in survival or fitness rates.	Displacement
Extent: Temporary habitat loss during cable laying operations in the intertidal zone.	Habitat extent
Extent: Temporary habitat disturbance due to access to the intertidal zone during the operational phase for routine inspections of export cables in the intertidal zone.	
Water quality: Temporary increase in suspended sediments, resuspension of sediment bound contaminants and smothering during cable laying operations.	Water quality
River morphology: Disruption of fish migratory pathways, or creation of artificial barriers during cable laying operations and operational phase (i.e. Electromagnetic Fields (EMF)).	Disruption to migration
Marine Mammals: Physical injury and/or behavioural disturbance from underwater noise impacts during construction piling of foundations and other construction activities.	Injury/Disturbance
Marine Mammals: Behavioural disturbance from underwater noise from vessel noise and other activities.	
Marine Mammals: Physical injury from increased risk of collision with vessels.	Collision risk
Marine Mammals: Change in prey (fish) species distribution and/or abundance (indirect effect).	Change in prey species distribution/abundance

2.13 In order to determine whether a LSE may occur on the qualifying features of the European sites identified as a result of impacts related to the construction, operation and decommissioning of Project One, the information presented in the Environmental Statement (ES) and the HRA report was reviewed with particular attention to the effects on those qualifying features. Where there is potential interaction between a project effect and a designated qualifying feature (as identified in the ES), this feature is taken through to the next stage and the test for LSE.

2.14 Where there is a potential interaction (impact pathway) with any feature and there is the potential to affect the conservation objectives of a site this will result in a LSE on the European site and consideration of the effect upon integrity of the European site would be required.

In-combination impacts

2.15 The applicant has addressed in-combination impacts within the matrices. The following projects have been included in the ornithological in-combination collision risk and displacement assessment carried out by the applicant, not all projects have been included as inclusion is dependent on the receptor being considered:

- Lynn and Inner Dowsing
- Thanet
- Gunfleet sands I, II and III
- Kentish Flats
- Egmond aan Zee
- Greater Gabbard
- Lincs
- London Array Phase I
- Sheringham Shoal
- Teesside
- Humber Gateway
- Race Bank
- Moray Firth Project One (MORL)
- Dogger Creyke Beck - Projects A and B
- East Anglia One
- Dudgeon
- Triton Knoll

- Kentish Flats Extension
- Beatrice
- Galloper
- London Array Phase II
- Westernmost Rough
- Aberdeen European Offshore Wind Deployment Centre
- Seagreen Alpha
- Seagreen Bravo
- Neart na Gaoithe
- Hornsea Project Two
- Dogger Teeside
- Inchcape

2.16 The following projects have been included in the marine mammals in-combination assessment carried out by the applicant:

- Aggregate extraction activities
- Disposal Areas
- Oil and Gas Activities
- Lincs
- Humber Gateway
- Teesside
- Gunfleet Sands 3 – Demonstration project
- BARD Offshore 1
- Thornton Bank Phase II
- Thornton Bank Phase III
- Borkum Phase 1
- Race Bank
- Westernmost Rough
- Dudgeon
- Triton Knoll
- Dogger Bank Creyke Beck A and B
- East Anglia One
- Galloper
- London Array Phase II

- Kentish Flats Extension
- Sheringham Shoal
- Moray Firth (MORL) – Telford, Stevenson and MacColl
- Beatrice
- Neart na Gaoithe
- Firth of Forth (Project Alpha and Project Bravo)
- Aberdeen European Offshore Wind Deployment Centre
- Cygnus oil and gas platform
- Potential vessel movements associated with Aggregate Application Areas 514/1, 514/3, 493, 400, 439, 492, 506, 483, 490, 491 and 484
- Hornsea Project Two
- Tetney Sea-line Replacement (section of the submarine sea line which runs from the Tetney Oil Terminal to an offshore buoy)
- Hornsea Project One
- Lynn and Inner Dowsing
- Thanet
- Gunfleet sands I, II and III
- Kentish Flats
- Egmond aan Zee
- Thornton Bank Phase I
- Greater Gabbard
- Lincs
- Sheringham Shoal
- London Array Phase I
- Teesside
- BARD Offshore 1
- Thornton Bank Phase II
- Thornton Bank Phase III
- Borkum Phase 1
- Race Bank
- Humber Gateway
- Moray Firth Project One (MORL)
- Dogger Creyke Beck - Projects A and B
- East Anglia One

- Dudgeon
- Triton Knoll
- Kentish Flats Extension
- Beatrice
- Galloper
- London Array Phase II
- Westernmost Rough
- Firth of Forth Phase 1
- Neart na Gaoithe
- Hornsea Project Two
- Dogger Teesside - Projects A and B
- Dogger Teesside - Projects C and D
- East Anglia Three
- East Anglia Four
- Inch Cape
- Moray Firth Project Two

2.17 It is not made clear within the HRA whether the above projects to be considered in the in-combination assessment were agreed with the SNCB's. The SNCB's have indicated that there is some disagreement with the projects considered and the extent to which they have been taken into account in the assessment.

Mitigation measures

2.18 A range of mitigation has been agreed with respect to the protection of marine mammals and includes:

- A 30 minute soft/slow-start will be used for all piling activities. Piling will commence at a maximum of 20% hammer energy with a reduced strike rate. Hammer energy will ramp up with a maximum increase up to full hammer energy. The strike rate will increase from every six seconds to every four seconds over the soft start.
- A Marine Mammal Mitigation Protocol (MMMP) approved by the Marine Management Organisation (MMO), will be implemented during construction. Marine Mammal Observers and Passive Acoustic Monitoring may be used to detect marine mammals within the mitigation zone.

For piling starts during darkness or periods of poor visibility (e.g. fog or high wave height) acoustic deterrents may be employed 30 minutes prior to piling. The use of acoustic deterrents will only be employed in consultation and agreement with JNCC following recommended guidelines.

- Codes of conduct for vessel operators including advice to operators to not deliberately approach marine mammals and to avoid abrupt changes in course or speed should marine mammals approach the vessel to bow-ride.
- A Code of Construction Practice (CoCP) will be developed and implemented to cover the construction phase and an appropriate Project Environmental Management and Monitoring Plan (PEMMP) will be produced and followed to cover the operation and maintenance phase of Project One. The latter will include planning for accidental spills, address all potential contaminant releases and include key emergency contact details (e.g. Environment Agency (EA), NE and Maritime and Coastguard Agency (MCA)).
- The maximum working distance between the two installation vessels will be 3 km. Mitigation will be applied for construction of the section of the cable route corridor that lies within 4 NM (7.4 km) of the Humber Estuary SAC and Ramsar site and/or 30 NM (55.6 km) of The Wash and North Norfolk Coast SAC. The MMMP will be developed in this regard incorporating best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors.

2.19 A range of mitigation has been agreed with respect to the protection of other SAC features and includes:

- An Ecological Clerk of Works will supervise the construction works in the intertidal zone and ensure that all works within the intertidal zone construction area, including plant movement and anchor placements will be restricted to the convergence zone and temporary working corridor.
- Sediment within the affected Salicornia habitat will be smoothed over to remove deep depressions (i.e. those with depths greater than 10 cm) in the sediment, such as those from wheel ruts or tracks. Smoothing over of sediments will be undertaken by hand raking under the supervision of the Ecological Clerk of Works. This will be undertaken across the impacted areas (i.e. the convergence zone) following completion of all cable installation works at the end of each of the cable installation phases.

- Measures to reduce ground pressure along the access tracks to the intertidal will be considered, including bog matting or trackways, as this type of mitigation has previously been successful at reducing ground pressures in areas of saltmarsh habitats (Centrica, 2012). The specific details of these measures have yet to be determined as details of the specific vehicles to be used for cable installation have not yet been confirmed. As such, the most appropriate measures will be detailed the cable specification and installation plan (to be produced post consent) which will be circulated for discussion and agreement with the MMO at least four months prior to the commencement of cable installation operations, as a condition in the marine licence.
- Sand dune habitats affected by access arrangements to the intertidal zone will also be reinstated following the completion of all cable installation works at Horseshoe Point. This will be done by fencing off affected areas to ensure no further disturbance and allow the sand dune vegetation to naturally re-colonise. This mitigation measure and monitoring of sand dune habitats will be focussed primarily on the northern access route, with the use of the southern access (e.g., by the EA, coastguard and the public) potentially continuing following completion of cable installation works.
- Horizontal Directional Drilling (HDD) at Horseshoe Point landfall site will incorporate a small lagoon at the drill entry point, within the compound area on the landward side of the sea defence to contain the bentonite mud and cuttings exiting from the HDD. The drilling system (including HDD exit pits in intertidal) will use a closed circuit mud management system where the mud is constantly pumped out of the pit for processing and re-use and will minimise the risk of drilling mud escaping into the surrounding environment.

2.20 A range of mitigation has been agreed with respect to the protection of SPA features and includes:

- A suitably experienced ornithologist as Ecological Clerk of Works to locate any active nests close to construction works shortly before these commence. The Ecological Clerk of Works will be charged with ensuring that impacts on designated features are minimised wherever possible.
- including ensuring that operations are spatially managed in the intertidal to avoid habitats such as Atlantic salt meadows and cockle beds.

- An Ecological Clerk of Works will supervise the construction works in the intertidal zone and ensure that all works within the intertidal construction area, including plant movement and anchor placements will be restricted to defined construction areas (i.e. the convergence zone and temporary working corridor; see Figure 2.1 and Figure 6.1).
- HDD drilling at Horseshoe Point landfall site will incorporate a small lagoon at the drill entry point, within the compound area on the landward side of the sea defence to contain the bentonite mud and cuttings exiting from the HDD.

  The drilling system (including HDD exit pits in intertidal) will use a closed circuit mud management system where the mud is constantly pumped out of the pit for processing and re-use and will minimise the risk of drilling mud escaping into the surrounding environment.
- Undertaking all construction works in the intertidal within the period of April 1 to September 30 each year, with installation being undertaken over two seasons.

2.21 Not all proposed mitigation is referred to within the DCO and consequently has not been clearly secured. With version 3 of the DCO reference is made to an appropriate soft start procedure whereby piling activities do not commence until an agreed time has elapsed and during which marine mammals have not been detected within the Marine Mammal Monitoring Zone (MMMZ) within section 9, 2, e, v. Reference is made to the appointment of an Ecological Clerk of Works within section 9, 2, c, vii. A proposed survey and reinstatement plan for Salicornia forming Annex I habitat is also mentioned within section 9, 2, h.

Issues

2.22 NE and JNCC's concerns can broadly be divided into two categories, ornithological and all other matters. NE and JNCC raised a number of methodological issues relevant to the outcomes and findings of the ornithological assessment:

- Collision Risk Modelling (CRM)
- Percentage of Birds at Collision Height (PCH)
- Methodology used to assign birds to flight height bands from boat survey data
- The size of the buffer used to study displacement effects
- Methodology used for cumulative assessment of displacement
- Population scales

- Breeding season definitions
- Distance sampling methodology
- Method of apportioning unidentified species, and
- In-combination assessment of impacts

2.23 As a result of these methodological concerns NE and JNCC could not conclude that the project would not have an adverse impact on the integrity of the Flamborough and Filey Coast pSPA (FFC pSPA) due to turbine impacts upon gannet, kittiwake, guillemot, and razorbill.

JNCC could not conclude with certainty that there would not be a significant impact on guillemot, razorbill, great black-backed gull, gannet, herring gull and lesser black backed gull. NE could not conclude that the project would not have an adverse effect on the integrity of the Humber Estuary SPA due to disturbance impacts upon oystercatcher, grey plover, ringed plover, dunlin knot, sanderling, curlew and bar-tailed godwit.

2.24 One of the main issues under discussion is the ornithological assessment. Concerns over collision risk modelling are key; these include the SNCB's recommendation to use Band (2012) model to derive outputs for CRM. Within this model there are two model types and several options (Basic (options 1 and 2) and Extended (options 3 and 4)) the model types differ in several ways but notably the way they take into account bird flight distribution. The applicant initially used and relied upon the information derived from the Extended model, Option 4, for key species in their assessment. NE currently recommends the use of the Basic Band model (i.e. Options 1 or 2), not the Extended Band model used in Option 3 and 4 as there is some uncertainty around the appropriateness of this model. In response to the second round of questions the Applicant provided data using Band Model 1.

2.25 A particular concern for NE and JNCC was the ability of boat-based observers to be able to accurately predict flight heights at fine scale resolution required for the use of Extended model option 4.

2.26 NE and JNCC also object on the basis that the methods used to further refine site-specific banded flight height data (i.e. at 5m intervals) to 1m intervals, using a modified approach derived from the modelling of bird flight height distributions presented in Cook et al. (2012) were not clearly explained or justified by the applicant.

2.27 NE and JNCC state that the displacement impacts were not adequately assessed due to the lack of sufficient buffers around the project site area. NE do not agree with the interpretation placed on sensitivity scores (Langston 2010) with respect to buffer sizes for displacement. Furthermore, the applicant's cumulative (in-combination) assessment of displacement was predominantly qualitative.

2.28 NE and JNCC state that the application lacked detail on how Biologically Defined Minimum Population Scale (BDMPS) had been selected and presented, only limited information on the seasonal breakdown of overall collision mortality has been provided.

2.29 NE and JNCC raised concerns regarding the definition of breeding seasons for key species (for example auks and kittiwakes).

2.30 NE and JNCC required further clarification as to how the apportioning was undertaken for unidentified birds as they were concerned that there was inconsistency between the application documents. Consequently, it was not possible to be certain that the estimates provided in the application documents were correct.

2.31 Concerns around the applicants cumulative (in-combination) assessment existed as both NE and JNCC were unable to conclude that the Project would not have an adverse effect on key species from certain SPAs, or an impact at an EIA level, for a number of species.

Likely significant effects

2.32 As a result of the screening assessment, the applicant concluded that LSE cannot be excluded on the following European sites:

SPAs/Ramsar Sites

- The Humber Estuary SPA and Ramsar
- Coquet Island SPA
- Farne Islands SPA
- Flamborough and Filey Coast pSPA
- Forth Islands SPA

SACs/SCIs

- Humber Estuary SAC
- River Derwent SAC
- Berwickshire and North Northumberland Coast SAC
- The Wash and North Norfolk Coast SAC

- SBZ 1 / ZPS 1 (Belgium) SCI
- SBZ 2 / ZPS 2 (Belgium) SCI
- SBZ 3 / ZPS 3 (Belgium) SCI
- Vlakte van de Raan (Belgium) pSCI
- NTP S-H Wattenmeer und angrenzende Küstengebiete SCI (Germany)
- Dogger Bank SCI (Germany)
- Östliche Deutsche Bucht SCI (Germany)
- Sylter Außenriff SCI (Germany)
- Steingrund SCI (Germany)
- Helgoland mit Helgoländer Felssockel SCI (Germany)
- Hamburgisches Wattenmeer SCI (Germany)
- Unterelbe SCI (Germany)
- Borkum-Riffgrund SAC (Germany)
- Nationalpark Niedersächsisches Wattenmeer SCI (Germany)
- Gule Rev SAC (Denmark)
- Sydlige Nordsø SAC (Denmark)
- Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI (France)
- Bancs des Flandres pSCI (France)
- Recifs Gris-nez Blanc-nez pSCI (France)
- Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI (France)
- Baie de canche et couloir des trois estuaries pSCI (France)
- Doggersbank pSCI (Netherlands)
- Klaverbank pSCI (Netherlands)
- Vlakte van de Raan SAC (Netherlands)
- Noordzeekustzone SAC (Netherlands)
- Noordzeekustzone II pSCI (Netherlands)

2.33 The Statements of Common Ground (SoCG) (REP-223, REP-224 and REP-237) agreed between the applicant and NE as relevant SNCB provides confirmation to the ExA as to the outcome of the LSE (screening) stage of the HRA process.

2.34 The ExA has had regard to the large number of sites considered as part of the LSE (screening) stage and the agreement reached between the applicant and NE in relation to LSE.

2.35 The ExA has decided that in order to avoid unnecessary duplication of information not all the applicants screening matrices have been presented in the main body of this report, only those where a LSE cannot be discounted and an assessment of the effects upon integrity is required. The applicant's matrices for the sites that have been discounted from LSE are appended to the RIES for reference.

2.36 The applicant and NE agreed that the European sites where a LSE cannot be discounted are as follows:

- Flamborough and Filey Coast pSPA
- Humber Estuary SPA
- Humber Estuary Ramsar

2.37 The relevant features of the European sites where LSE cannot be discounted are included in Section 3 and have also been taken forward to the integrity matrices in Section 4 of this report.

Effects on integrity

2.38 The applicant concluded that the project will not adversely affect the integrity of the European sites and features detailed in paragraph 2.35. This was not agreed with the relevant SNCB's.

3.0 STAGE 1: SCREENING FOR LIKELY SIGNIFICANT EFFECTS

Background

3.1 The project is not connected with or necessary to the management for nature conservation of the European sites considered within the assessment.

3.2 This section reports on the screening for LSE of the project in relation to the potentially affected European sites.

Stage 1 Matrices Key

✓ = Likely significant effect cannot be excluded

X = Likely significant effect can be excluded

C= construction

O = operation

D = decommissioning

3.4 Evidence supporting the conclusions is detailed in footnotes for each table with reference to relevant supporting documentation.

3.5 Where an impact is not considered relevant for a feature of a European site, the cell in the matrix is formatted as follows:

Stage 1 Matrix 1: Flamborough and Filey Coast pSPA

Site Code: UK9006101

Distance to project: 51.2 km

European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Kittiwake *Rissa tridactyla*		**✓a**			**×b**			**✓c**			**✓v**	
Razorbill *Alca torda*		**×d**			**×e**			**✓f**			**✓v**	
Guillemot *Uria aalge*		**×g**			**×h**			**✓i**			**✓v**	
Gannet *Morus bassanus*		**✓j**			**×k**			**✓l**			**✓v**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Puffin *Fratercula arctica*		**×m**			**×n**			**✓o**			**✓v**	
Razorbill *Alca torda*		**×d**			**×e**			**✓f**			**✓v**	
Guillemot *Uria aalge*		**×g**			**×h**			**✓i**			**✓v**	
Herring Gull *Larus argentatus*		**✓p**			**×q**			**×r**			**✓v**	
Gannet *Morus bassanus*		**✓j**			**×k**			**✓l**			**✓v**	
Kittiwake *Rissa tridactyla*		**✓a**			**×b**			**✓c**			**✓v**	
Fulmar *Fulmaris glacialis*		**×s**			**×t**			**✓u**			**✓v**	

Evidence supporting conclusions:

a. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the mean maximum foraging range for kittiwake but within the maximum foraging range during the breeding season and therefore birds at this site may occur within the development area. Outwith the breeding season, numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171)**) identified a potential likely significant effect alone and/or in combination. Further information submitted by the applicant allowed agreement to be reached with NE that there will be no adverse impact on integrity for the kittiwake feature as a result of collision risk where the project is considered alone. Agreement was also reached between the applicant and NE that there would be no adverse effect on integrity in combination on the kittiwake feature as a result of collision risk where a building block approach is taken to the in-combination assessment **(Doc Ref: H-024)**.

b. The SPA is within the maximum foraging range for kittiwake during the breeding season and therefore barrier effects may occur during this period. However, the distance from the breeding colony is at the far end of reported foraging range (Thaxter *et al.* 2012) and therefore barrier effects are not predicted to be significant. Furthermore, evidence from existing wind farms have not reported any barrier effects on kittiwakes (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (**Annex A of the HRA Report (Doc Ref: APP-171)**).

c. Results from site specific monitoring indicate that kittiwakes are widespread across the Hornsea Zone throughout the year, with peak densities from July to September, corresponding with post-breeding movements from colonies. Kittiwakes recorded within Project One/Subzone 1 are at the maximum reported foraging range for this species. However, observations of flying birds recorded a significant majority of birds flying in an east-west direction across the Hornsea Zone during the breeding period, indicating that at least some kittiwakes recorded during the breeding period will be birds from the Flamborough and Filey Coast pSPA.

Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (e.g. Zucco et al. 2006). However, due to high peak counts recorded within Project One, and the proximity to this pSPA, a likely significant effect cannot be discounted (**Annex A of the HRA Report (Doc Ref: APP-171)**).

d. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision (**Annex A of the HRA Report (Doc Ref: APP-171)**).

e. The SPA is beyond the mean maximum foraging range for razorbill during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (**Annex A of the HRA Report (Doc Ref: APP-171)**).

f. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). There is therefore the potential for a likely significant effect from displacement outwith the breeding season. Screening (**Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171)**) identified a potential likely significant effect alone and/or in combination. Further information submitted by the applicant allowed agreement to be reached with NE that there will be no adverse impact on integrity for the razorbill feature as a result of displacement where the project is considered alone. Though agreement was not reached between the applicant and NE that there would be no adverse effect on integrity in-combination on the razorbill feature as a result of displacement **(Doc Ref: H-024)**.

g. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate) **HRA Report (Doc Ref: APP-171)**.

h. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown **HRA Report (Doc Ref: APP-171)**.

i. Some evidence from constructed offshore wind farms indicate that guillemots may be displaced (e.g. Petersen *et al.* 2006). There is therefore the potential for a likely significant effect outwith the breeding season. Screening (**Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171)**) identified a potential likely significant effect alone and/or in combination. Further information submitted by the applicant allowed agreement to be reached with NE that there will be no adverse impact on integrity for the guillemot feature as a result of displacement where the project is considered alone. Though agreement was not reached between the applicant and NE that there would be no adverse effect on integrity in-combination on the guillemot feature as a result of displacement **(Doc Ref: H-024)**.

j. A total of 13,034 gannets were recorded, with peak numbers between August and November. Of those recorded in flight the large majority were below rotor height and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore birds at this site may occur in the area but at a low risk of being impacted. Outwith the breeding season gannets from this SPA may disperse widely. Collision risk modelling predicted some mortality may be from this SPA. Screening (**Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171)**) identified a potential likely significant effect alone and/or in combination. Further information submitted by the applicant allowed agreement to be reached with NE that there will be no adverse impact on integrity for the gannet feature as a result of collision risk where the project is considered alone. Agreement was also reached between the applicant and NE that there would be no adverse effect on integrity in combination on the gannet feature as a result of collision risk where a building block approach is taken to the in-combination assessment and a higher avoidance rate was used **(Doc Ref: H-024)**.

k. The SPA is within the maximum foraging range for gannet during the breeding season and therefore barrier effects may occur. The additional estimated distance of up to 36 km will, if a barrier effect does occur, be a very small incremental increase in overall distance flown and therefore not cause a significant increase in energetic costs.

l. There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere. However, the proximity of this SPA to the proposed development area indicates that there may be the potential for a significant effect. Screening (**Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171)**) identified a potential likely significant effect alone and/or in combination.

m. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision hence further modelling work was not required. NE have agreed that there is no adverse impact on integrity of the puffin feature either as a result of the project alone or in combination.

n. The SPA is outwith the maximum foraging range for puffin during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown **HRA Report (Doc Ref: APP-171)**.

o. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. However, should it occur there is the potential for a likely significant effect outwith the breeding season. Screening **(Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171))** identified a potential likely significant effect alone and/or in combination. Agreement was also reached between the applicant and NE that there would be no adverse effect on integrity in combination on the puffin feature as a result of displacement either as a result of the project alone or in-combination **(Doc Ref: H-024)**.

p. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Birds from this SPA may be at risk of a significant impact either alone or in-combination with other potential future developments. Screening (**Annex A and Table 4.3 of the HRA Report (Doc Ref: APP-171)**) identified a potential likely significant effect alone and/or in combination.

q. The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown **HRA Report (Doc Ref: APP-171)**.

r. Evidence from constructed offshore wind farms indicate that herring gulls are not displaced by wind farms (Petersen *et al.* 2006).

s. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. Collision risk modelling predicted zero collisions. Therefore the risk of any actual collisions is very low **HRA Report (Doc Ref: APP-171)**.

t. The SPA is within the mean maximum foraging range for fulmar during the breeding season and therefore barrier effects may potentially occur. However, the additional estimated foraging distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species **HRA Report (Doc Ref: APP-171)**.

u. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species. Nevertheless, due to the proximity of this SPA population to Project One, this cannot be ruled out **HRA Report (Doc Ref: APP-171)**.

v. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A43 of the HRA Report (Doc Ref: APP-171)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc Ref: APP-171)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 2: Humber Estuary SPA

Site Code: UK9006111

Distance to project: 0 km

European site features	**Likely Effects of Project One**																				
Article 4.1 - Breeding	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Bittern *Botaurus stellaris*	**×a**		**×aa**	**×a**		**×aa**	**×a**		**×aa**		**×bb**			**×bb**			**×bb**		**×a**	**×tt**	**×aa**
Marsh harrier *Circus aeruginosus*	**×b**		**×aa**	**×b**		**×aa**	**×b**		**×aa**		**×bb**			**×bb**			**×bb**		**×b**	**×tt**	**×aa**
Avocet *Recurvirostra avosetta*	**×c**		**×aa**	**×c**		**×aa**	**×c**		**×aa**		**×bb**			**×bb**			**×bb**		**×c**	**×tt**	**×aa**
Little tern *Sterna albifrons*	**×d**		**×aa**	**×d**		**×aa**	**×d**		**×aa**		**×dd**			**×ff**			**×gg**		**×d**	**×tt**	**×aa**
Article 4.1 – Winter	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Bittern *Botaurus stellaris*	**×a**		**×aa**	**×a**		**×aa**	**×a**		**×aa**		**×bb**			**×bb**			**×bb**		**×a**	**×tt**	**×aa**
Hen harrier *Circus cyaneus*	**×e**		**×aa**	**×e**		**×aa**	**×e**		**×aa**		**×bb**			**×bb**			**×bb**		**×e**	**×tt**	**×aa**
Bar-tailed godwit *Limosa lapponica*	**✓f**		**×aa**	**✓f**		**×aa**	**✓f**		**×aa**		**×hh**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Golden plover *Pluvialis apricaria*	**✓g**		**×aa**	**✓g**		**×aa**	**✓g**		**×aa**		**×bb**			**×cc**			**×dd**		**✓ss**	**×tt**	**×aa**
Avocet *Recurvirostra avosetta*	**×c**		**×aa**	**×c**		**×aa**	**×c**		**×aa**		**×bb**			**×bb**			**×bb**		**×c**	**×tt**	**×aa**
Article 4.1 – On passage	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Ruff *Philomachus pugnax*	**×h**		**×aa**	**×h**		**×aa**	**×h**		**×aa**		**×bb**			**×bb**			**×bb**		**×h**	**×tt**	**×aa**
Article 4.2 – Migratory (over winter)	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*	**✓i**		**×aa**	**✓i**		**×aa**	**✓i**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Knot *Calidris canutus*	**✓j**		**×aa**	**✓j**		**×aa**	**✓j**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Black-tailed godwit *Limosa limosa islandica*	**×k**		**×aa**	**×k**		**×aa**	**×k**		**×aa**		**×bb**			**×bb**			**×bb**		**×k**	**×tt**	**×aa**
Shelduck *Tadorna tadorna*	**×l**		**×aa**	**×l**		**×aa**	**×l**		**×aa**		**×bb**			**×bb**			**×bb**		**×l**	**×tt**	**×aa**
Redshank *Tringa totanus*	**✓m**		**×aa**	**✓m**		**×aa**	**✓m**		**×aa**		**×bb**			**×bb**			**×bb**		**✓ss**	**×tt**	**×aa**

European site features	**Likely Effects of Project One**																				
Article 4.2 – Migratory (on passage)	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*	**✓i**		**×aa**	**✓i**		**×aa**	**✓i**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Knot *Calidris canutus*	**✓j**		**×aa**	**✓j**		**×aa**	**✓j**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Black-tailed godwit *Limosa limosa islandica*	**×k**		**×aa**	**×k**		**×aa**	**×k**		**×aa**		**×bb**			**×bb**			**×bb**		**×k**	**×tt**	**×aa**
Redshank *Tringa totanus*	**✓m**		**×aa**	**✓m**		**×aa**	**✓m**		**×aa**		**×bb**			**×bb**			**×bb**		**✓ss**	**×tt**	**×aa**
Article 4.2 – Assemblage	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Teal *Anas crecca*	**×n**		**×aa**	**×n**		**×aa**	**×n**		**×aa**		**×ii**			**×cc**			**×ee**		**×n**	**×tt**	**×aa**
Wigeon *Anas penelope*	**×o**		**×aa**	**×o**		**×aa**	**×o**		**×aa**		**×jj**			**×kk**			**×ll**		**×o**	**×tt**	**×aa**
Mallard *Anas platyrhynchos*	**×p**		**×aa**	**×p**		**×aa**	**×p**		**×aa**		**×bb**			**×cc**			**×ee**		**×p**	**×tt**	**×aa**
Turnstone *Arenaria interpres*	**×q**		**×aa**	**×q**		**×aa**	**×q**		**×aa**		**×dd**			**×cc**			**×ee**		**×q**	**×tt**	**×aa**
Pochard *Aythya ferina*	**×a**		**×aa**	**×a**		**×aa**	**×a**		**×aa**		**×dd**			**×cc**			**×ee**		**×a**	**×tt**	**×aa**
Greater scaup *Aythya marila*	**×a**		**×aa**	**×a**		**×aa**	**×a**		**×aa**		**×bb**			**×bb**			**×bb**		**×a**	**×tt**	**×aa**
Bittern *Botaurus stellaris*	**×a**		**×aa**	**×a**		**×aa**	**×a**		**×aa**		**×bb**			**×bb**			**×bb**		**×a**	**×tt**	**×aa**
Dark-bellied brent goose *Branta bernicla bernicla*	**✓r**		**×aa**	**✓r**		**×aa**	**✓r**		**×aa**		**×mm**			**×nn**			**×ee**		**✓ss**	**×tt**	**×aa**
Goldeneye *Bucephala clangula*	**×a**		**×aa**	**×a**		**×aa**	**×a**		**×aa**		**×bb**			**×bb**			**×bb**		**×a**	**×tt**	**×aa**
Sanderling *Calidris alba*	**✓s**		**×aa**	**✓s**		**×aa**	**✓s**		**×aa**		**×bb**			**×bb**			**×bb**		**✓ss**	**×tt**	**×aa**
Dunlin *Calidris alpina alpina*	**✓i**		**×aa**	**✓i**		**×aa**	**✓i**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Knot *Calidris canutus*	**✓j**		**×aa**	**✓j**		**×aa**	**✓j**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Ringed plover *Charadrius hiaticula*	**✓t**		**×aa**	**✓t**		**×aa**	**✓t**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Oystercatcher *Haematopus ostralegus*	**✓u**		**×aa**	**✓u**		**×aa**	**✓u**		**×aa**		**×dd**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Bar-tailed godwit *Limosa lapponica*	**✓f**		**×aa**	**✓f**		**×aa**	**✓f**		**×aa**		**×hh**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Black-tailed godwit *Limosa limosa islandica*	**×k**		**×aa**	**×k**		**×aa**	**×k**		**×aa**		**×bb**			**×bb**			**×bb**		**×k**	**×tt**	**×aa**
Curlew *Numenius arquata*	**×v**		**×aa**	**×v**		**×aa**	**×v**		**×aa**		**×oo**			**×cc**			**×ee**		**×v**	**×tt**	**×aa**
Whimbrel *Numenius phaeopus*	**×w**		**×aa**	**×w**		**×aa**	**×w**		**×aa**		**×pp**			**×cc**			**×ee**		**×w**	**×tt**	**×aa**
Ruff *Philomachus pugnax*	**×h**		**×aa**	**×h**		**×aa**	**×h**		**×aa**		**×bb**			**×bb**			**×bb**		**×h**	**×tt**	**×aa**
Golden plover *Pluvialis apricaria*	**✓g**		**×aa**	**✓g**		**×aa**	**✓g**		**×aa**		**×bb**			**×cc**			**×dd**		**✓ss**	**×tt**	**×aa**
Grey plover *Pluvialis squatarola*	**✓x**		**×aa**	**✓x**		**×aa**	**✓x**		**×aa**		**×bb**			**×cc**			**×ee**		**✓ss**	**×tt**	**×aa**
Avocet *Recurvirostra avosetta*	**×c**		**×aa**	**×c**		**×aa**	**×c**		**×aa**		**×bb**			**×bb**			**×bb**		**×c**	**×tt**	**×aa**

European site features	**Likely Effects of Project One**																			
Shelduck *Tadorna tadorna*	**×l**		**×aa**	**×l**		**×aa**	**×l**		**×aa**		**×bb**			**×bb**			**×bb**		**×l**	**×tt**	**×aa**
Greenshank *Tringa nebularia*	**×y**		**×aa**	**×y**		**×aa**	**×y**		**×aa**		**×bb**			**×bb**			**×bb**		**×y**	**×tt**	**×aa**
Redshank *Tringa totanus*	**✓m**		**×aa**	**✓m**		**×aa**	**✓m**		**×aa**		**×bb**			**×bb**			**×bb**		**✓ss**	**×tt**	**×aa**
Lapwing *Vanellus vanellus*	**×z**		**×aa**	**×z**		**×aa**	**×z**		**×aa**		**×qq**			**×rr**			**×ee**		**×z**	**×tt**	**×aa**

Evidence supporting conclusions (Ref: Table A1 of Annex A of the HRA Report (Doc Ref: APP-171)):

a. No LSE as no bitterns were recorded during surveys. Habitat surrounding cable landfall, onshore cable route corridor and HVDC converter/HVAC substation is unsuitable for this species (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

b. No LSEs alone or in-combination as cable landfall area is unsuitable breeding habitat for this species. Recorded single individuals are probably passage or wandering individuals and area is of little importance to SPA population. No LSE for onshore cable route corridor and HVDC converter/HVAC substation as there was no evidence of feeding or roosting during surveys (Ref: **Table 4.11** of HRA).

c. No LSEs alone or in-combination as this species is largely absent from the Horseshoe Point landfall site due to unsuitable habitat (peak of 0.3% of current SPA population). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

d. No LSEs alone or in-combination as this species no longer breeds in the vicinity of Horseshoe Point landfall site, with the small number of individuals recorded during WeBS counts only likely to be loafing or feeding offshore away from the nearest colonies. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

e. No LSEs alone or in-combination as the sandy substrate at Horseshoe Point is unsuitable for foraging hen harrier, although with occasional individuals recorded during baseline surveys, the area may form a minor part of the wintering range of the SPA population. Birds disperse from roost sites during daylight hours so are unlikely to be affected by activities. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

f. Potential for LSEs as the species is known to roost near the cable landfall site in numbers that are potentially significant in the context of the SPA population (up to 13% of current SPA value, although numbers appear to be highly variable between and within years). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

g. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant in the context of the SPA population (<16% of current value), despite considerable growth since the citation figure. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

h. No LSEs alone or in-combination as the species is found predominantly on the north estuary, and only a small number of individuals (peak count of 3) have been recorded briefly within the cable landfall site area on passage or over winter. Not significant within the context of the SPA population. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

i. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant in the context of the SPA population (<10%), particularly since there is evidence of decline since the citation figure. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

j. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant in the context of the SPA population (<7.8% of passage citation), despite growth since the citation figure. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

k. No LSEs alone or in-combination as very small peak numbers within the context of cited and current SPA populations, during all surveys, were recorded in the vicinity of the cable landfall site, indicating that the area is of unsuitable habitat and little significance to this species at an SPA level. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

l. No LSEs alone or in-combination for this species as numbers are increasing within the SPA and peak counts suggest that the population within the potential zone of influence of the cable landfall site is insignificant (<1%) compared to the cited SPA population, and that the habitat is unsuitable. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

m. Potential for LSEs. Although peak numbers in the area of the cable landfall site are relatively low compared to the overall SPA passage and wintering populations (<2%), the species has undergone a recent decline in numbers, and so significant effects cannot be ruled out at this stage. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

n. No LSEs alone or in-combination for this species, as low numbers recorded during surveys suggest that the area of the cable landfall site is of little importance in the context of the SPA (<0.2% of population) and the habitat is unsuitable. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

o. No LSEs alone or in-combination for this species. Wigeon are distributed widely across the whole estuary, and despite an apparent decrease in overall numbers, the area around the cable landfall site appears to be of little importance within the context of the SPA population (<0.3%), and the habitat is unsuitable. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

p. No LSEs alone or in-combination for this species. Mallard are distributed widely across the whole estuary, and despite an apparent sharp decline in overall numbers, the area around the cable landfall site appears to be an unfavoured habitat and of little importance within the context of the SPA population (<0.1%). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

q. No LSEs alone or in-combination. WeBS surveys generally recorded low numbers, although recent surveys in the vicinity of the cable landfall site recorded higher numbers in late October. This however appeared to be a brief occurrence, as numbers were very low during the remainder of the survey period and habitat is generally unsuitable as the species prefers more rocky shorelines. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

r. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant (<18% of current SPA population) in the context of the cited SPA population (although there has been a large growth in SPA population since). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

s. Potential for LSEs as the species was found roosting near the cable landfall site in numbers that are potentially significant in the context of the SPA population (<15% of current SPA population). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

t. Potential for LSEs. The species was recorded in high numbers on passage and possibly over winter, (<4.8% of current SPA population) and although the SPA population appears to have stabilised over the recent past, a significant effect cannot be ruled out at this stage. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

u. Potential for LSEs. The species was recorded in very high numbers within the context of the SPA population (<91% of current population). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

v. No LSEs alone or in-combination for this species. The cable landfall site is not within a recognised key feeding or roosting area within the SPA, and in general peak numbers found close to this site are unlikely to be important in the context of the SPA population (<1.7% of current population recorded within the Horseshoe Point survey area). Converter station habitats outside of the SPA do not appear to provide significant functional support for curlew (i.e. not important as an important feeding or roost site) (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

w. No LSEs alone or in-combination for this species, as peak counts were very low during all surveys, with a peak of four birds during low tide counts in the vicinity of the cable landfall site. Only recorded on one occasion near to the converter station site. Only recorded on one occasion near to the converter station site (Ref: **Table 4.11** of HRA).

x. Potential for LSEs. Although SPA numbers appear to have increased since the citation date, peak survey counts during brief passage periods were relatively high (<31% of current SPA population) and distributed throughout the Horseshoe Point survey area, and so a LSE cannot be discounted. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

y. No LSEs alone or in-combination for this species. Although up to seven individuals were recorded near the cable landfall site in late August and September, these were the only surveys where this species was recorded. Birds are therefore likely only to be briefly on-site during passage periods. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

z. No LSEs alone or in-combination. Although the wider Grainthorpe area (to the south) appears to hold significant numbers, evidence from surveys at Horseshoe Point suggests that closer to the cable landfall site, numbers are much lower and unlikely to be important within the context of the SPA population (<1.9% of current SPA population). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

aa. No LSE during the decommissioning phase (either alone or in-combination) as cables are likely to remain in situ (Ref: **Section 2.5 of the HRA Report (Doc Ref: APP-171)**).

bb. These species were recorded at very low abundances or not recorded during Project One surveys (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

cc. These species may fly around the wind farm, though the incremental increase in flight distance to the SPA is likely to be negligible (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

dd. These species were recorded at low abundances and flying at low levels (i.e. below rotor height) and therefore are not at risk of collision (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

ee. No birds were recorded using the area and no displacement effects are predicted (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

ff. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006) (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

gg. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006) (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171))**.

hh. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

ii. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

jj. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

kk. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

ll. All wigeon were recorded in flight and none were seen using the Hornsea Project One. Therefore no displacement effects will occur (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

mm. A total of 7 dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

nn. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

oo. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

pp. Eleven out of a total of 49 whimbrel recorded were in the Hornsea Project One. 55.1% of all whimbrel recorded were flying above 22.5 m and therefore at potential risk of collision. However, the number of whimbrel recorded in the development zone was low and therefore at low risk of a significant effect (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

qq. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

rr. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

ss. Plans/projects with potential for LSE on qualifying features in-combination with Project One infrastructure within the Humber Estuary and onshore include: Land at Bishopthorpe Farm Newton Marsh Wind Farm Extension, Phillips 66 Tetney Sea Line Replacement Project, Tetney to Saltfleet Tidal Flood Defence Scheme and Able Marine Energy Park (AMEP) (see HRA **Table 4.13 and paragraph 4.4.15 to 4.4.61 of the HRA Report (Doc Ref: APP-171)**). However in NE's written submission to deadline IV dated 22 April 2014 **(Doc Ref: REP-304)** it was noted that the clarification note which was provided at Appendix T to the Applicant's First Response presented additional information regarding the likely activities which would take place as part of the cable installation operation. This extra information was welcomed and provided additional clarity on the proposed activities. On the basis of this extra information Natural England advises that there will be no adverse effect to the integrity of the Humber Estuary Special Protection Area (SPA) from the Project alone, so long as the operations are undertaken in line with the description presented in Appendix T. NE noted however, that should operations occur in a manner different to that presented it may be the case that the conclusion of no adverse effect on integrity no longer remain valid and further consideration may be required. Therefore, to ensure that adequate controls are in place, NE advises that the pre-construction plans and documents must provide sufficient detail on the methods and timings of the cable installation activities to allow a comparison to be made with Appendix T.

tt. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Table A45** of **Annex A of the HRA Report (Doc Ref: APP-171)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc Ref: APP-171)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc Ref: APP-171)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc Ref: APP-171)**for Barrier Effects.

Stage 1 Matrix 3: Humber Estuary Ramsar

Site Code: UK11031

Distance to project: 0 km

European site features	**Likely Effects of Project One**																				
Ramsar criterion 6 – Species with peak counts in spring/autumn	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Golden plover *Pluvialis apricaria apricaria*– Wintering	**✓a**		**×h**	**✓a**		**×h**	**✓a**		**×h**		**×i**			**×l**			**×m**		**✓o**	**×p**	**×h**
Knot *Calidris canutus islandica*– Over winter and on passage	**✓b**		**×h**	**✓b**		**×h**	**✓b**		**×h**		**×j**			**×l**			**×n**		**✓o**	**×p**	**×h**
Dunlin *Calidris alpina alpina*– Over winter and on passage	**✓c**		**×h**	**✓c**		**×h**	**✓c**		**×h**		**×j**			**×l**			**×n**		**✓o**	**×p**	**×h**
Black-tailed godwit *Limosa limosa islandica* – Over winter and on passage	**×d**		**×h**	**×d**		**×h**	**×d**		**×h**		**×i**			**×i**			**×i**		**×f**	**×p**	**×h**
Redshank *Tringa totanus totanus*– Over winter and on passage	**✓e**		**×h**	**✓e**		**×h**	**✓e**		**×h**		**×i**			**×i**			**×i**		**✓o**	**×p**	**×h**
Ramsar criterions 6 – Species with peak counts in winter	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Shelduck *Tadorna tadorna* – Over winter	**×f**		**×h**	**×f**		**×h**	**×f**		**×h**		**×i**			**×i**			**×i**		**×j**	**×p**	**×h**
Golden plover *Pluvialis apricaria Apricaria* – Wintering	**✓a**		**×h**	**✓a**		**×h**	**✓a**		**×h**		**×i**			**×l**			**×j**		**✓o**	**×p**	**×h**
Knot *Calidris canutus islandica*– Over winter and on passage	**✓b**		**×h**	**✓b**		**×h**	**✓b**		**×h**		**×j**			**×l**			**×n**		**✓o**	**×p**	**×h**
Dunlin *Calidris alpina alpine* – Over winter and on passage	**✓c**		**×h**	**✓c**		**×h**	**✓c**		**×h**		**×j**			**×l**			**×n**		**✓o**	**×p**	**×h**
Black-tailed godwit *Limosa limosa islandica* – Over winter and on passage	**×d**		**×h**	**×d**		**×h**	**×d**		**×h**		**×i**			**×i**			**×i**		**×d**	**×p**	**×h**
Bar-tailed godwit *Limosa lapponica lapponica* – Wintering and on passage	**✓g**		**×h**	**✓g**		**×h**	**✓g**		**×h**		**×k**			**×l**			**×n**		**✓o**	**×p**	**×h**

European site features	**Likely Effects of Project One**																				
Ramsar criterion 5	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Site supports an assemblage of international importance of waterfowl with peak counts in winter.	**✓bb**		**×h**	**✓bb**		**×h**	**✓bb**		**×h**		**×cc**			**×l**			**×dd**		**✓ee**	**×p**	**×h**
Ramsar criterion 1	Habitat extent			Water quality															In-combination		
	C	O	D	C	O	D													C	O	D
Sand dunes; see footnote **u**.	**✓q**	**×r**	**×h**	**✓s**		**×h**													**✓t**		
Estuarine waters	**✓s**	**×r**	**×h**	**✓s**		**×h**													**✓t**		
Intertidal mud and sand flats	**✓s**	**×r**	**×h**	**✓s**		**×h**													**✓t**		
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	**✓q**	**×r**	**×h**	**✓s**		**×h**													**✓t**		
Salicornia and other annuals colonizing mud and sand	**✓s**	**×r**	**×h**	**✓s**		**×h**													**✓t**		
Coastal brackish/saline lagoons; see footnote **v**.																					
Standing open water and canals; see footnote **v**.																					
Ramsar criterion 3	Injury/Disturbance			Collision risk			Change in prey species distribution / abundance												In-combination		
	C	O	D	C	O	D	C	O	D										C	O	D
Grey seals *Halichoerus grypus*	**✓w**	**✓w**	**✓w**	**✓w**	**✓w**	**✓w**	**✓w**	**✓w**	**✓w**										**✓t,x**	**✓ t,x**	**✓ t,x**
Natterjack toad *Bufo calamita*; see footnote **r**.																					
Ramsar criterion 8	Disruption to migration																		In-combination		
	C	O	D																C	O	D
River lamprey *Lampetra fluviatilis*	**✓y**	**✓z**	**×aa**																**✓x**	**✓x**	
Sea lamprey *Petromyzon marinus*	**✓y**	**✓z**	**×aa**																**✓x**	**✓x**	

Evidence supporting conclusions:

a. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant in the context of the Ramsar population (<16% of current value), despite considerable growth since the citation figure. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

b. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant in the context of the Ramsar population (<7.8% of passage citation), despite growth since the citation figure. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11** of **the HRA Report (Doc Ref: APP-171)**).

c. Potential for LSEs as the species was found near the cable landfall site in numbers that are potentially significant in the context of the Ramsar population (<10%), particularly since there is evidence of decline since the citation figure. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

d. No LSEs alone or in-combination as very small peak numbers within the context of cited and current Ramsar populations, during all surveys, were recorded in the vicinity of the cable landfall site, indicating that the area is of unsuitable habitat and little significance to this species at a Ramsar level. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

e. Potential for LSEs. Although peak numbers in the area of the cable landfall site are relatively low compared to the overall Ramsar passage and wintering populations (<2%), the species has undergone a recent decline in numbers, and so significant effects cannot be ruled out at this stage. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

f. No LSEs alone or in-combination for this species as numbers are increasing within the Ramsar and peak counts suggest that the population within the potential zone of influence of the cable landfall site is insignificant (<1%) compared to the cited Ramsar population, and that the habitat is unsuitable. No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

g. Potential for LSEs as the species is known to roost near the cable landfall site in numbers that are potentially significant in the context of the Ramsar population (up to 13% of current Ramsar value, although numbers appear to be highly variable between and within years). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.11 of the HRA Report (Doc Ref: APP-171)**).

h. No LSE during the decommissioning phase (either alone or in-combination) as cables are likely to remain in situ (Ref: **Section 2.5 of the HRA Report (Doc Ref: APP-171)**).

i. These species were recorded at very low abundances or not recorded during Project One surveys (Ref: **Annex A, Table A4 of the HRA Report (Doc Ref: APP-171)5**).

j. These species were recorded at low abundances and flying at low levels (i.e. below rotor height) and therefore are not at risk of collision (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

k. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

l. These species may fly around the wind farm, though the incremental increase in flight distance to the Ramsar is likely to be negligible (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

m. These species were recorded at low abundances and flying at low levels (i.e. below rotor height) and therefore no displacement effects are predicted (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

n. No birds were recorded using the area and no displacement effects are predicted (Ref: **Annex A, Table A45 of the HRA Report (Doc Ref: APP-171)**).

o. Plans/projects with potential for LSE on qualifying features in-combination with Project One infrastructure within the Humber Estuary and onshore include: Land at Bishopthorpe Farm Newton Marsh Wind Farm Extension, Phillips 66 Tetney Sea Line Replacement Project, Tetney to Saltfleet Tidal Flood Defence Scheme and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraph 4.4.15 to 4.4.61 of the HRA Report (Doc Ref: APP-171)**).

p. In-combination LSE informed by the footnotes above for the individual SPA/Ramsar receptors as presented in **Table A45** of **Annex A**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.*** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc Ref: APP-171)** for Barrier Effects.

q. Potential for LSE as these habitats occur at the Horseshoe Point landfall site though may not be directly affected by the proposed works (see **Table 4.10 of the HRA Report (Doc Ref: APP-171)).**

r. No cable maintenance (e.g. cable re-burial) is predicted within designated estuarine habitats of the Humber Estuary SAC (**Section 2.4 of the HRA Report (Doc Ref: APP-171)**). Although access to the intertidal will be required during the operational phase (e.g. for cable inspection), no LSE from access during the operational phase is predicted as access to the intertidal will be gained along a permitted access route and will result in minimal disturbance to qualifying features (see **Table 4.10 and Section 2.4 of HRA**).

s. LSE as these habitats occur at the Horseshoe Point landfall site and are likely to be directly affected by the proposed works (see **Table 4.10 of HRA**).

t. Plans/projects with potential for LSE on qualifying features in-combination with Project One construction and components within the Humber Estuary include: Hornsea Project Two, Tetney to Saltfleet Tidal Flood Defence Scheme, Phillips 66 Tetney Sea Line Replacement Project and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraphs 4.4.15 to 4.4.61 of the HRA Report (Doc Ref: APP-171)**).

u. Sand dunes includes both 'Shifting dunes along the shoreline with Ammophila arenaria ('white dunes')' and 'Embryonic shifting dunes' which were both recorded in the vicinity of Project One. Fixed dunes with herbaceous vegetation ('grey dunes') were not recorded in the vicinity of Project One and were therefore screened out (see **Stage 1 Matrix 114 A: Humber Estuary SAC**).

v. Habitats supporting these species were not recorded in the vicinity of Project One and therefore no likely significant effects are predicted on these features (see **Annex E**, **paragraphs E.12 *et seq***. and **E.126 *et seq.* of the HRA Report (Doc Ref: APP-171)**).

w. Grey seal: Construction and operation of Project One may cause physical and/or behavioural disturbance of grey seal from increased potential of vessel traffic and strikes (both within the Humber Estuary and Offshore), suspended sediments, habitat/prey species loss, accidental pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g., piling noise for a 2,300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see **Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Tagging studies from the Donna Nook haul out site in the Humber Estuary SAC show trips between this site and Project One (in particular the export cable route and the southern boundary of Subzone 1) (see **Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Densities of grey seal averaged 0.043 animals per km^2 in the Hornsea Zone plus 10 km buffer, with a slightly lower density recorded in Subzone 1 plus 4 km buffer (0.038 animals per km2) (see **Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Given that grey seal from the SAC may occur in close proximity to Project One (both offshore and within the Humber Estuary), there is considered to be potential for a likely significant effect on the conservation objectives of grey seal from this site, either alone and/or in combination with other projects/plans (**Section 4.3 and 4.4 of the HRA Report (Doc Ref: APP-171)**).

x. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.5 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc Ref: APP-171)**). NE noted in their response to deadline IV dated 22 April 2014 **(Doc Ref: REP-304)** that they still consider the relationship between Project One and Project Two to be unclear. Whilst NE accept that the programming of Project Two is still at an initial stage consideration must still be given to the different potential construction scenarios that may occur.

y. Potential for LSE as these species may occur in the vicinity of the cable laying operations (see **Table 4.10 of the HRA Report (Doc Ref: APP-171)**).

z. Potential for LSE as these species may occur in the vicinity of the operational cable, with potential for EMF related effects on migratory behaviour (see **Table 4.10 of the HRA Report (Doc Ref: APP-171)**).

aa. No LSE during the decommissioning phase as cables are likely to remain in situ (see **Section 2.5 of the HRA Report (Doc Ref: APP-171)**).

bb. Potential for LSEs as species that are part of the waterfowl assemblage were found near the cable landfall site in numbers that are potentially significant in the context of their respective Ramsar populations (>1% of current value). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as species were either absent or recorded at very low abundances in these areas.

cc. Assemblage species were recorded at low abundances and/or flying at low levels (i.e. below rotor height) during Project One surveys and therefore are at low risk of collision (Ref: **Annex A, Table A45**).

dd. Assemblage species were recorded at very low abundances during offshore Project One surveys and did not utilise offshore environment so no displacement effects will occur (Ref: **Annex A, Table A45**).

ee. Plans/projects with potential for LSE on the Ramsar assemblage in-combination with Project One infrastructure within the Humber Estuary and onshore include: Land at Bishopthorpe Farm Newton Marsh Wind Farm Extension, Phillips 66 Tetney Sea Line Replacement Project, Tetney to Saltfleet Tidal Flood Defence Scheme and Able Marine Energy Park (AMEP) (see HRA **Table 4.13 and paragraphs 4.4.15 to 4.4.61 of the HRA Report (Doc Ref: APP-171)**).

References

Petersen, I.K. Christensen, T.K. Kahlert, J. Deshom, M. & Fox, A.D. (2006) Final results of Bird Studies at the offshore wind farms at Nysted and Horns rev, Denmark. NERI Report. Commissioned by DONG Energy and Vattenfall A/S.

Thaxter C.B., Lascelles B., Sugar K., Cook A.S.C.P., Roos S., Bolton M., Langton R.H.W. and Burton N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas.

Zucco, C. Wende, W. Merck, T. Kochling, I. Koppel, J. (2006) Ecological research on Offshore Wind Farms: International Exchange of Experiences. Part B: Literature Review of Ecological Impacts. BfN-Skripten 186.

4.0 STAGE 2: EFFECTS ON INTEGRITY

Background

4.1 The screening exercise has identified the potential for a likely significant effect on one or more features of the European sites considered. This section summarises the anticipated effects on the integrity of the European sites, in the context of their conservation objectives.

Stage 2 Matrices Key

4.2 ✓ = Adverse effect on integrity cannot be excluded

× = Adverse effect on integrity can be excluded

C= construction

O = operation

D = decommissioning

4.3 Evidence supporting the conclusions is detailed in footnotes for each table with reference to relevant supporting documentation.

4.4 Where an impact is not considered relevant for a feature of a European site, the cell in the matrix is formatted as follows:

Stage 2 Matrix 1: Flamborough and Filey Coast pSPA

Site Code: UK9006101

Distance to project: 51.2 km

European site features	**Adverse effect on integrity**											
Article 4.2 – Migratory (Breeding)	***Collision***						***Displacement***			***In-combination***		
	C	O	D				C	O	D	C	O	D
Kittiwake *Rissa tridactyla*		**×a**						**×b**			**×c,d**	
Article 4.2 – Assemblage	***Collision***						***Displacement***			***In-combination***		
	C	O	D				C	O	D	C	O	D
Puffin *Fratercula arctica*								**×e**			**×f**	
Razorbill *Alca torda*								**×g**			**×h**	
Guillemot *Uria aalge*								**×i**			**×j**	
Herring Gull *Larus argentatus*		**×k**									**×l**	
Gannet *Morus bassanus*		**×m**						**×n**			**×o,p**	
Kittiwake *Rissa tridactyla*		**×a**						**×b**			**×c,d**	
Fulmar *Fulmaris glacialis*								**×q**			**×r**	

Evidence supporting conclusions:

a. Collision **–** The applicant has stated in their HRA report that although the conservation objectives of the Flamborough and Filey Coast pSPA are currently not being met, based on the relatively small numbers of kittiwakes predicted to be impacted (0.02% of the population), and the small contribution the predicted impacts will make on the overall decline, it is predicted that the potential annual impact on kittiwakes from Project One alone will not affect the integrity of the site (**paragraphs 5.4.58 to 5.4.69 of the HRA Report (Doc Ref: APP-171)**). However NE in their response to deadline IV dated 22 April 2014 **(Doc Ref: REP-304)** stated that if all consented and proposed developments were taken into consideration using Band Option 1 and an avoidance rate of 98% was applied it cannot be safely concluded that there will not be an adverse in-combination impact on the integrity of the kittiwake feature of the Flamborough and Filey Coast pSPA. However it was subsequently agreed with NE that it could only be concluded that there will be no adverse in-combination impact on the integrity of the kittiwake feature if a building block approach is taken to the in-combination assessment **(Doc Ref: H-024)**.

b. Displacement – The applicant has stated in their HRA report that although the conservation objectives of the Flamborough and Filey Coast pSPA are currently not being met, based on the relatively small numbers of kittiwakes predicted to be impacted (0.02% of the population, and an increase in baseline mortality of 0.09%), and the small contribution the predicted impacts will make on the overall decline, it is predicted that the potential annual impact on kittiwakes from Project One alone will not affect the integrity of the site. This conclusion is supported by population modelling of the SPA population (**paragraphs 5.4.58 to 5.4.77 of the HRA Report (Doc Ref: APP-171)**).

c. Collision – The applicant has stated in their HRA report that the conservation objectives of the Flamborough and Filey Coast pSPA site are not currently being met. However, based on the results from the PBR modelling and supplementary PVA modelling, it is predicted that the potential impact on kittiwakes in-combination with Tier 1-3 offshore wind farms will not affect the integrity of the site (**paragraphs 5.5.67 to 5.5.90 of the HRA Report (Doc Ref: APP-171)**). In NE's response to deadline IV dated 22 April 2014 **(Doc Ref: REP-304)** it is considered that on the basis of the available evidence, no reasonable scientific doubt remains as to the absence of an adverse effect on the integrity of the Flamborough and Filey Coast pSPA due to predicted collision mortality of kittiwakes at Hornsea Project One alone.

If only previously consented developments are taken into consideration use of Band Option 1 and an avoidance rate of 98% the project, in-combination will not result in an adverse effect on the integrity of the kittiwake feature of the Flamborough and Filey Coast pSPA.

d. Displacement – The applicant has stated in their HRA report that the conservation objectives of the Flamborough and Filey Coast pSPA site are not currently being met. However, based on the results from the PBR modelling and supplementary PVA modelling, it is predicted that the potential impact on kittiwakes in-combination with Tier 1-3 offshore wind farms will not affect the integrity of the site (**paragraphs 5.5.91 to 5.5.101 of the HRA Report (Doc Ref: APP-171)**).

e. Displacement – The applicant has stated in their HRA report that over a year an estimated three adult puffins may be impacted as a result of mortality from displacement from the Flamborough and Filey Coast pSPA. The potential increase in mortality arising from displacement effects from Project One alone on puffins from Flamborough and Filey Coast pSPA is 0.3% of the total breeding pSPA population, and an increase in baseline mortality by 6.1%. PBR modelling undertaken on puffins from Flamborough and Filey Coast pSPA indicates that the loss of more than 7.6 puffins per year would be unsustainable (**Annex J, paragraph J.61 and Table J.6 of the HRA Report (Doc Ref: APP-171)**). This is based on a precautionary recovery factor of 0.2, reserved for populations of high concern. The estimated loss of three puffins per year from the SPA is below the level at which an unsustainable population loss is predicted to occur. The level of impact predicted on puffins from the SPA due to displacement effects will therefore not affect the conservation status of the species, or the conservation objectives of the site and therefore there will not be an adverse effect on the integrity of the SPA (**paragraphs 5.4.142 to 5.4.161 of the HRA Report (Doc Ref: APP-171)**). In RSPBs response to deadline IV dated 22 April 2014 **(Doc Ref: REP-305)** it is stated that the applicants predictions of mortality for razorbills differ significantly from those predicted using the NE recommended approach, the applicants methodology leads to a prediction, for the project alone, that the population will be 49% lower after 25 years where as NE's recommended approach predicts that the population will be 70% lower after 25 years, RSPB consider NE's approach to be the more appropriate one to adopt. Subsequently it was agreed with NE that there will be no adverse impact on the integrity of the puffin feature either alone or in-combination **(Doc Ref: H-024)**.

f. Displacement – The applicant has stated in their HRA report that only a small number of losses will be attributable to the Flamborough and Filey Coast pSPA population, with most coming from the larger populations further north.

The level of impact predicted will not affect the conservation status of the species, nor the conservation objectives of the site and therefore there will be no adverse effect on the integrity of the SPA. This conclusion is supported by population modelling of the SPA population (**paragraphs 5.5.131 to 5.5.139 of the HRA Report (Doc Ref: APP-171)**).
It was subsequently agreed with NE that there will be no adverse impact on the integrity of the puffin feature either alone or in-combination **(Doc Ref: H-024)**.

g. Displacement – The applicant has stated in their HRA report that a PBR model has been created to estimate the level of removal each year of adult razorbills from the Flamborough and Filey Coast pSPA population before it becomes unsustainable (**Annex J of the HRA Report (Doc Ref: APP-171)**). Using the most recent population data available, and a recovery factor of 0.5 (considered precautionary since the population appears to be stable at least), then a loss of 607 birds would be required before this happens (**Annex J, Table J.6 of the HRA Report (Doc Ref: APP-171)**). The predicted mortality rate of 79 adult razorbills due to displacement from Project One would therefore fall well below this threshold. (**paragraphs 5.4.115 to 5.4.141 of the HRA Report (Doc Ref: APP-171)**). It was agreed with NE that there will be no adverse impact on the integrity of the razorbill feature as a result of the project alone but agreement is still outstanding with regard to in-combination impacts **(Doc Ref: H-024)**.

h. Displacement – The applicant has stated within their HRA report that the level of impact predicted will not affect the conservation status of the species, nor the conservation objectives of the site and therefore there will be no adverse effect on the integrity of the SPA, due to Project One either alone or in-combination (**paragraphs 5.5.119 to 5.5.130 of the HRA Report (Doc Ref: APP-171)**). It was agreed with NE that there will be no adverse impact on the integrity of the razorbill feature as a result of the project alone but agreement is still outstanding with regard in-combination impacts **(Doc Ref: H-024)**.

i. Displacement – The applicant has stated in their HRA report that the potential increase in mortality arising from displacement effects from Project One alone on guillemots from Flamborough and Filey Coast pSPA is 0.15% of the total breeding population, and an increase in baseline mortality by 1.3%. A PBR model has been created to estimate the level of removal each year of adult guillemots from the Flamborough and Filey Coast pSPA population before it becomes unsustainable (**Annex J of the HRA Report (Doc Ref: APP-171**).

Using the most recent population data available, and a recovery factor of 0.4 (considered precautionary since the population appears to be stable at least), then a loss of 1,293 birds would be required before this happens. The predicted mortality rate of 127 adult guillemots due to displacement from Project One would therefore fall well below this threshold, and so it is clear that there is no risk to the population as a result of displacement from Project One. As such, the level of impact predicted will not affect the conservation status of the species, or the conservation objectives of the site, and therefore there will be no adverse effect on the integrity of the SPA (**paragraphs 5.4.90 to 5.4.114 of the HRA Report (Doc Ref: APP-171)**).

In RSPBs response to deadline IV dated 22 April 2014 **(Doc Ref: REP-305)** it is stated that the applicants predictions of mortality for guillemots differ significantly from those predicted using the NE recommended approach, the applicants methodology leads to a prediction, for the project alone, that the population will be 2% lower after 25 years where as NE's recommended approach predicts that the population will be 19% lower after 25 years, RSPB consider NE's approach to be the more appropriate one to adopt. It was agreed with NE that there will be no adverse impact on the integrity of the guillemot feature as a result of the project alone but agreement is still outstanding with regard to in-combination impacts **(Doc Ref: H-024)**.

j. Displacement – The applicant has stated in their HRA report that the level of impact predicted will not affect the conservation status of the species, nor the conservation objectives of the site and therefore there will be no adverse effect on the integrity of the SPA from Project One, either alone or in-combination (**paragraphs 5.5.103 to 5.5.118 of the HRA Report (Doc Ref: APP-171)**). It was agreed with NE that there will be no adverse impact on the integrity of the guillemot feature as a result of the project alone but agreement is still outstanding with regard in-combination impacts **(Doc Ref: H-024)**.

k. Collision – The applicant has stated in their HRA report that the Flamborough and Filey Coast pSPA is beyond the maximum foraging range of this species during the breeding period and therefore the likelihood is that neither of the estimated two collisions of breeding adults per year will be from this SPA.

During the non-breeding period an estimated seven adult herring gulls possibly from SPAs may be impacted. Based on the relative sizes of the SPA breeding populations, no herring gulls from the Flamborough and Filey Coast pSPA are predicted to collide with Project One. Consequently, no adult herring gulls from the Flamborough and Filey Coast pSPA are predicted to be impacted by Project One.

It is predicted that the potential annual impact on herring gulls from Project One alone will not affect the integrity of the site (**paragraphs 5.4.79 to 5.4.89 of the HRA Report (Doc Ref: APP-171)**). In the RSPB's response to deadline IV dated 22 April 2014 **(Doc Ref: REP-305)** it is noted that concerns have been raised regarding the neglect of the applicant to consider the possibility of the attraction of gulls to windfarms and the consequent decrease in avoidance rate despite this being reported in relation to Thortonbank and Blythbank offshore wind farms.

l. Collision – No impacts on herring gulls from the Flamborough and Filey Coast pSPA are predicted likely to occur due to Project One and therefore there will be no in-combination impacts (**paragraph 5.5.102 of the HRA Report (Doc Ref: APP-171)**).

m. Collision – The applicant has stated in their HRA report that the population of gannet at the Flamborough and Filey Coast pSPA is increasing and the potential increase in mortality arising from collision impacts from Project One alone is below that predicted to cause a decline in the gannet breeding population. Based on site specific data and results from population modelling the level of impact predicted will not adversely affect the conservation status of the species, nor the conservation objectives of the site and therefore, it is predicted, that there will be no effect on the integrity of the SPA (**paragraphs 5.4.34 to 5.4.41 of the HRA Report (Doc Ref: APP-171)**). It was subsequently agreed with NE that it could only be concluded that there will be no adverse in-combination impact on the integrity of the gannet feature if a building block approach is taken to the in-combination assessment and in addition a higher avoidance rate is applied **(Doc Ref: H-024)**.

n. Displacement – Based on site specific data and results from population modelling the level of impact predicted will not adversely affect the conservation status of the species, nor the conservation objectives of the site and therefore, it is predicted, that there will be no effect on the integrity of the SPA (**paragraphs 5.4.42 to 5.4.52 of the HRA Report (Doc Ref: APP-171)**).

o. Collision – The population of gannet at the Flamborough and Filey Coast pSPA is increasing and the potential increase in mortality arising from collision impacts from Project One alone and in-combination on gannets from Flamborough and Filey Coast pSPA is below that predicted to cause a decline in the gannet breeding population.

Based on site specific data and results from population modelling the level of impact predicted will not adversely affect the conservation status of the species, nor the conservation objectives of the site and therefore, it is predicted, that there will be no effect on the integrity of the SPA (**paragraphs 5.5.22 to 5.5.51 of the HRA Report (Doc Ref: APP-171)**).

p. Displacement – The population of gannet at the Flamborough and Filey Coast pSPA is increasing and the potential increase in mortality arising from displacement impacts from Subzone 1 alone and in-combination with other projects (i.e. including those with no estimates) on gannets from Flamborough and Filey Coast pSPA is likely to be relatively small compared to the total breeding population. Based on site specific data and results from population modelling the level of impact predicted will not adversely effect the conservation status of the species, nor the conservation objectives of the site and therefore, it is predicted, that there will be no effect on the integrity of the SPA (**paragraphs 5.5.52 to 5.5.66 of the HRA Report (Doc Ref: APP-171)**).

q. Displacement – The total breeding population of fulmar at Flamborough and Filey Coast pSPA is 1,447 pairs (2008 - 2011 count (JNCC and NE, 2013)). The potential loss of four adult fulmars per year is 0.1% of the breeding population. The level of impact predicted will not affect the conservation status of the species or the conservation objectives of the site and therefore there will be no effect on the integrity of the SPA (**paragraphs 5.4.6 to 5.4.25 of the HRA Report (Doc Ref: APP-171)**).

r. Displacement – Tier 1 projects: No quantitative assessments of displacement to fulmar were carried out for any other Tier 1 projects, but where displacement was considered to be a potential impact for the species, the level of significance was determined to be negligible or minor adverse. Despite relatively high fulmar peak counts for Project One in comparison with other sites (e.g. a peak of 129 individuals reported at London Array, one of the larger Tier 1 sites, compared to 948 for Project One), the predicted mortality rates from displacement were low (up to four adult deaths during the breeding season and one during the winter). This indicates that for other smaller Tier 1 projects, mortality is likely to be even lower. Tier 2: Again, only a qualitative assessment was possible for Tier 2 projects, and the levels of significance predicted were also negligible or minor adverse, with the higher value likely to be more of a reflection of the species' conservation status rather than vulnerability to displacement. Tier 3: Mortality rates calculated from preliminary population estimates from Project Two, predicted five deaths during the breeding season, and one death during winter. Assuming around two thirds of birds are adults, then when combined with Project One results, a total mortality of seven adult birds during the breeding season would represent 0.2% of the Flamborough and Filey Coast pSPA population.

Although it is acknowledged that a quantitative assessment has not been possible for the large majority of projects, the predicted levels of significance in each ES chapter suggest that displacement effects are not a significant impact for fulmar. The level of impact that is therefore likely from all Tier 1-3 projects combined will not affect the conservation status of the species or the conservation objectives of the site and therefore there will be no effect on the integrity of the SPA (**paragraphs 5.5.16 to 5.5.21 of the HRA Report (Doc Ref: APP-171)**).

Stage 2 Matrix 2: Humber Estuary SPA

Site Code: UK9006111

Distance to project: 0 km

European site features	**Adverse effect on integrity**											
Article 4.1 – Winter	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed godwit *Limosa lapponica*	**×a**			**×b**			**×l**			**×m, n, o**		
Golden plover *Pluvialis apricaria*	**×a**			**×c**			**×l**			**×m, n, o**		
Article 4.2 – Migratory (over winter)	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*	**×a**			**×d**			**×l**			**×m, n, o**		
Knot *Calidris canutus*	**×a**			**×e**			**×l**			**×m, n, o**		
Redshank *Tringa totanus*	**×a**			**×f**			**×l**			**×m, n, o**		
Bar-tailed godwit *Limosa lapponica* – Wintering and	**×a**			**×b**			**×l**			**×m, n, o**		

European site features	**Adverse effect on integrity**											
on passage												
Article 4.2 – Migratory (on passage)	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*	**×a**			**×d**			**×l**			**×m, n, o**		
Knot *Calidris canutus*	**×a**			**×e**			**×l**			**×m, n, o**		
Redshank *Tringa totanus*	**×a**			**×f**			**×l**			**×m, n, o**		
Article 4.2 – Assemblage	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied brent goose *Branta bernicla bernicla*	**×a**			**×g**			**×l**			**×m, n, o**		
Sanderling *Calidris alba*	**×a**			**×h**			**×l**			**×m, n, o**		
Ringed plover *Charadrius hiaticula*	**×a**			**×i**			**×l**			**×m, n, o**		
Oystercatcher *Haematopus ostralegus* – Over winter (assemblage)	**×a**			**×j**			**×l**			**×m, n, o**		

European site features	Adverse effect on integrity											
Grey plover *Pluvialis squatarola*	**×a**			**×k**			**×l**			**×m, n, o**		
Dunlin *Calidris alpina alpina*	**×a**			**×d**			**×l**			**×m, n, o**		
Knot *Calidris canutus*	**×a**			**×e**			**×l**			**×m, n, o**		
Bar-tailed godwit *Limosa lapponica*	**×a**			**×b**			**×l**			**×m, n, o**		
Golden plover *Pluvialis apricaria*	**×a**			**×c**			**×l**			**×m, n, o**		

Evidence supporting conclusions:

a. In relation to the relevant conservation objectives, the extent and distribution of supporting habitats will not be significantly affected, being minimal with the vast majority of habitat loss will be reversible within a short period. As a result, the numbers or distribution of qualifying species will not be affected by habitat loss. It can therefore be concluded no conservation objectives are expected to be compromised by habitat loss, and consequently there will be no adverse effects on the integrity of the Humber Estuary SPA as a result of temporary habitat loss during cable installation at the landfall site (**paragraphs 6.3.5 to 6.3.26 of the HRA Report (Doc Ref: APP-171)**). To provide further confidence, mitigation measures have been proposed to reduce habitat loss and increase recovery rates within the *Salicornia* and other annuals colonising mud and sand Annex I habitat and other Annex I habitats following cable installation (**Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

b. Bar-tailed godwits are likely to be present in numbers within the area around the cable landfall site from mid-September to early May.

The species was recorded over winter and observed widely across the mudflats near the cable landfall site during low and rising tides. It appears that a low tide roost of up to 800 birds may be present in winter, representing 29% of the cited Humber Estuary SPA population, or 13% of the most recent WeBS core count population for the Humber Estuary. Numbers present during each survey did, however, vary considerably despite similar tidal states, suggesting that alternative habitat is available within the estuary if required. In the Firth of Forth, studies have shown that bar-tailed godwits ranged more widely than most other species (Symonds et al, 1984), reflecting their flexibility in habitat choice (estuarine mudflats). Although in a worst-case situation a significant number of SPA birds may be displaced if within around 100 m from human movements (as predicted from Smit and Visser, 1993), the distribution of individuals within the survey area suggests that birds may require moving only short distances across mudflats, away from where the restricted work area would be, and that a roost site would be maintained in the area. Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.60 to 6.3.61 and Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

c. Golden plovers are likely to be found mainly in the vicinity of Horseshoe Point from September to November with peak numbers of up to 8,000 individuals on autumn passage representing 26% of the cited and 16% of the current Humber Estuary SPA populations respectively. Numbers were however very low for the remainder of the year. The saltmarsh area is likely to form part of a feeding site and high tide roost for the species during autumn passage, with the majority of records being close to land. In a worst-case situation a significant number of roosting or feeding SPA birds may be displaced if within 100 m from human movements (as predicted from Smit and Visser, 1993). The species is widely distributed within the Humber Estuary and the population is in favourable conservation status, suggesting that no particular locality is of significant importance within the context of the Humber Estuary SPA. Although significantly large numbers were recorded locally, golden plover does not appear to be particularly vulnerable to disturbance and key habitats for this species (i.e. saltmarsh habitats) are not within the area of effect (i.e. approximately 100 m from human movements/cable laying operations).

Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the limited effects on preferred habitats for this species and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.62 to 6.3.66 and Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

d. Dunlin are likely to be present between September and May, with peaks in October and early April on passage. It is likely that up to 2,000-3,000 dunlin (>10% of the Humber Estuary SPA population) use the mudflats close to the cable landfall survey area, particularly during autumn passage from late October, as determined from survey results and consultation with NE. Birds were recorded throughout the survey area, although predominantly above mean high water mark on muddy substrates, suggesting that some individuals may be displaced by construction activities. The dunlin is widespread around the Humber at low water, and may form large roosting flocks at high water, although many birds remain along the tideline. Burton *et al*. (2002a) suggested that construction work may have affected dunlin on a studied estuarine site, while Burton *et al*. (2002b) demonstrated that numbers of dunlin were significantly lower where a footpath was close to a count section, although such an effect was recorded only up to 25 m from the source of disturbance. Cutts and Allen (1999) have recorded variable responses to human disturbance on the Humber, with minimum approach distances to construction activity being between 100 m and 200 m, although in some cases up to 50 m. Birds are then put to flight, with movements downshore or onto adjacent mudflats up to 500 m away, with a gradual return to the area of construction. The widespread availability of potential alternative habitat (i.e. with a maximum of 1.68% of intertidal habitats within the Humber Estuary SPA being affected) across the estuary suggests that any birds displaced would likely find suitable sites elsewhere without any significant impacts (particularly as a small species, as per Stillman *et al*. 2005), although the species has declined nationally and locally since the Humber Estuary SPA citation date (potentially due to a reduction in suitable habitat). Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.67 to 6.3.70, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

e. Knot are likely to arrive on site from September, peaking in November and remaining until early April. Surveys at the cable landfall site in 2011/12 recorded a peak count of 3,000 birds in November, which equates to 10% of the cited Humber Estuary SPA population, or around 8% of the current Humber Estuary SPA population, although NE has advised that up to 10,000 birds may be present. Birds were located widely within the survey area, although some of the largest flocks were to be found well below mean high water mark at low tide. It is therefore possible that large numbers of birds may be affected by construction activities, however the small species is highly mobile between feeding and roosting areas on the Humber, in response to weather conditions, tidal conditions or disturbance (Allen *et al*., 2003). As such, it does not necessarily follow that displacement would result in a reduction in numbers, with alternative habitat undoubtedly available (i.e. with a maximum of 1.68% of intertidal habitats within the Humber Estuary SPA being affected) for the period of disturbance. In addition, although a possible high tide roost site may be present in the vicinity of the convergence corridor, similar roost sites were also recorded at a number of other locations within the Horseshoe Point survey area. Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.71 to 6.3.73, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

f. Redshank are particularly vulnerable to severe weather conditions as they take small prey items in relation to body size, and so must spend longer periods feeding during severe weather (Mitchell *et al*., 2000). Displacement effects may therefore also be particularly acute for the species if feeding time is reduced, especially in bad weather. Results from Smit and Visser (1993) suggest that birds may be displaced up to around 120 m, the furthest of the species studied by the authors. Redshank may be found on site throughout the year though much less frequently during summer. There is a peak on passage in the Humber in September and October, and again in April corresponding with the spring passage of what are presumed to be Icelandic birds. Small numbers of breeding birds may be present on saltmarshes through summer. At Horseshoe Point, numbers did indeed peak during October, but were much smaller on spring passage and throughout summer. Although the species is widespread across the Humber Estuary, they have a preference for muddy river channels and saltmarsh (Allen *et al*., 2003), with saltmarshes at Tetney and Grainthorpe Haven and Donna Nook providing important roost sites (Cruickshanks *et al*., 2010). Numbers were relatively low in the vicinity of the cable landfall site, as during surveys in 2011/12, a peak flock size of 87 individuals was recorded in October 2011 representing 1.2% of the cited passage Humber Estuary SPA population.

Although this is a sensitive species, with a declining population in the SPA, it appears that, although some birds may be displaced within the vicinity of construction works, the numbers are likely to represent less than 1% of the Humber Estuary SPA population. In addition, effects on this species' preferred habitats (e.g. saltmarsh) are not within the area of disturbance effects for this species. Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the low number of birds expected to be affected and available alternative habitat, as well as the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.74 to 6.3.78, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

g. Dark-bellied brent geese are likely to be present in the Humber Estuary SPA on passage from October and November, and peak in December to February with numbers falling rapidly by March (Allen *et al*., 2003). During surveys in 2011/12 at the cable landfall site, a peak of 835 individuals was recorded at low tide in March 2012 with similar numbers in January, representing 40% of the cited Humber Estuary SPA population and around 18% of the likely current population, which has greatly increased. The effects of disturbance on brent geese within estuarine sites are less reported than for waders, however, numbers of brent geese were found to decrease with increased proximity to a footpath access point on weekends, when use was likely to have been greatest (Burton *et al*., 2002a), suggesting that construction disturbance may be an issue. Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the periods of the year when this species is present in significant numbers (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.79 to 6.3.83, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

h. Sanderlings are potentially present within the Humber Estuary SPA most of the year, but peak numbers coincide with spring and autumn passage. During surveys in 2011/12 at the cable landfall site, a peak of 150 birds was however recorded in January 2012, which represents 31% of the cited wintering Humber Estuary SPA population, or 18% of the passage population. Numbers substantially declined in summer, with the species absent across the estuary during most surveys. WeBS core counts recorded a peak of 158 birds in May 2010 in the Tetney to Horseshoe Point sector. Sanderling are largely restricted to the outer southern shore of the Humber Estuary, and so habitat may be limited.

Negative effects on sanderling, as a result of reduced time spent feeding due to human presence has been recorded by Burger and Gochfeld (1991) although the species can feed through the night and so more time can be devoted to feeding outside periods of disturbance. Additionally, the species tends to feed at the water's edge, and so will likely be further away from construction activities, and according to Stillman *et al*. (2005), should be more likely to survive as a smaller species. Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the low numbers of birds likely to be affected and the available alternative habitat, as well as the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.84 to 6.3.85, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

i. Ringed plover may be present on site throughout the year, although numbers are likely to peak during migration periods. Autumn migration is from mid-July to early October, and spring migration is from late April to early June. Cable landfall site surveys in 2011/12 recorded ringed plovers on the majority of surveys, with a peak of 120 birds in mid-September representing 7% of the cited Humber Estuary SPA passage population. Most records of ringed plover were above mean high water mark on the muddy substrates suggesting a probable roost site. NE reported that there is normally a concentration of roosting ringed plover close to the shore, directly to the north of the cable landfall site in May, although a peak of only 37 birds was recorded during cable landfall surveys in May 2012. A relatively high count of 778 birds was however recorded within the Horseshoe Point WeBS core count sector in May 2010, representing 44% of the cited Humber Estuary SPA passage population and 31% of the most recent Humber Estuary population. Cutts and Allen (1999) recorded a dispersal of birds due to construction activity alongside dunlin, with similar responses predicted, i.e. at distances of 100 m to 200 m, with a gradual return to the area of construction. Survey results therefore suggest that the site is of relatively high importance, probably during passage movements in autumn and spring and if works were to take place during these periods, roosting may be disturbed. There is evidence for alternative roost sites outside the area of effect (i.e. approximately 100 m to 200 m from human movements/cable laying operations) at Horseshoe Point, though it is not clear whether alternative habitat is available as in the adjacent Grainthorpe Haven WeBS sector where the species was recorded in much lower numbers.

Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat at Horseshoe Point and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.86 to 6.3.90, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

j. Southerly passage of oystercatcher may occur in the Humber Estuary between July and September, with a large influx during September. Overall numbers may decrease slightly through the winter. A small summering and breeding population remains throughout summer. The area between Horseshoe Point and Grainthorpe has been identified as an important feeding area during much of the year within the context of the Humber Estuary SPA. In addition, birds tend to establish high tide roosts close to key feeding areas (Catley, 2000). Near to the cable landfall site, oystercatchers roost in creeks mid-estuary in low, turning tides, and at low tide roost size can reach up to around 3,000 individuals (November 2011 and February 2012), representing much of the cited Humber Estuary SPA population (>94%). During winter, birds were generally concentrated on the mudflats on low and rising tides, some 1 km or more from the shoreline. It is therefore possible that significant numbers could be disturbed by construction activities. Oystercatcher feeding rates have been recorded as being reduced due to human disturbance (Goss-Custard and Verboven, 1993) although this was compensated by shifting to other areas and habituation. Fitzpatrick and Bouchez (1998) found that arrival times of oystercatcher at their low water feeding sites were delayed as a result of human presence, with earlier departures when disturbed. Stillman *et al*. (2005) reported however, that oystercatcher survival rates are likely to be higher than other similarly-sized waders as they consume larger prey items. Although high peak numbers of oystercatcher were recorded within the context of the Humber SPA, the preferred habitats for these species (i.e. creeks and cockle beds to the south of the convergence corridor) will largely be outside the area of effect (i.e. approximately 100 m to 200 m from human movements/cable laying operations). Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance (which will largely be away from key habitat for this species) and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.91 to 6.3.94, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

k. Grey plover numbers within the Humber Estuary SPA rapidly build up through August to a September/October peak, and thereafter steadily decline. Numbers build up rapidly from March to May as birds arrive on spring passage, on the same scale as the autumn migration. Cable landfall surveys in 2011/12 recorded a peak of 885 birds on spring passage in April during rising tide, which is 52% of the cited Humber Estuary SPA population, and 31% of the likely current population. Birds were located on the muddy substrate mainly below mean high water, although the saltmarshes may provide an important communal roost site in the wider Tetney Marshes area (Cruickshanks *et al*. 2010). The species was absent on surveys from mid-June until September around Horseshoe Point, with a smaller autumn passage (peak of 231 birds in October). Cutts *et al*. (2009) identified the species as being particularly sensitive to roosting disturbance, with the overlapping WeBS sectors at Horseshoe Point being important within the estuary. In contrast to cable route surveys, the species was almost entirely absent during low tide counts from April to July inclusive in the two overlapping WeBS sectors (Mander and Cutts, 2005). Although there is relatively little work directly on this species, (Smit and Visser, 1993; Burton *et al*., 2002) it has been recorded that grey plover is territorial in winter (Turpie 1995). Reaction distances may however be similar to golden plover, where in a worst-case situation a significant number of roosting or feeding birds may be displaced if within 100 m from human movements (as predicted from Smit and Visser, 1993). Although the Humber Estuary SPA population is in relatively favourable conservation status, due to the high peak numbers within the context of the Humber Estuary SPA population, and this species has low thresholds for habituation during passage periods, it is possible that a significant number of roosting or feeding passage birds may be disturbed and leave the Humber Estuary SPA altogether (Cutts *et al*., 2009) during cable laying operations. The predicted area of effect is, however, relatively limited (i.e. approximately 100 m from human movements/cable laying operations) and although high tide roost sites may be present within the convergence corridor, alternative habitats were recorded within the survey area outside the predicted area of effect (i.e. to the north of the convergence corridor and within the saltmarsh habitat to the south). Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative roosting habitat at Horseshoe Point and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.95 to 6.3.99, Section 6.4: Mitigation Measures and Monitoring, and Table 6.6 of the HRA Report (Doc Ref: APP-171)**).

l. In relation to the relevant conservation objectives the extent, distribution and function of supporting habitats will only be briefly affected in the local area, and will not result in the significant redistribution or reduction of populations occurring within the Humber Estuary SPA. As such no conservation objectives are predicted to be compromised as a result of indirect disturbance (i.e. via impacts on prey species), and so the integrity of the Humber Estuary SPA will be unaffected. Effects related to reductions in water quality are also not expected to lead to adverse effects on qualifying features with effects predicted to be short-term and areas affected are likely to be very small compared to available alternative habitat and prey items within these habitats. The potential for any discharges associated with construction activities will also be minimised through the implementation of good working and management practices as detailed in the CoCP (**paragraphs 6.3.104 to 6.3.125 Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc Ref: APP-171)**).

m. Habitat loss is predicted to occur as a result of the AMEP development plans, the Tetney to Saltfleet Tidal Flood Defence Scheme, the Phillips 66 Tetney Sea Line Replacement project and Hornsea Project Two, though the proportion of estuarine habitats affected is small in the context of the available habitats within the SAC/SPA (i.e. 0.75% of the total estuarine habitat). The majority of this is temporary habitat loss/disturbance, with the affected habitats expected to recovery quickly following disturbance. Any long term habitat loss (as a result of the AMEP development) will be mitigated through a habitat creation scheme. In-combination effects on habitat extent are therefore not predicted to result in an adverse effect on ornithological features of the SPA (**paragraphs 6.3.128 to 6.3.132 of the HRA Report (Doc Ref: APP-171)**).

n. Due to the limited area of effect associated with Hornsea Project One and Project Two and accounting for the anticipated completion dates for the Tetney flood defence project (i.e. at least 2 years before the start of Project One and Two cable installation) and the Phillips 66 Tetney sea line replacement project (due to be completed by 2015) in advance of the start of Project One and Project Two cable installation, adverse effects are not expected for Project One in combination with other projects. A commitment for Project One restricting cable installation activities to avoid the most sensitive period, will also help to ensure that disturbance related adverse effects on populations of the Humber Estuary SPA will not occur (**paragraphs 6.3.133 to 6.3.142 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc Ref: APP-171)**).

o. In-combination disturbance to prey items is likely to be highly localised with the area affected predicted to be small in the context of the Humber Estuary SAC/SPA, with other prey items available during the construction phase in similar habitats both at Horseshoe Point and in the wider SPA. In addition, effects are expected to be reversible with recovery time for prey species expected to be fast. As such, no in-combination effects on prey availability are likely to occur. In-combination effects of disturbance or water quality changes for prey species are most likely to occur when construction phases of projects are coincidental. Although the nature and extent of any discharges associated with construction activities are difficult to predict with any accuracy, it is unlikely that individuals from most species will be adversely affected to a level that will significantly affect the populations within the relevant SPAs, with overall areas affected likely to be very small compared to available alternative habitat, even in-combination with other projects. This is particularly likely to be the case when best practice and mitigation measures are considered for other projects (which are likely to be conditions of consent) which will minimise the risk of any in-combination discharge events and it can be reasonably concluded that no in-combination adverse effects are likely to occur (**paragraphs 6.3.143 to 6.3.144 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc Ref: APP-171)**).

Stage 2 Matrix 3: Humber Estuary Ramsar

Site Code: UK11031

Distance to project: 0 km

European site features	**Likely Effects of Project One**											
Ramsar criterions 6	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination***		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed godwit *Limosa lapponica lapponica*	**×a**			**×b**			**×g**			**×h, i, j**		
Golden plover *Pluvialis apricaria apricaria*	**×a**			**×c**			**×g**			**×h, i, j**		
Dunlin *Calidris alpina alpina*	**×a**			**×d**			**×g**			**×h, i, j**		
Knot *Calidris canutus islandica*	**×a**			**×e**			**×g**			**×h, i, j**		
Redshank *Tringa totanus totanus*	**×a**			**×f**			**×g**			**×h, i, j**		
Ramsar criterion 5	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination***		
	C	O	D	C	O	D	C	O	D	C	O	D

European site features	**Likely Effects of Project One**											
Site supports an assemblage of international importance of waterfowl with peak counts in winter.	**×a**			**× r**			**×g**			**×h, i, j**		
Ramsar criterion 1	***Habitat extent***			***Water quality***						***In-combination***		
	C	O	D	C	O	D				C	O	D
Sand dunes	**×k**			**×k**						**×k**		
Estuarine waters	**×l**			**×l**						**×l**		
Intertidal mud and sand flat	**×m**			**×m**						**×m**		
Salicornia and other annuals colonising mud and sand	**×n**			**×n**						**×n**		
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	**×o**			**×o**						**×o**		
Ramsar criterion 3	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination***		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seals *Halichoerus grypus*	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**	**×p**
Ramsar criterion 8	Disruption to migration									In-combination		
	C	O	D							C	O	D

European site features	Likely Effects of Project One											
River lamprey *Lampetra fluviatilis*	**×q**	**×q**								**×q**	**×q**	
Sea lamprey *Petromyzon marinus*	**×q**	**×q**								**×q**	**×q**	

Evidence supporting conclusions:

a. In relation to the relevant conservation objectives, the extent and distribution of supporting habitats will not be significantly affected, being minimal with the vast majority of habitat loss will be reversible within a short period. As a result, the numbers or distribution of qualifying species will not be affected by habitat loss. It can therefore be concluded no conservation objectives are expected to be compromised by habitat loss, and consequently there will be no adverse effects on the integrity of the Humber Estuary Ramsar as a result of temporary habitat loss during cable installation at the landfall site (**paragraphs 6.3.5 to 6.3.26 of the HRA Report (Doc Ref: APP-171)**). To provide further confidence, mitigation measures have been proposed to reduce habitat loss and increase recovery rates within the *Salicornia* and other annuals colonising mud and sand Annex I habitat and other Annex I habitats following cable installation (**Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

b. Bar-tailed godwits are likely to be present in numbers within the area around the cable landfall site from mid-September to early May. The species was recorded over winter and observed widely across the mudflats near the cable landfall site during low and rising tides. It appears that a low tide roost of up to 800 birds may be present in winter, representing 29% of the cited Humber Estuary Ramsar population, or 13% of the most recent WeBS core count population for the Humber Estuary. Numbers present during each survey did, however, vary considerably despite similar tidal states, suggesting that alternative habitat is available within the estuary if required. In the Firth of Forth, studies have shown that bar-tailed godwits ranged more widely than most other species (Symonds *et al*., 1984), reflecting their flexibility in habitat choice (estuarine mudflats). Although in a worst-case situation a significant number of Ramsar birds may be displaced if within around 100 m from human movements (as predicted from Smit and Visser, 1993), the distribution of individuals within the survey area suggests that birds may require moving only short distances across mudflats, away from where the restricted work area would be, and that a roost site would be maintained in the area.

Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.60 to 6.3.61** and **Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

c. Golden plovers are likely to be found mainly in the vicinity of Horseshoe Point from September to November with peak numbers up to 8,000 individuals on autumn passage representing 26% of the cited and 16% of the current Humber Estuary Ramsar populations respectively. Numbers were however very low for the remainder of the year. The saltmarsh area is likely to form part of a feeding site and high tide roost for the species during autumn passage, with the majority of records being close to land. In a worst-case situation a significant number of roosting or feeding Ramsar birds may be displaced if within 100 m from human movements (as predicted from Smit and Visser, 1993). The species is widely distributed within the Humber Estuary and the population is in favourable conservation status, suggesting that no particular locality is of significant importance within the context of the Humber Estuary Ramsar. Although significantly large numbers were recorded locally, golden plover does not appear to be particularly vulnerable to disturbance and key habitats for this species (i.e. saltmarsh habitats) are not within the area of effect (i.e. approximately 100 m from human movements/cable laying operations). Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the limited effects on preferred habitats for this species and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.62 to 6.3.66 and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

d. Dunlin are likely to be present between September and May, with peaks in October and early April on passage. It is likely that up to 2,000 to 3,000 dunlin (>10% of the Humber Estuary Ramsar population) use the mudflats close to the cable landfall survey area, particularly during autumn passage from late October, as determined from survey results and consultation with NE. Birds were recorded throughout the survey area, although predominantly above mean high water mark on muddy substrates, suggesting that some individuals may be displaced by construction activities. The dunlin is widespread around the Humber at low water, and may form large roosting flocks at high water, although many birds remain along the tideline.

Burton *et al*. (2002a) suggested that construction work may have affected dunlin on a studied estuarine site, while Burton *et al*. (2002b) demonstrated that numbers of dunlin were significantly lower where a footpath was close to a count section, although such an effect was recorded only up to 25 m from the source of disturbance. Cutts and Allen (1999) have recorded variable responses to human disturbance on the Humber, with minimum approach distances to construction activity being between 100 m and 200 m, although in some cases up to 50 m. Birds are then put to flight, with movements downshore or onto adjacent mudflats up to 500 m away, with a gradual return to the area of construction. The widespread availability of potential alternative habitat (i.e. with a maximum of 1.68% of intertidal habitats within the Humber Estuary Ramsar being affected) across the estuary suggests that any birds displaced would likely find suitable sites elsewhere without any significant impacts (particularly as a small species, as per Stillman *et al*., 2005), although the species has declined nationally and locally since the Humber Estuary Ramsar citation date (potentially due to a reduction in suitable habitat). Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.67 to 6.3.70 and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

e. Knot are likely to arrive on site from September, peaking in November and remaining until early April. Surveys at the cable landfall site in 2011/12 recorded a peak count of 3,000 birds in November, which equates to 10% of the cited Humber Estuary Ramsar population, or around 8% of the current Humber Estuary Ramsar population, although NE has advised that up to 10,000 birds may be present. Birds were located widely within the survey area, although some of the largest flocks were to be found well below mean high water mark at low tide. It is therefore possible that large numbers of birds may be affected by construction activities, however the small species is highly mobile between feeding and roosting areas on the Humber, in response to weather conditions, tidal conditions or disturbance (Allen *et al*., 2003). As such, it does not necessarily follow that displacement would result in a reduction in numbers, with alternative habitat undoubtedly available (i.e. with a maximum of 1.68% of intertidal habitats within the Humber Estuary Ramsar being affected) for the period of disturbance. In addition, although a possible high tide roost site may be present in the vicinity of the convergence corridor, similar roost sites were also recorded at a number of other locations within the Horseshoe Point survey area.

Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the available alternative habitat and the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.71 to 6.3.73, and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

f. Redshank are particularly vulnerable to severe weather conditions as they take small prey items in relation to body size, and so must spend longer periods feeding during severe weather (Mitchell *et al*., 2000). Displacement effects may therefore also be particularly acute for the species if feeding time is reduced, especially in bad weather. Results from Smit and Visser (1993) suggest that birds may be displaced up to around 120 m, the furthest of the species studied by the authors. Redshank may be found on site throughout the year though much less frequently during summer. There is a peak on passage in the Humber in September and October, and again in April corresponding with the spring passage of what are presumed to be Icelandic birds. Small numbers of breeding birds may be present on saltmarshes through summer. At Horseshoe Point, numbers did indeed peak during October, but were much smaller on spring passage and throughout summer. Although the species is widespread across the Humber Estuary, they have a preference for muddy river channels and saltmarsh (Allen et al. 2003), with saltmarshes at Tetney and Grainthorpe Haven and Donna Nook providing important roost sites (Cruickshanks *et al*., 2010). Numbers were relatively low in the vicinity of the cable landfall site, as during surveys in 2011/12, a peak flock size of 87 individuals was recorded in October 2011 representing 1.2% of the cited passage Humber Estuary Ramsar population. Although this is a sensitive species, with a declining population in the Ramsar, it appears that, although some birds may be displaced within the vicinity of construction works, the numbers are likely to represent less than 1% of the Humber Estuary Ramsar population. In addition, effects on this species' preferred habitats (e.g. saltmarsh) are not within the area of disturbance effects for this species. Given the temporary nature of the disturbance from cable laying activities, the limited spatial extent of disturbance, the low number of birds expected to be affected and available alternative habitat, as well as the commitment to avoid works within the most sensitive periods of the year (i.e. all works to be undertaken between April and September), it is concluded that there will not be an adverse effect on this feature or its conservation objectives (**paragraphs 6.3.27 to 6.3.59, 6.3.74 to 6.3.78 and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

g. In relation to the relevant conservation objectives the extent, distribution and function of supporting habitats will only be briefly affected in the local area, and will not result in the significant redistribution or reduction of populations occurring within the Humber Estuary Ramsar. As such no conservation objectives are predicted to be compromised as a result of indirect disturbance (i.e. via impacts on prey species), and so the integrity of the Humber Estuary Ramsar will be unaffected. Effects related to reductions in water quality are also not expected to lead to adverse effects on qualifying features with effects predicted to be short-term and areas affected are likely to be very small compared to available alternative habitat and prey items within these habitats. The potential for any discharges associated with construction activities will also be minimised through the implementation of good working and management practices as detailed in the CoCP (**paragraphs 6.3.104 to 6.3.125 and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

h. Habitat loss is predicted to occur as a result of the AMEP development plans, the Tetney to Saltfleet Tidal Flood Defence Scheme, the Phillips 66 Tetney Sea Line Replacement project and Hornsea Project Two, though the proportion of estuarine habitats affected is small in the context of the available habitats within the SAC/Ramsar (i.e. 0.75% of the total estuarine habitat). The majority of this is temporary habitat loss/disturbance, with the affected habitats expected to recover quickly following disturbance. Any long term habitat loss (as a result of the AMEP development) will be mitigated through a habitat creation scheme. In-combination effects on habitat extent are therefore not predicted to result in an adverse effect on ornithological features of the Ramsar (**paragraphs 6.3.128 to 6.3.132 of the HRA Report (Doc Ref: APP-171)**). NE noted in their response to deadline IV dated 22 April 2014 **(Doc Ref: REP-304)** that they still consider the relationship between Project One and Project Two to be unclear. Whilst NE accept that the programming of Project Two is still at an initial stage consideration must still be given to the different potential construction scenarios that may occur.

i. Due to the limited area of effect associated with Hornsea Project One and Project Two and accounting for the anticipated completion dates for the Tetney flood defence project (i.e. at least 2 years before the start of Project One and Two cable installation) and the Phillips 66 Tetney sea line replacement project (due to be completed by 2015) in advance of the start of Project One and Project Two cable installation, adverse effects are not expected for Project One in combination with other projects. A commitment for Project One restricting cable installation activities to avoid the most sensitive period, will also help to ensure that disturbance related adverse effects on populations of the Humber Estuary Ramsar will not occur (**paragraphs 6.3.133 *et seq.* and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

j. In-combination disturbance to prey items is likely to be highly localised with the area affected predicted to be small in the context of the Humber Estuary SAC/Ramsar, with other prey items available during the construction phase in similar habitats both at Horseshoe Point and in the wider Ramsar. In addition, effects are expected to be reversible with recovery time for prey species expected to be fast. As such, no in-combination effects on prey availability are likely to occur. In-combination effects of disturbance or water quality changes for prey species are most likely to occur when construction phases of projects are coincidental. Although the nature and extent of any discharges associated with construction activities are difficult to predict with any accuracy, it is unlikely that individuals from most species will be adversely affected to a level that will significantly affect the populations within the relevant Ramsars, with overall areas affected likely to be very small compared to available alternative habitat, even in-combination with other projects. This is particularly likely to be the case when best practice and mitigation measures are considered for other projects (which are likely to be conditions of consent) which will minimise the risk of any in-combination discharge events and it can be reasonably concluded that no in-combination adverse effects are likely to occur (**paragraphs 6.3.143 to 6.3.144 and Section 6.4: Mitigation Measures and Monitoring, Tables 6.5 and 6.6 of the HRA Report (Doc Ref: APP-171)**).

k. No adverse effect on the integrity of the Humber Estuary Ramsar as a result of cable installation, either alone or in-combination with other plans and projects. A small proportion of the extent of these habitats within the Humber Estuary SAC (0.03%) is predicted to be affected by access arrangements to the intertidal. In-combination effects are predicted to increase this proportion slightly, though the area affected is likely to be small and all habitats will be reinstated following completion of development works (i.e. for Project One and other projects considered in-combination, including future access arrangements at Horseshoe Point). Measures to reduce ground pressures in the vicinity of these habitats are to be considered prior to cable installation in order to aid natural recovery of these habitats. Fencing off of these habitats to prevent further disturbance will also aid recovery and the speed and success of natural regeneration will be also be monitored post cable burial operations. Potential for fuel spillages would be minimised through the use of good working practices (i.e. CoCP). No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.23 to 6.2.26 and 6.2.28 to 6.2.38 of the HRA Report (Doc Ref: APP-171)**).

l. No adverse effect on the integrity of the Humber Estuary Ramsar as a result of cable installation, either alone or in-combination with other plans and projects. A small proportion of the extent of this habitat within the Humber Estuary Ramsar (0.47%) is predicted to be temporarily affected (i.e., temporary habitat loss/disturbance) by cable installation.

All habitats affected are predicted to recover quickly following disturbance, with no long term effects anticipated. Effects on water quality and the hydrodynamic regime of the estuary are also not expected to be adversely affected, with any potential effects (e.g. increased suspended sediment concentrations) likely to be limited both spatially and temporally, with no long term effects on this feature. Similarly, potential water quality effects as a result of fuel spillages would be minimised through the use of good working practices (i.e. the implementation of a Code of Construction Practices, or CoCP). In-combination effects are also not predicted to result in an adverse effect on this habitat feature, with the majority of the in-combination habitat loss being short lived (i.e., temporary habitat loss) and any long term habitat loss (i.e. as a result of the AMEP development) mitigated by the creation of intertidal habitats. No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.1 to 6.211 and 6.2.28 to 6.2.38 of the HRA Report (Doc Ref: APP-171)**).

m. No adverse effect on the integrity of the Humber Estuary Ramsar C as a result of cable installation, either alone or in-combination with other plans and projects. A small proportion of the extent of this habitat within the Humber Estuary Ramsar (1.68%) is predicted to be temporarily affected by installation of Project One export cables. Recovery of this habitat and its associated communities is expected to occur quickly following cable burial, with no long term effects anticipated. Potential water quality effects as a result of fuel spillages would be minimised through the use of good working practices (i.e. the implementation of a Code of Construction Practices). In-combination effects are not predicted to result in an adverse effect on this habitat feature, with the majority of the in-combination habitat loss being short lived (i.e. temporary habitat loss) and any long term habitat loss (i.e. as a result of the AMEP development) mitigated by the creation of intertidal habitats. No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.1 to 6.2.11, 6.2.12 to 6.2.14 and 6.2.28 to 6.2.38 of the HRA Report (Doc Ref: APP-171)**).

n. No adverse effect on the integrity of the Humber Estuary Ramsar as a result of cable installation, either alone or in-combination with other plans and projects. Although a relatively large proportion of the extent of this habitat within the Humber Estuary Ramsar is predicted to be affected by cable installation from Project One (i.e., approximately 7.8%), recovery of this habitat and its component species is expected to be fast, with full recovery expected within 1 year. It is also likely that the baseline used to estimate the area of this habitat within the Ramsar is an underestimate.

Measures will be employed to reduce the area of this habitat affected (i.e. working within the convergence corridor only within this habitat) and also increase the recovery rate of this habitat (i.e. by smoothing of disturbed sediment to encourage seed capture). Pre and post construction monitoring will also be undertaken to assess the success of the mitigation measures employed. Potential for water quality effects as a result of fuel spillages would be minimised through the use of good working practices (i.e. CoCP). In-combination effects on this habitat are expected as a result of cable installation for Hornsea Project Two. This will result in further loss of this habitat, though the area affected by repeat disturbance from Project One and Project Two is likely to be limited to access routes, and recovery rates following cable installation would be expected to be rapid. Although an area of this habitat may be affected in the short term, due to the expected high recovery rates and the measures employed to encourage recolonisation, no adverse effects on this feature are predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraph 6.2.1 to 6.2.11, 6.2.15 to 6.2.17 and 6.2.28 to 6.2.38 of the HRA Report (Doc Ref: APP-171)**).

o. No adverse effect on the integrity of the Humber Estuary Ramsar as a result of cable installation, either alone or in-combination with other plans and projects. Based on the area of saltmarsh habitat mapped at Horseshoe Point in 2011 and assuming all cable laying operations will occur within the convergence route corridor, cable laying during Project One will not result in any loss of this Annex I habitat feature. Indirect effects (e.g. sediment deposition or fuel spillages) on saltmarsh habitats are also not expected to occur as a result of cable installation activities as plume modelling showed that sedimentation would not be expected in these habitats and the potential for fuel spillages would be minimised through the use of good working practices (i.e. CoCP). Adverse effects in combination with other project are also not predicted as only a small proportion of this habitat would be affected (i.e. loss of <0.001 of this habitat within the Ramsar), with none of this loss coming from Project One or Project Two (**paragraphs 6.2.1 to 6.2.11, 6.2.18 to 6.2.22 and 6.2.28 to 6.2.38 of the HRA Report (Doc Ref: APP-171)**).

p. Grey seal: No adverse effect on the integrity of the Humber Estuary SAC and Ramsar site as a result of cable installation or risk of collision between cable laying vessels and grey seal, either alone or in-combination with other plans and projects (**paragraphs 6.2.52 to 6.2.55 and 6.2.60 of the HRA Report (Doc Ref: APP-171)**). Installation of export cables for Project One is not predicted to affect accessibility of the Donna Nook breeding site to adult seals in the Humber Estuary Ramsar site. The offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance) are also not predicted to affect grey seal conservation objectives for the Humber Estuary Ramsar and Ramsar site. The zone of noise disturbance for grey seal does not extend as far as the Donna Nook breeding site, which lies over 100 km from Subzone 1, and accessibility for adult seals to this breeding site is not predicted to be affected. Furthermore, due to grey seal exploiting a range of prey resources and ranging widely to forage, effects will be localised and unlikely to result in a significant effect on prey species. There may also be a potential for the operational offshore wind farm to provide benefits to fish and shellfish may also indirectly benefit grey seal populations. Given the large extent of available alternative foraging habitat outside of areas of disturbance, the highly localised nature of the predicted impacts and intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered, and the small numbers of the Humber Estuary SAC grey seal population affected; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for grey seal at a population level or as a feature of the Humber Estuary Ramsar. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.21 to 7.2.24 and 7.4.1 of the HRA Report (Doc Ref: APP-171)**).

q. No adverse effect on the integrity of the Humber Estuary Ramsar as a result of cable installation, either alone or in-combination with other plans and projects. Installation of export cables for Project One is not predicted to create artificial barriers to lamprey species (i.e. through sediment plume effects during construction or EMF during operation) on migration to spawning grounds in the rivers flowing to the Humber Estuary, including the River Derwent SAC. In-combination effects on migration are also not expected from other projects in the Humber Estuary (e.g. through habitat loss, plume effects or underwater noise disturbance). No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.42 to 6.2.51 and 6.2.57 to 6.2.59 of the HRA Report (Doc Ref: APP-171)**).

r. For disturbance-displacement effects on Ramsar over-wintering waterfowl assemblage, see footnotes **b to f of Stage 2, Matrix 36 and b to k of Stage 2 Matrix 1**. No other assemblage species were predicted to have LSEs due to Project One alone or in-combination with other projects. With prescribed mitigation measures (**paragraphs 6.3.27 to 6.3.59 and 6.3.60 to 6.3.103 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc Ref: APP-171)**) it is concluded that there will not be an adverse effect on this feature or its conservation objectives.

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5.0 APPENDICES

Applicant's screening and integrity matrices demonstrating no LSE for sites that are not contained in the main body of the report.

Applicants Screening Matrices

Table of Contents

Stage 1 Matrix 3: Coquet Island SPA

Name of European site: Coquet Island SPA																					
Distance to Hornsea Project One: 204.3 km at nearest point																					
European site features	**Likely Effects of Project One**																				
Article 4.1 – Breeding Article 4.2 - Assemblage	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Common tern *Sterna hirundo*	**✓a**		**×b**	**✓a**		**×b**	**✓a**		**×b**		**×c**			**×d**			**×e**		**✓o**	**×p**	
Arctic Tern *Sterna paradisaea*											**×f**			**×d**			**×e**			**×p**	
Roseate Tern *Sterna dougallii*											**×g**			**×g**			**×g**			**×p**	
Sandwich Tern *Sterna sandvicensis*											**×h**			**×i**			**×e**			**×p**	
Puffin *Fratercula arctica*											**×j**			**×k**			**×l**			**×p**	
Black-headed Gull *Larus ridibundus*											**×m**			**×n**			**×e**			**×p**	

Evidence supporting conclusions:

a. Potential for LSEs as the species was found roosting on passage near the cable landfall site in numbers that are potentially significant in the context of the two SPA populations (i.e. Coquet Island and Farne Islands SPAs). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.12 of the HRA Report (Doc ref No 12.6)**).

b. No LSE during the decommissioning phase as cables are likely to remain in situ (Ref: **Section 2.5 of the HRA Report (Doc ref No 12.6)**).

c. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

d. No barrier effects on these species have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for these species and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

e. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005) (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

f. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

g. No roseate terns were recorded (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

h. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

i. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006) (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

j. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

k. The SPA is outwith the maximum foraging range for puffin during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

l. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**). HRA screening (see **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected. Outside of the breeding season birds disperse widely.

m. A total of 388 black-headed gulls were recorded. Of those in flight 99.7% were below 22.5 m and therefore at low risk of collision. The distance this SPA is from the proposed development and the low usage of the site indicates low risk of a significant impact (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

n. The SPA is outwith the maximum foraging range for black-headed gull during the breeding season and therefore no regularly barrier effects will occur during the breeding season. Birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in energetic costs during migration (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

o. Plans/projects with potential for LSE on qualifying features in-combination with Project One infrastructure within the Humber Estuary and onshore include: Land at Bishopthorpe Farm Newton Marsh Wind Farm Extension, Phillips 66 Tetney Sea Line Replacement Project, Tetney to Saltfleet Tidal Flood Defence Scheme and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraph 4.4.15 to 4.4.61 of the HRA Report (Doc ref No 12.6)**).

p. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A40**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.*** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 4: Farne Islands SPA

Name of European site: Farne Islands SPA																				
Distance to Hornsea Project One: 235.8 km at nearest point																				
European site features	**Likely Effects of Project One**																			
Article 4.1 – Breeding Article 4.2 - Assemblage	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Common tern *Sterna hirundo*	✓**a**		×**b**	✓**a**		×**b**	✓**a**		×**b**		×**c**			×**d**			×**e**		✓**u**	×**v**	
Arctic Tern *Sterna paradisaea*											×**f**			×**d**			×**e**			×**v**	
Roseate Tern *Sterna dougallii*											×**g**			×**g**			×**g**			×**v**	
Sandwich Tern *Sterna sandvicensis*											×**h**			×**i**			×**e**			×**v**	
Puffin *Fratercula arctica*											×**j**			×**k**			×**l**			×**v**	
Guillemot *Uria aalge*											×**m**			×**k**			×**n**			×**v**	
Article 4.2 - Assemblage	Habitat extent			Disturbance and displacement			Indirect effects			Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern *Sterna paradisaea*											×**f**			×**d**			×**e**			×**v**	
Roseate Tern *Sterna dougallii*											×**g**			×**g**			×**g**			×**v**	
Sandwich Tern *Sterna sandvicensis*											×**h**			×**i**			×**e**			×**v**	
Puffin *Fratercula arctica*											×**j**			×**k**			×**l**			×**v**	
Guillemot *Uria aalge*											×**m**			×**k**			×**n**			×**v**	
Kittiwake *Rissa tridactyla*											×**o**			×**k**			×**e**			×**v**	
Shag *Phalacrocorax aristotelis*											×**p**			×**q**			×**r**			×**v**	
Cormorant *Phalacrocorax carbo*											×**s**			×**t**			×**e**			×**v**	

Evidence supporting conclusions:

a. Potential for LSEs as the species was found roosting on passage near the cable landfall site in numbers that are potentially significant in the context of the two SPA populations (i.e. Coquet Island and Farne Islands SPAs). No LSE for onshore cable route corridor or HVDC converter/HVAC substation as this species was either absent or recorded at very low abundances in these areas (Ref: **Table 4.12 of the HRA Report (Doc ref No 12.6)**).

b. No LSE during the decommissioning phase as cables are likely to remain in situ (Ref: **Section 2.5 of the HRA Report (Doc ref No 12.6)**).

c. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

d. No barrier effects on these species have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for these species and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

e. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005) (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

f. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

g. No roseate terns were recorded (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

h. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

i. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006) (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

j. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

k. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

l. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not (Ref: **Annex A, Table A39**). HRA screening (see **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected. Outside of the breeding season birds disperse widely.

m. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate) (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**.

n. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006) (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**). HRA screening (see **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

o. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**). HRA screening (see **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

p. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

q. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

r. There are a no records of shags using the area and therefore no displacement impacts are predicted (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

s. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

t. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration (Ref: **Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**).

u. Plans/projects with potential for LSE on qualifying features in-combination with Project One infrastructure within the Humber Estuary and onshore include: Land at Bishopthorpe Farm Newton Marsh Wind Farm Extension, Phillips 66 Tetney Sea Line Replacement Project, Tetney to Saltfleet Tidal Flood Defence Scheme and Able Marine Energy Park (AMEP) (see HRA **Table 4.13 and paragraphs 4.4.15 to 4.4.61 of the HRA Report (Doc ref No 12.6)**).

v. In-combination LSE informed by the footnotes above for the individual receptors as presented **in Annex A, Table A39 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.*** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 5: Hermaness Saxa Vord & Valla Field SPA

Name of European site: Hermaness Saxa Vord & Valla Field SPA												
Distance to Hornsea Project One: 771.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver		**×a**			**×b**			**×c**			**×z**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Gannet		**×d**			**×e**			**×f**			**×z**	
Great skua		**×g**			**×h**			**×i**			**×z**	
Puffin		**×j**			**×k**			**×l**			**×z**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×m**			**×n**			**×o**			**×z**	
Kittiwake		**×p**			**×q**			**×r**			**×z**	
Shag		**×s**			**×t**			**×u**			**×z**	
Fulmar		**×v**			**×w**			**×y**			**×z**	
Gannet		**×d**			**×e**			**×f**			**×z**	
Great skua		**×g**			**×h**			**×i**			**×z**	
Puffin		**×j**			**×k**			**×l**			**×z**	

Evidence supporting conclusions (Ref: Table A1 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Collision: Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. The SPA is outwith the mean maximum foraging range for red-throated diver during the breeding season. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. Barrier: Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

c. Displacement: Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

d. Collision: A total of 13,034 gannets were recorded; with peak numbers between August and November. Of those recorded in flight the large majority were below rotor height and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season. Therefore birds at this site will not likely regularly occur in the area. Outwith the breeding season gannets from this SPA may disperse widely.

e. Barrier: The SPA is outwith the mean maximum foraging range and the maximum range for gannet during the breeding season and therefore barrier effects will not occur during the breeding season. Outwith the breeding season gannets are highly pelagic and the incremental increases in flight caused by the barrier effect will be insignificant.

f. Displacement: There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere.

g. Collision: A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates no one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

h. Barrier: There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

i. Displacement: Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

j. Collision: A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

k. Barrier: The SPA is outwith the maximum foraging range for puffin during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

l. Displacement: There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. However, from Annex B, the size of the colony and distance from Project One indicates that impacts will not be significant.

m. Collision: 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

n. Barrier: The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

o. Displacement: Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al..* 2006). However a likely significant effect for this site was ruled out in **Annex B** of the HRA Report (Doc ref No 12.6).

p. Collision: A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments might increase the risk of a significant impact. However a likely significant effect for this site was ruled out in **Annex B of the HRA Report (Doc ref No 12.6)**.

q. Barrier: The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regular barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

r. Displacement: Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (e.g. Petersen *et al..* 2006).

s. Collision: The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

t. Barrier: There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

u. Displacement: There are a no records of shags using the area and therefore no displacement impacts are predicted.

v. Collision: A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

w. Barrier: The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

y. Displacement: There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

z. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A1 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.*** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)**for Barrier Effects**.**

Stage 1 Matrix 6: Fetlar SPA

Name of European site: Fetlar SPA												
Distance to Hornsea Project One: 755.1 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×r**	
Red-necked Phalarope		**×d**			**×d**			**×d**			**×r**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin		**×e**			**×f**			**×g**			**×r**	
Great Skua		**×h**			**×i**			**×j**			**×r**	
Whimbrel		**×k**			**×f**			**×g**			**×r**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Skua		**×l**			**×m**			**×n**			**×r**	
Fulmar		**×o**			**×p**			**×q**			**×r**	
Great Skua		**×j**			**×k**			**×l**			**×r**	
Arctic Tern		**×a**			**×b**			**×c**			**×r**	
Red-necked Phalarope		**×d**			**×d**			**×d**			**×r**	

Evidence supporting conclusions (see Table A2 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005**).**

d. No red-necked phalaropes were recorded.

e. A total of 23 dunlin were recorded in the Hornsea Project One area. All were flying below 22.5 m and therefore not at risk of collision.

f. These species may migrate around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to overall distance flown during migration.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

i. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

j. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

k. Eleven out of a total of 49 whimbrel recorded were in the Hornsea Project One. 55.1% of all whimbrel recorded were flying above 22.5 m and therefore at potential risk of collision. However, the number of whimbrel recorded in the development zone was low and therefore at low risk of a significant effect.

l. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

m. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.* 2006).

n. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

o. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

p. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

q. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

r. In-combination LSE informed by the footnotes above for the individual receptors as presented **in Annex A, Table A2 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.*** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 7: Ronas Hill – North Roe and Tingon SPA

Name of European site: Ronas Hill – North Roe and Tingon SPA												
Distance to Hornsea Project One: 751.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Great Skua		**×a**			**×b**			**×c**			**×h**	
Merlin		**×d**			**×d**			**×d**			**×h**	
Red-throated diver		**×e**			**×f**			**×g**			**×h**	

Evidence supporting conclusions (see Table A3 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

b. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

c. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

d. No merlins were recorded.

e. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. The SPA is outwith the mean maximum foraging range for red-throated diver during the breeding season. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

f. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

g. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented **in Annex A, Table A3 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)**for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)**for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)**for Barrier Effects.

Stage 1 Matrix 8: Ronas Hill – North Roe and Tingon Ramsar

Name of European site: Ronas Hill – North Roe and Tingon Ramsar												
Distance to Hornsea Project One: 751.8 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 1												
Site supports outstanding examples of blanket bog with extensive pool systems, deep peat with some of the best preserved active blanket bog in Shetland. and many oligotrophic lochs and dystrophic lochans and has an unusual formation of peat moulds; see footnote **a**.												
Ramsar criterion 2	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Common seal *Phoca vitulina*	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Otter *Lutra lutra;* see footnote **a**.												
Arctic water flea *Eurycercus glacialis;* see footnote **a**.												

Evidence supporting conclusions:

a. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 751.8 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

b. **Harbour seal:** As this site is located 751.8 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on this feature and consequently this site (Section 4.3 and Section 4.5 **of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 9: Papa Stour SPA

Name of European site: Papa Stour SPA												
Distance to Hornsea Project One: 736.6 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×g**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover		**×d**			**×e**			**×f**			**×g**	

Evidence supporting conclusions (Ref: Table A4 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

e. Migrating ringed plover may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

f. No ringed plover were recorded using the development area and no displacement effects are predicted.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A4 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 10: Noss SPA

Name of European site: Noss SPA												
Distance to Hornsea Project One: 702.5 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gannet		**×a**			**×b**			**×c**			**×s**	
Great Skua		**×d**			**×e**			**×f**			**×s**	
Guillemot		**×g**			**×h**			**×i**			**×s**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gannet		**×a**			**×b**			**×c**			**×s**	
Great Skua		**×d**			**×e**			**×f**			**×s**	
Guillemot		**×g**			**×h**			**×i**			**×s**	
Puffin		**×j**			**×k**			**×l**			**×s**	
Kittiwake		**×m**			**×n**			**×o**			**×s**	
Fulmar		**×p**			**×q**			**×r**			**×s**	

Evidence supporting conclusions (Ref: Table A5 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 13,034 gannets were recorded; with peak numbers between August and November. Of those recorded in flight the large majority were below rotor height and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore birds at this site may occur in the area but at a low risk of being impacted. Outwith the breeding season gannets from this SPA may disperse widely.

b. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect does occur, be a small incremental increase in overall distance flown by this highly pelagic species.

c. There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere.

d. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

e. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

f. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

g. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

h. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

i. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

j. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

k. The SPA is outwith the maximum foraging range for puffin during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

l. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

m. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (see HRA, **Annex A and B**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

n. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

o. Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (Zucco *et al.* 2006).

p. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

q. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

r. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species. Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

s. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A5 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 11: Foula SPA

Name of European site: Foula SPA												
Distance to Hornsea Project One: 712.7 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×dd**	
Leach's Storm-petrel		**×d**			**×e**			**×f**			**×dd**	
Red-throated Diver		**×g**			**×h**			**×i**			**×dd**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Great Skua		**×aa**			**×ab**			**×ac**			**×dd**	
Guillemot		**×j**			**×k**			**×l**			**×dd**	
Puffin		**×m**			**×k**			**×n**			**×dd**	
Shag		**×o**			**×p**			**×q**			**×dd**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Leach's Storm-petrel		**×d**			**×e**			**×f**			**×dd**	
Razorbill		**×r**			**×k**			**×s**			**×dd**	
Kittiwake		**×t**			**×k**			**×c**			**×dd**	
Arctic Skua		**×u**			**×v**			**×w**			**×dd**	
Fulmar		**×x**			**×y**			**×z**			**×dd**	
Puffin		**×m**			**×k**			**×o**			**×dd**	
Guillemot		**×j**			**×k**			**×l**			**×dd**	
Great Skua		**×aa**			**×bb**			**×cc**			**×dd**	
Shag		**×p**			**×q**			**×r**			**×dd**	
Arctic Tern		**×a**			**×b**			**×c**			**×dd**	

Evidence supporting conclusions (Ref: Table A6 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Leach's petrel is a scarce to rare migrant off the Yorkshire coast (Thomas 2011). Two Leach's petrels were recorded in Year 1 and three in Year 2. All were recorded flying below 2.5 m and therefore not at risk of collision.

e. There is no evidence of whether or not Leach's petrels fly around offshore wind farms. However, the incremental increase in distance required should they do so is negligible compared to the distances this highly pelagic species flies to and from breeding or wintering grounds.

f. There is no evidence of whether a displacement effect may occur or not. However, the total area avoided should they be displaced compared to the potential total foraging area is very small and there is no evidence, based on the low number of observations, that the area is a favoured foraging location for this species.

g. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. The SPA is outwith the mean maximum foraging range for red-throated diver during the breeding season. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

h. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

i. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts are likely to be negligible.

j. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

k. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

l. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

m. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

n. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

o. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

p. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

q. There are a no records of shags using the area and therefore no displacement impacts are predicted.

r. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

s. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

t. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

u. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

v. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.*, 2006).

w. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

x. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

y. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

z. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

aa. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

bb. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

cc. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

dd. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A6 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 12: Mousa SPA

Name of European site: Mousa SPA												
Distance to Hornsea Project One: 697.6 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	C	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×g**	
Storm Petrel		**×d**			**×e**			**×f**			**×g**	

Evidence supporting conclusions (Ref: Table A7 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Storm petrels are an uncommon to scarce migrant off the Yorkshire coast (Thomas 2011). A total of 29 storm petrels were recorded across both years and all were recorded flying below 2.5 m and therefore not at risk of collision.

e. There's no evidence of whether or not storm petrels fly around offshore wind farms. However, the incremental increase in distance required should they do so is negligible compared to the distances this highly pelagic species flies to and from breeding or wintering grounds.

f. There's no evidence of whether a displacement effect may occur or not. However, the total area avoided should they be displaced compared to the potential total foraging area is very small and there is no evidence based on the low number of observations that the area is a favoured foraging location for this species.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A7 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 13: Sumburgh Head SPA

Name of European site: Sumburgh Head SPA												
Distance to Hornsea Project One: 679.2 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×l**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×d**			**×e**			**×f**			**×l**	
Kittiwake		**×g**			**×h**			**×c**			**×l**	
Fulmar		**×i**			**×j**			**×k**			**×l**	
Arctic Tern		**×a**			**×b**			**×c**			**×l**	

Evidence supporting conclusions (Ref: Table A8 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

e. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

g. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

i. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

j. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

k. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

l. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A8 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 14: Fair Isle SPA

Name of European site: Fair Isle SPA												
Distance to Hornsea Project One: 645.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×bb**	
Fair Isle Wren		**×d**			**×d**			**×d**			**×bb**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×e**			**×f**			**×g**			**×bb**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Puffin		**×h**			**×f**			**×i**			**×bb**	
Razorbill		**×j**			**×f**			**×k**			**×bb**	
Kittiwake		**×l**			**×f**			**×c**			**×bb**	
Great Skua		**×m**			**×n**			**×o**			**×bb**	
Arctic Skua		**×p**			**×q**			**×r**			**×bb**	
Shag		**×s**			**×t**			**×u**			**×bb**	
Gannet		**×v**			**×w**			**×x**			**×bb**	
Fulmar		**×y**			**×z**			**×aa**			**×bb**	
Guillemot		**×e**			**×f**			**×g**			**×bb**	
Arctic Tern		**×a**			**×b**			**×c**			**×bb**	

Evidence supporting conclusions (Ref: Table A9 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Four wrens were recorded.

e. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

f. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

g. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (see HRA, **Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

i. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

j. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

k. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

l. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

m. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

n. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

o. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

p. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

q. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.* 2006).

r. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

s. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

t. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

u. There are a no records of shags using the area and therefore no displacement impacts are predicted.

v. A total of 13,034 gannets were recorded; with peak numbers between August and November. Of those recorded in flight the large majority were below rotor height and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore birds at this site may occur in the area but at a low risk of being impacted. Outwith the breeding season gannets from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

w. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect does occur, be a small incremental increase in overall distance flown by this highly pelagic species.

x. There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere.

y. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

z. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

aa. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

bb. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A9 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 15: Papa Westray SPA

Name of European site: Papa Westray SPA												
Distance to Hornsea Project One: 654 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×g**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Skua		**×d**			**×e**			**×f**			**×g**	

Evidence supporting conclusions (Ref: Table A10 of Annex A of the HRA Report (Doc ref No 12.6)).

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

e. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.* 2006).

f. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A10 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects.

Stage 1 Matrix 16: East Sanday Coast SPA

Name of European site: East Sanday Coast SPA												
Distance to Hornsea Project One: 640.3 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed godwit		**×a**			**×b**			**×c**			**×h**	
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Turnstone		**×d**			**×e**			**×f**			**×h**	
Purple Sandpiper		**×g**			**×g**			**×g**			**×h**	

Evidence supporting conclusions (Ref: Table A11 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating bar-tailed godwit may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

c. No bar-tailed godwit were recorded using the development area and no displacement effects are predicted.

d. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

e. Migrating turnstone may fly around the wind farm but the incremental increase in flight distance to or from the SPA is likely to be negligible.

f. No turnstones were recorded using the development area and no displacement effects are predicted.

g. Only one purple sandpiper was recorded during two years of surveys.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A11 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects**.**

Stage 1 Matrix 17: East Sanday Coast Ramsar

Name of European site: East Sanday Coast Ramsar												
Distance to Hornsea Project One: 640.3 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Turnstone		**×a**			**×b**			**×c**			**×e**	
Purple Sandpiper		**×d**			**×d**			**×d**			**×e**	

Evidence supporting conclusions (Ref: Table A11 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

b. Migrating turnstone may fly around the wind farm but the incremental increase in flight distance to or from the Ramsar is likely to be negligible.

c. No turnstones were recorded using the development area and no displacement effects are predicted.

d. Only one purple sandpiper was recorded during two years of surveys.

e. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A11 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.* of the HRA Report (Doc ref No 12.6)** for Barrier Effects**.**

Stage 1 Matrix 18: West Westray SPA

Name of European site: West Westray SPA													
Distance to Hornsea Project One: 646.7 km													
European site features	**Likely Effects of Project One**												
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination			
	C	O	D	C	O	D	C	O	D	C	O	D	
Arctic Tern		**×a**			**×b**			**×c**			**×p**		
Article 4.2 Migratory Species	Collision			Barrier			Displacement			In-combination			
	C	O	D	C	O	D	C	O	D	C	O	D	
Guillemot		**×d**			**×e**			**×f**			**×p**		
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination			
	C	O	D	C	O	D	C	O	D	C	O	D	
Razorbill		**×g**			**×e**			**×h**			**×p**		
Kittiwake		**×i**			**×e**			**×c**			**×p**		
Arctic Skua		**×j**			**×k**			**×l**			**×p**		
Fulmar		**×m**			**×n**			**×o**			**×p**		
Guillemot		**×d**			**×e**			**×f**			**×p**		
Arctic Tern		**×a**			**×b**			**×c**			**×p**		

Evidence supporting conclusions (Ref: Table A12 of Annex A of the HRA Report (Doc ref No 12.6)).

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

e. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). There is therefore the potential for a likely significant effect outwith the breeding season.

g. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

h. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

i. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

j. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

k. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.* 2006).

l. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

m. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

n. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

o. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

p. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A12 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 19: Marwick Head SPA

Name of European site: Marwick Head SPA												
Distance to Hornsea Project One: 634.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×a**			**×b**			**×c**			**×g**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×a**			**×b**			**×c**			**×g**	
Kittiwake		**×d**			**×e**			**×f**			**×g**	

Evidence supporting conclusions (Ref: Table A13 of Annex A of the HRA Report (Doc ref No 12.6)).

a. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

b. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

e. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (Zucco *et al.* 2006).

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A13 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects**.**

Stage 1 Matrix 20: Calf of Eday SPA

Name of European site: Calf of Eday SPA												
Distance to Hornsea Project One: 643.7 km												
European site features	**Likely Effects of Project One**											
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×a**			**×b**			**×c**			**×p**	
Kittiwake		**×d**			**×e**			**×f**			**×p**	
Great black-backed gull		**×g**			**×h**			**×i**			**×p**	
Cormorant		**×j**			**×k**			**×l**			**×p**	
Fulmar		**×m**			**×n**			**×o**			**×p**	

Evidence supporting conclusions (Ref: Table A14 of Annex A of the HRA Report (Doc ref No 12.6)).

a. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

b. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. There is therefore the potential for a likely significant effect outwith the breeding season. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

e. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (Zucco *et al.* 2006).

g. A total of 4,906 great black-backed gulls were recorded in in flight; with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris 1962) and will therefore unlikely to occur in the Hornsea Project One.

h. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

i. Evidence from constructed offshore wind farms indicate that great black-backed gulls are not displaced by wind farms (Petersen *et al.* 2006).

j. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

k. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

l. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

m. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

n. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

o. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

p. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A14 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 21: Rousay SPA

Name of European site: Rousay SPA												
Distance to Hornsea Project One: 635.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×n**	
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot		**×d**			**×e**			**×f**			**×n**	
Kittiwake		**×g**			**×e**			**×c**			**×n**	
Arctic Skua		**×h**			**×i**			**×j**			**×n**	
Fulmar		**×k**			**×l**			**×m**			**×n**	
Arctic Tern		**×a**			**×b**			**×c**			**×n**	

Evidence supporting conclusions (Ref: Table A15 of Annex A of the HRA Report (Doc ref No 12.6)).

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

e. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). There is therefore the potential for a likely significant effect outwith the breeding season. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

g. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

i. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.* 2006).

j. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

k. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

l. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

m. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

n. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A15 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq*. of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq*.** for Displacement Effects and **paragraphs 4.3.229 *et seq*.** for Barrier Effects.

Stage 1 Matrix 22: Auskerry SPA

Name of European site: Auskerry SPA												
Distance to Hornsea Project One: 235.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding birds	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern		**×a**			**×b**			**×c**			**×g**	
Storm Petrel		**×d**			**×e**			**×f**			**×g**	

Evidence supporting conclusions (Ref: Table A16 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Storm petrels are an uncommon to scarce migrant off the Yorkshire coast (Thomas 2011). A total of 29 storm petrels were recorded across both years and all were recorded flying below 2.5 m and therefore not at risk of collision.

e. There's no evidence of whether or not storm petrels fly around offshore wind farms. However, the incremental increase in distance required should they do so is negligible compared to the distances this highly pelagic species flies to and from breeding or wintering grounds.

f. There's no evidence of whether a displacement effect may occur or not. However, the total area avoided should they be displaced compared to the potential total foraging area is very small and there is no evidence based on the low number of observations that the area is a favoured foraging location for this species.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A16 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 23: Orkney Mainland Moors SPA

Name of European site: Orkney Mainland Moors SPA												
Distance to Hornsea Project One: 614.6 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Hen Harrier *Circus cyaneus*		**×a**			**×a**			**×a**			**×h**	
Red-throated Diver *Gavia stellata*		**×b**			**×c**			**×d**			**×h**	
Short-eared Owl *Asio flammeus*		**×e**			**×f**			**×g**			**×h**	
Article 4.1 Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Hen Harrier *Circus cyaneus*		**×a**			**×a**			**×a**			**×h**	

Evidence supporting conclusions (Ref: Table A17 of Annex A of the HRA Report (Doc ref No 12.6)):

a. No hen harriers were recorded.

b. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. The SPA is outwith the mean maximum foraging range for red-throated diver during the breeding season. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height **(e.g. LAL 2006).**

c. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

d. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

e. Only two short-eared owls were recorded in the Hornsea Project One area in September and November of Year 1. One was flying at rotor height. The very low numbers recorded indicate that there is negligible risk of an effect.

f. Migrating short-eared owls may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

g. No short-eared owls were recorded using the development area and no displacement effects are predicted.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A17 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 24: Copinsay SPA

Name of European site: Copinsay SPA												
Distance to Hornsea Project One: 614.3 km												
European site features	**Likely Effects of Project One**											
Article 4.2 Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot *Uria aalge*		**×a**			**×b**			**×c**			**×j**	
Kittiwake *Rissa tridactyla*		**×d**			**×b**			**×e**			**×j**	
Great Black-backed Gull *Larus marinus*		**×f**			**×b**			**×e**			**×j**	
Fulmar *Fulmarus glacialis*		**×g**			**×h**			**×i**			**×j**	

Evidence supporting conclusions (Ref: Table A18 of Annex A of the HRA Report (Doc ref No 12.6)):

a. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

b. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (see HRA, **Annex A and B**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (see HRA, **Annex A and B**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

e. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (Zucco *et al.*, 2006; Petersen *et al.* 2006).

f. A total of 3,151 great black-backed gulls were recorded in Year 1 with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris, 1962) and will therefore unlikely to occur in the Hornsea Project One.

g. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

h. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

i. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

j. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A18 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 25: Hoy SPA

Name of European site: Hoy SPA												
Distance to Hornsea Project One: 600.4 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Peregrine *Falco peregrinus*		**×a**			**×a**			**×a**			**×w**	
Red-throated Diver *Gavia stellata*		**×b**			**×c**			**×d**			**×w**	
Article 4.2 – Migratory Species (br)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Great Skua *Catharacta skua*		**×e**			**×f**			**×g**			**×w**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Puffin *Fratercula arctica*		**×h**			**×i**			**×j**			**×w**	
Guillemot *Uria aalge*		**×k**			**×l**			**×m**			**×w**	
Kittiwake *Rissa tridactyla*		**×n**			**×l**			**×o**			**×w**	
Great Black-backed Gull *Larus marinus*		**×p**			**×l**			**×p**			**×w**	
Arctic Skua *Stercorarius parasiticus*		**×q**			**×r**			**×s**			**×w**	
Fulmar *Fulmarus glacialis*		**×t**			**×u**			**×v**			**×w**	
Great Skua *Catharacta skua*		**×e**			**×f**			**×g**			**×w**	

Evidence supporting conclusions (Ref: Table A19 of Annex A of the HRA Report (Doc ref No 12.6)):

a. No peregrines were recorded.

b. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. The SPA is outwith the mean maximum foraging range for red-throated diver during the breeding season. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

c. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

d. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

e. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

f. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

g. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

h. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

i. The SPA is outwith the maximum foraging range for puffin during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

j. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

k. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

l. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

n. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

o. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (Zucco *et al.* 2006; Petersen *et al.* 2006).

p. A total of 3,151 great black-backed gulls were recorded in Year 1 with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris, 1962) and are therefore unlikely to occur in the Hornsea Project One.

q. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

r. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.*, 2006).

s. Arctic skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

t. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

u. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

v. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

w. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A19 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 26: Pentland Firth Islands SPA

Name of European site: Pentland Firth Islands SPA												
Distance to Hornsea Project One: 584.7 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern *Sterna paradisaea*		**×a**			**×b**			**×c**			**×d**	

Evidence supporting conclusions (Ref: Table A20 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.,* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.,* 2006, Pettersson, 2005).

d. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A20 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq*. of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq*.** for Displacement Effects and **paragraphs 4.3.229 *et seq*.** for Barrier Effects.

Stage 1 Matrix 27: North Caithness Cliffs SPA

Name of European site: North Caithness Cliffs SPA												
Distance to Hornsea Project One: 574.1 km												
European site features	**Likely Effects of Project One**											
Article 4.1 Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Peregrine *Falco peregrinus*		**×a**			**×a**			**×a**			**×q**	
Article 4.2 – Migratory Species (breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot *Uria aalge*		**×b**			**×c**			**×d**			**×q**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Puffin *Fratercula arctica*		**×e**			**×f**			**×g**			**×q**	
Fulmar *Fulmarus glacialis*		**×h**			**×i**			**×j**			**×q**	
Razorbill *Alca torda*		**×k**			**×l**			**×m**			**×q**	
Guillemot *Uria aalge*		**×b**			**×c**			**×d**			**×q**	
Kittiwake *Rissa tridactyla*		**×n**			**×o**			**×p**			**×q**	

Evidence supporting conclusions (Ref: Table A21 of Annex A of the HRA Report (Doc ref No 12.6)):

a. No peregrines were recorded.

b. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

c. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

d. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.*, 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

e. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

f. The SPA is outwith the maximum foraging range for puffin during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

g. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

i. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

j. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

k. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

l. The SPA is beyond the mean maximum foraging range for razorbill during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.,* 2006; Petersen *et al.*, 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

n. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5 m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

o. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

p. Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (Zucco *et al.*, 2006).

q. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A21 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq*. of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq*.** for Displacement Effects and **paragraphs 4.3.229 *et seq*.** for Barrier Effects.

Stage 1 Matrix 28: East Caithness Cliffs SPA

Name of European site: East Caithness Cliffs SPA

Distance to Hornsea Project One: 540 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Peregrine *Falco peregrinus*		**×a**			**×a**			**×a**			**×v**	
Article 4.2 – Migratory Species (breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot *Uria aalge*		**×b**			**×c**			**×d**			**×v**	
Herring Gull *Larus argentatus*		**×e**			**×c**			**×f**			**×v**	
Kittiwake *Rissa tridactyla*		**×g**			**×c**			**×f**			**×v**	
Razorbill *Alca torda*		**×h**			**×c**			**×m**			**×v**	
Shag *Phalacrocorax aristotelis*		**×n**			**×o**			**×p**			**×v**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Puffin *Fratercula arctica*		**×n**			**×c**			**×o**			**×v**	
Great Black-backed Gull *Larus marinus*		**×m**			**×c**			**×f**			**×v**	
Cormorant *Phalacrocorax carbo*		**×s**			**×t**			**×u**			**×v**	
Fulmar *Fulmarus glacialis*		**×p**			**×q**			**×r**			**×v**	
Razorbill *Alca torda*		**×h**			**×c**			**×i**			**×v**	
Guillemot *Uria aalge*		**×b**			**×c**			**×d**			**×v**	
Kittiwake *Rissa tridactyla*		**×g**			**×c**			**×f**			**×v**	
Herring Gull *Larus argentatus*		**×e**			**×c**			**×f**			**×v**	
Shag *Phalacrocorax aristotelis*		**×j**			**×k**			**×l**			**×v**	

Evidence supporting conclusions (Ref: Table A22 of Annex A of the HRA Report (Doc ref No 12.6)):

a. No peregrines were recorded.

b. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

c. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

d. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

e. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

f. Evidence from constructed offshore wind farms indicate that these species are not displaced by wind farms (Petersen *et al*., 2006).

g. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

i. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.,* 2006; Petersen *et al.*, 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

j. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g., npower, 2006). Therefore there is a low risk of collision.

k. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

l. There are a no records of shags using the area and therefore no displacement impacts are predicted.

m. A total of 3,151 great black-backed gulls were recorded in Year 1 with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris, 1962) and are therefore unlikely to occur in the Hornsea Project One.

n. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

o. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

p. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

q. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

r. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

s. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g., npower, 2005). Consequently, the risk of an impact is low.

t. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.*, 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

u. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.,* 2006).

v. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A22 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** or Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 29: Dornoch Firth & Loch Fleet SPA

Name of European site: Dornoch Firth & Loch Fleet SPA												
Distance to Hornsea Project One: 517.4 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Osprey *Pandion haliaetus*		**×a**			**×a**			**×a**			**×n**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×b**			**×c**			**×d**			**×n**	
Article 4.2 – Migratory Species (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose		**×e**			**×f**			**×d**			**×n**	
Wigeon *Anas penelope*		**×k**			**×l**			**×m**			**×n**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Curlew *Numenius arquata*		**×g**			**×c**			**×d**			**×n**	
Dunlin *Calidris alpina alpina*		**×h**			**×c**			**×d**			**×n**	
Oystercatcher *Haematopus ostralegus*		**×i**			**×c**			**×d**			**×n**	
Teal *Anas crecca*		**×j**			**×c**			**×d**			**×n**	
Wigeon *Anas penelope*		**×k**			**×l**			**×m**			**×n**	
Greylag Goose *Anser anser*		**×e**			**×f**			**×d**			**×n**	
Bar-tailed Godwit *Limosa lapponica*		**×b**			**×c**			**×d**			**×n**	

Evidence supporting conclusions (Ref: Table A23 of Annex A of the HRA Report (Doc ref No 12.6)):

a. No ospreys were recorded.

b. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

c. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds

g. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

h. A total of 23 dunlin were recorded in the Hornsea Project One area. All were flying below 22.5 m and therefore not at risk of collision.

i. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

j. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

k. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

l. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

m. All wigeon were recorded in flight and none were seen using the Hornsea Project One. Therefore no displacement effects will occur.

n. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A23 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 30: Dornoch Firth Ramsar

Name of European site: Dornoch Firth Ramsar												
Distance to Hornsea Project One: 517.4 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×i**	
Greylag Goose		**×d**			**×e**			**×c**			**×i**	
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Wigeon *Anas penelope*		**×f**			**×g**			**×h**			**×i**	
Ramsar criterion 1												
Wetland features (*Alnus glutinosa,* Morrich More, low-level sandy plain); see footnote **j**.												
Ramsar criterion 2												
Nationally-scarce aquatic plants and British Red Data Book invertebrates; see footnote **j**.												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	O	D	C	C	O	D	C
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×k**			**×l**			**×m**			**×i**	

Evidence supporting conclusions (Ref: Table A23 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

e. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

f. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

g. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

h. All wigeon were recorded in flight and none were seen using the Hornsea Project One. Therefore no displacement effects will occur.

i. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A23 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

j. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 517.4 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

k. Low numbers of assemblage species were recorded (see Matrix 29) and with the majority of wader and duck flights below rotor height, the high avoidance rate of goose species and the distance to Project One, the risk of a significant impact is very low.

l. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

m. No assemblage species were recorded utilising the development area (Matrix 29) and no displacement effects are predicted.

Stage 1 Matrix 31: Cromarty Firth SPA

Name of European site: Cromarty Firth SPA												
Distance to Hornsea Project One: 507.1 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common Tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×q**	
Osprey *Pandion haliaetus*		**×d**			**×d**			**×d**			**×q**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×q**	
Whooper Swan *Cygnus cygnus*		**×d**			**×d**			**×d**			**×q**	
Article 4.2 – Migratory Species (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose		**×i**			**×j**			**×g**			**×q**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×k**			**×k**			**×k**			**×q**	
Curlew *Numenius arquata*		**×l**			**×f**			**×g**			**×q**	
Dunlin *Calidris alpina alpina*		**×m**			**×f**			**×g**			**×q**	
Knot *Calidris canutus*		**×n**			**×f**			**×g**			**×q**	
Oystercatcher *Haematopus ostralegus*		**×o**			**×f**			**×g**			**×q**	
Red-breasted Merganser *Mergus serrator*		**×p**			**×z**			**×z**			**×q**	
Scaup *Aythya marila*		**×d**			**×d**			**×d**			**×q**	
Pintail *Anas acuta*		**×d**			**×d**			**×d**			**×q**	
Wigeon *Anas penelope*		**×d**			**×d**			**×d**			**×q**	
Greylag Goose *Anser anser*		**×i**			**×j**			**×g**			**×q**	
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×q**	
Whooper Swan *Cygnus cygnus*		**×d**			**×d**			**×d**			**×q**	

Evidence supporting conclusions (Ref: Table A24 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.,* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.,* 2006, Pettersson, 2005).

d. These species were not recorded during surveys.

e. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. No whooper swans were recorded.

i. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

j. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

k. Only seven redshank were recorded during two years of surveys.

l. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

m. A total of 23 dunlin were recorded in the Hornsea Project One area. All were flying below 22.5 m and therefore not at risk of collision.

n. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

o. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

p. Only two red-breasted merganser were recorded during two years of surveys.

q. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A24 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 32: Cromarty Firth Ramsar

Name of European site: Cromarty Firth Ramsar												
Distance to Hornsea Project One: 507.1 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×f**	
Greylag Goose		**×d**			**×e**			**×c**			**×f**	
Ramsar criterion 1												
Intertidal flats with eelgrass *Zostera* spp. beds; see footnote **g**.												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×h**			**×i**			**×j**			**×f**	

Evidence supporting conclusions (Ref: Table A24 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

e. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

f. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A24 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

g. This habitat has been screened out for this Ramsar site as it is 507.1 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site

h. Low numbers of assemblage species were recorded (see Matrix 31) and with the majority of wader and duck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

i. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

j. No assemblage species were recorded utilising the development area (Matrix 31) and no displacement effects are predicted.

Stage 1 Matrix 33: Inner Moray Firth SPA

Name of European site: Inner Moray Firth SPA

Distance to Hornsea Project One: 495.1 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common Tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×v**	
Osprey *Pandion haliaetus*		**×d**			**×d**			**×d**			**×v**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×v**	
Article 4.2 – Migratory Species (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose *Anser anser*		**×h**			**×i**			**×g**			**×v**	
Red-breasted Merganser *Mergus serrator*		**×j**			**×j**			**×j**			**×v**	
Redshank *Tringa totanus*		**×k**			**×k**			**×k**			**×v**	
Scaup *Aythya marila*		**×d**			**×d**			**×d**			**×v**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Scaup *Aythya marila*		**×d**			**×d**			**×d**			**×v**	
Curlew *Numenius arquata*		**×l**			**×f**			**×g**			**×v**	
Oystercatcher *Haematopus ostralegus*		**×m**			**×f**			**×g**			**×v**	
Goosander *Mergus merganser*		**×n**			**×t**			**×t**			**×v**	
Goldeneye *Bucephala clangula*		**×o**			**×u**			**×u**			**×v**	
Teal *Anas crecca*		**×p**			**×f**			**×g**			**×v**	
Wigeon *Anas penelope*		**×q**			**×r**			**×g**			**×v**	
Cormorant *Phalacrocorax carbo*		**×s**			**×t**			**×u**			**×v**	
Redshank *Tringa totanus*		**×l**			**×l**			**×l**			**×v**	
Red-breasted Merganser *Mergus serrator*		**×k**			**×k**			**×k**			**×v**	
Greylag Goose *Anser anser*		**×h**			**×i**			**×g**			**×v**	
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×v**	

Evidence supporting conclusions (Ref: Table A25 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g., Zucco *et al.,* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g., Zucco *et al.,* 2006, Pettersson, 2005).

d. These species were not recorded during Project One surveys.

e. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

i. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

j. Only two red-breasted merganser were recorded during two years of surveys.

k. Only seven redshank were recorded during two years of surveys.

l. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

m. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

n. Three goosander were recorded outwith the Hornsea Project One in Year 2.

o. Only one goldeneye was recorded during two years of surveys.

p. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

q. A total of 19 wigeon were recorded during two years of surveys. The low numbers recorded and predicted high avoidance rates indicate low risk of collision. Collision risk modelling predicts up to 20 collisions per year (APEM, 2012).

r. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

s. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g., npower, 2005). Consequently, the risk of an impact is low.

t. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.*, 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

u. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.,* 2006).

v. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A25 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 34: Inner Moray Firth Ramsar

Name of European site: Inner Moray Firth Ramsar												
Distance to Hornsea Project One: 495.1 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×h**	
Greylag Goose *Anser anser*		**×d**			**×e**			**×c**			**×h**	
Red-breasted Merganser *Mergus serrator*		**×f**			**×f**			**×f**			**×h**	
Redshank *Tringa totanus*		**×g**			**×g**			**×g**			**×h**	
Ramsar criterion 1												
Variety of important wetland habitats including intertidal flats with eelgrass *Zostera* beds, saltmarsh, and a sand and shingle spit; see footnote **i**.												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×j**			**×k**			**×l**			**×h**	

Evidence supporting conclusions (Ref: Table A25 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

e. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

f. Only two red-breasted merganser were recorded during two years of surveys.

g. Only seven redshank were recorded during two years of surveys.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A25 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

i. These habitats have been screened out for this Ramsar site as it is 495.1 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

j. Low numbers of assemblage species were recorded (see Matrix 33) and with the majority of wader, duck and tern flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

k. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

l. No assemblage species were recorded utilising the development area (Matrix 33) and no displacement effects are predicted.

Stage 1 Matrix 35: Moray and Nairn Coast SPA

Name of European site: Moray and Nairn Coast SPA

Distance to Hornsea Project One: 476.8 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Osprey *Pandion haliaetus*		**×a**			**×a**			**×a**			**×q**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×b**			**×c**			**×d**			**×q**	
Article 4.2 – Migratory Species (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose *Anser anser*		**×e**			**×f**			**×d**			**×q**	
Pink-footed Goose *Anser brachyrhynchus*		**×h**			**×i**			**×d**			**×q**	
Redshank *Tringa totanus*		**×i**			**×i**			**×i**			**×q**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×g**			**×h**			**×d**			**×q**	
Dunlin *Calidris alpina alpina*		**×j**			**×c**			**×d**			**×q**	
Oystercatcher *Haematopus ostralegus*		**×k**			**×c**			**×d**			**×q**	
Red-breasted Merganser *Mergus serrator*		**×l**			**×r**			**×r**			**×q**	
Velvet Scoter *Melanitta fusca*		**×a**			**×a**			**×a**			**×q**	
Common Scoter *Melanitta nigra*		**×m**			**×n**			**×d**			**×q**	
Long-tailed duck *Clangula hyemalis*		**×a**			**×a**			**×a**			**×q**	
Wigeon *Anas penelope*		**×o**			**×o**			**×d**			**×q**	
Redshank *Tringa totanus*		**×i**			**×i**			**×i**			**×q**	
Greylag Goose *Anser anser*		**×e**			**×f**			**×d**			**×q**	
Bar-tailed Godwit *Limosa lapponica*		**×b**			**×c**			**×d**			**×q**	

Evidence supporting conclusions (Ref: Table A26 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

c. Migrating birds from these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

g. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

h. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c*. 32 km is considered negligible.

i. Only seven redshank were recorded during two years of surveys.

j. A total of 23 dunlin were recorded in the Hornsea Project One area. All were flying below 22.5 m and therefore not at risk of collision.

k. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

l. Only two red-breasted merganser were recorded during two years of surveys.

m. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

n. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

o. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

p. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

q. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A26 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 36: Moray and Nairn Coast Ramsar

Name of European site: Moray and Nairn Coast Ramsar												
Distance to Hornsea Project One: 476.8 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Long-tailed duck *Clangula hyemalis*		**×a**			**×a**			**×a**			**×f**	
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×b**			**×b**			**×b**			**×f**	
Greylag Goose *Anser anser*		**×c**			**×d**			**×e**			**×f**	
Ramsar criterion 1												
Site has important wetland features, including particularly good examples of intertidal flats, saltmarsh and floodplain alder *Alnus glutinosa* woodland; see footnote **g**.												
Ramsar criterion 2												
At least six nationally scarce aquatic and coastal plants: sea centaury *Centaurium littorale*, Baltic rush *Juncus balticus*, oysterplant *Mertensia maritima* and the eelgrasses *Zostera noltei, Z. angustifolia* and *Z. marina*. British Red Data Book invertebrates *Ochthebius lenensis* and *Tetanocera freyi;* see footnote **g**.												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×h**			**×i**			**×j**			**×f**	

Evidence supporting conclusions (Ref: Table A26 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. Only seven redshank were recorded during two years of surveys.

c. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

d. f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

e. These species were not recorded using the development area and no displacement effects are predicted.

f. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A26 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq***. **of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq***. for Displacement Effects and **paragraphs 4.3.229 *et seq***. for Barrier Effects.

g. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 476.8 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

h. Low numbers of assemblage species were recorded (see Matrix 33) and with the majority of wader and duck flights below rotor height, the high avoidance rate of geese and the distance to Project One, the risk of a significant impact is very low.

i. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

j. No assemblage species were recorded utilising the development area (Matrix 35, with the exception of very small numbers of common scoter) and no displacement effects are predicted.

Stage 1 Matrix 37: Troup Penan and Lion's Heads SPA

Name of European site: Troup Penan and Lion's Heads SPA												
Distance to Hornsea Project One: 464.9 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot *Uria aalge*		**×a**			**×b**			**×c**			**×l**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda*		**×j**			**×b**			**×k**			**×l**	
Kittiwake *Rissa tridactyla*		**×i**			**×b**			**×h**			**×l**	
Herring Gull *Larus argentatus*		**×g**			**×b**			**×h**			**×l**	
Fulmar *Fulmarus glacialis*		**×d**			**×e**			**×f**			**×l**	
Guillemot *Uria aalge*		**×a**			**×b**			**×c**			**×l**	

Evidence supporting conclusions (Ref: Table A27 of Annex A of the HRA Report (Doc ref No 12.6)):

a. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

b. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

e. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

f. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

g. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. Evidence from constructed offshore wind farms indicate that these species are not displaced by wind farms (Petersen *et al.* 2006).

i. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

j. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

k. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). Screening (see HRA, **Annex A and B**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

l. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A27 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 38: Loch of Strathbeg SPA

Name of European site: Loch of Strathbeg SPA

Distance to Hornsea Project One: 462.2 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Sandwich Tern *Sterna sandvicensis*		**×a**			**×b**			**×c**			**×l**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Barnacle Goose *Branta leucopsis*		**×d**			**×d**			**×d**			**×l**	
Whooper Swan *Cygnus cygnus*		**×d**			**×d**			**×d**			**×l**	
Article 4.2 – Migratory Species (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose *Anser anser*		**×j**			**×k**			**×g**			**×l**	
Pink-footed Goose *Anser brachyrhynchus*		**×e**			**×f**			**×g**			**×l**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Teal *Anas crecca*		**×h**			**×i**			**×g**			**×l**	
Greylag Goose *Anser anser*		**×j**			**×k**			**×g**			**×l**	
Pink-footed Goose *Anser brachyrhynchus*		**×e**			**×f**			**×g**			**×l**	
Barnacle Goose *Branta leucopsis*		**×d**			**×d**			**×d**			**×l**	
Whooper Swan *Cygnus cygnus*		**×d**			**×d**			**×d**			**×l**	

Evidence supporting conclusions (Ref: Table A28 of Annex A of the HRA Report (Doc ref No 12.6)):

a. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

b. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.,* 2006).

c. Evidence from constructed offshore wind farms indicates that Sandwich terns are not displaced by wind farms (e.g. Petersen *et al.,* 2006).

d. These species were not recorded during Project One surveys.

e. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell and Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

f. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c.* 32 km is considered negligible.

g. These species were not recorded using the Hornsea Project One and therefore no displacement effects are predicted to occur.

h. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

i. Migrating birds may fly around the wind farm but the incremental increase in flight distance is likely to be negligible compared to the overall distance flown during migration.

j. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in Project One are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

k. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

l. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A28 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 39: Loch of Strathbeg Ramsar

Name of European site: Loch of Strathbeg Ramsar												
Distance to Hornsea Project One: 462.2 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Whooper Swan *Cygnus cygnus*		**×a**			**×a**			**×a**			**×g**	
Pink-footed Goose *Anser brachyrhynchus*		**×b**			**×c**			**×d**			**×g**	
Greylag Goose *Anser anser*		**×e**			**×f**			**×d**			**×g**	
Ramsar criterion 6 – Species identified subsequent to designation for possible future consideration.	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Barnacle Goose *Branta leucopsis*		**×a**			**×a**			**×a**			**×g**	
Ramsar criterion 1												
Dune slack pool												
Naturally eutrophic loch												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×h**			**×i**			**×j**			**×g**	

Evidence supporting conclusions (Ref: Table A28 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

c. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c.* 32 km is considered negligible.

d. These species were not recorded using the Hornsea Project One and therefore no displacement effects are predicted to occur.

e. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in Project One are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A28 of the HRA Report (Doc ref No 12.6).** Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq***. **of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq***. for Displacement Effects and **paragraphs 4.3.229 *et seq***. for Barrier Effects.

h. These habitats have been screened out for this Ramsar site as it is 462.2 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

i. Low numbers of assemblage species were recorded (see Matrix 38) and with most wader and duck flights below rotor height, the high avoidance rate of geese, and the large distance to Project One, the risk of a significant impact is very low.

j. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

k. No assemblage species were recorded utilising the development area (Matrix 38) and no displacement effects are predicted.

Stage 1 Matrix 40: Buchan Ness to Collieston Coast SPA

Name of European site: Buchan Ness to Collieston Coast SPA												
Distance to Hornsea Project One: 421.8 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot *Uria aalge*		**×a**			**×b**			**×c**			**×o**	
Kittiwake *Rissa tridactyla*		**×j**			**×k**			**×i**			**×o**	
Herring Gull *Larus argentatus*		**×g**			**×h**			**×i**			**×o**	
Shag *Phalacrocorax aristotelis*		**×l**			**×m**			**×n**			**×o**	
Fulmar *Fulmarus glacialis*		**×d**			**×e**			**×f**			**×o**	

Evidence supporting conclusions (Ref: Table A29 of Annex A of the HRA Report (Doc ref No 12.6)):

a. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

b. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

e. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

f. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

g. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

i. Evidence from constructed offshore wind farms indicate that these species are not displaced by wind farms (Petersen *et al.* 2006).

j. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5 m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

k. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

l. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

m. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

n. There are a no records of shags using the area and therefore no displacement impacts are predicted.

o. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A29 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 41: Ythan Estuary, Sands of Forvie and Meikle Loch SPA

Name of European site: Ythan Estuary, Sands of Forvie and Meikle Loch SPA												
Distance to Hornsea Project One: 437.4 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common Tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×p**	
Little Tern *Sterna albifrons*		**×d**			**×e**			**×c**			**×p**	
Sandwich Tern *Sterna sandvicensis*		**×f**			**×g**			**×c**			**×p**	
Article 4.2 – Migratory Species (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×h**			**×i**			**×j**			**×p**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×k**			**×k**			**×k**			**×p**	
Lapwing *Vanellus vanellus*		**×l**			**×m**			**×j**			**×p**	
Eider *Somateria mollissima*		**×n**			**×o**			**×j**			**×p**	
Pink-footed Goose *Anser brachyrhynchus*		**×j**			**×k**			**×j**			**×p**	

Evidence supporting conclusions (Ref: Table A30 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Three little terns were recorded, all flying below 5 m.

e. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

f. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

g. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

h. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell and Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

i. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c*. 32 km is considered negligible.

j. These species were not recorded using the Hornsea Project One and therefore no displacement effects are predicted to occur.

k. Only seven redshank were recorded during two years of surveys.

l. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.,* 2006). Therefore the risk of an impact is low and will not be significant.

m. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

n. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

o. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

p. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A30 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 42: Ythan Estuary and Meikle Loch Ramsar

Name of European site: Ythan Estuary and Meikle Loch Ramsar												
Distance to Hornsea Project One: 437.4 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species regularly supported during the breeding season	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Sandwich Tern *Sterna sandvicensis*		**×a**			**×b**			**×c**			**×g**	
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×d**			**×e**			**×f**			**×g**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	O	D	C	C	O	D	C
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×h**			**×i**			**×j**			**xg**	

Evidence supporting conclusions (Ref: Table A30 of Annex A of the HRA Report (Doc ref No 12.6)):

a. One sandwich tern was recorded in Year 1 and six in Year 2. The Ramsar is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

b. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

e. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c*. 32 km is considered negligible.

f. These species were not recorded using the Hornsea Project One and therefore no displacement effects are predicted to occur.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A30 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

h. Low numbers of assemblage species were recorded (see Matrix 41) and with the majority of tern, wader and duck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

i. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

j. No assemblage species were recorded utilising the development area (Matrix 41, with the exception of small numbers of eider) and no displacement effects are predicted.

Stage 1 Matrix 43: Fowlsheugh SPA

Name of European site: Fowlsheugh SPA												
Distance to Hornsea Project One: 380.3 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory Species (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Guillemot *Uria aalge*		**×a**			**×b**			**×c**			**×l**	
Kittiwake *Rissa tridactyla*		**×d**			**×b**			**×e**			**×l**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda*		**×f**			**×b**			**×g**			**×l**	
Herring Gull *Larus argentatus*		**×h**			**×b**			**×e**			**×l**	
Fulmar *Fulmarus glacialis*		**×i**			**×j**			**×k**			**×l**	
Guillemot *Uria aalge*		**×a**			**×b**			**×c**			**×l**	
Kittiwake *Rissa tridactyla*		**×d**			**×b**			**×e**			**×l**	

Evidence supporting conclusions (Ref: Table A31 of Annex A of the HRA Report (Doc ref No 12.6)):

a. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

b. The SPA is outwith the maximum foraging range for these species during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5 m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

e. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (Petersen *et al.* 2006).

f. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

g. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

i. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

j. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

k. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

l. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A31 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 44: Montrose Basin SPA

Name of European site: Montrose Basin SPA												
Distance to Hornsea Project One: 367.4 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory Species (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose *Anser anser*		**×a**			**×b**			**×c**			**×q**	
Knot *Calidris canutus*		**×d**			**×e**			**×c**			**×q**	
Pink-footed Goose *Anser brachyrhynchus*		**×f**			**×g**			**×c**			**×q**	
Redshank *Tringa totanus*		**×h**			**×h**			**×h**			**×q**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*		**×i**			**×e**			**×c**			**×q**	
Oystercatcher *Haematopus ostralegus*		**×j**			**×e**			**×c**			**×q**	
Eider *Somateria mollissima*		**×k**			**×l**			**×c**			**×q**	
Wigeon *Anas penelope*		**×m**			**×n**			**×c**			**×q**	
Shelduck *Tadorna tadorna*		**×o**			**×p**			**×p**			**×q**	
Redshank *Tringa totanus*		**×h**			**×h**			**×h**			**×q**	
Knot *Calidris canutus*		**×d**			**×e**			**×c**			**×q**	
Greylag Goose *Anser anser*		**×a**			**×b**			**×c**			**×q**	
Pink-footed Goose *Anser brachyrhynchus*		**×f**			**×g**			**×c**			**×q**	

Evidence supporting conclusions (Ref: Table A32 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

b. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

e. Migrating knot may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

f. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

g. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c*. 32 km is considered negligible.

h. Only seven redshank were recorded during two years of surveys.

i. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

j. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

k. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

l. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

m. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM, 2012).

n. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

o. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM, 2012).

p. Only one shelduck was recorded during two years of surveys.

q. In-combination LSE informed by the footnotes above for the individual receptors as presented **in Annex A, Table A32 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects**.**

Stage 1 Matrix 45: Montrose Basin Ramsar

Name of European site: Montrose Basin Ramsar												
Distance to Hornsea Project One: 367.4 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×a**			**×a**			**×a**			**×g**	
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose *Anser anser*		**×b**			**×c**			**×d**			**×g**	
Pink-footed Goose *Anser brachyrhynchus*		**×e**			**×f**			**×d**			**×g**	
Ramsar criterion 1												
Estuary; see footnote **h**.												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×i**			**×j**			**×k**			**×g**	

Evidence supporting conclusions (Ref: Table A32 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only seven redshank were recorded during two years of surveys.

b. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

c. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

f. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

g. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A32 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

h. These habitats have been screened out for this Ramsar site as it is 367.4 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

i. Low numbers of assemblage species were recorded (see Matrix 44) and with the majority of wader and duck flights below rotor height, the high goose avoidance rates and the distance to Project One, the risk of a significant impact is very low.

j. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

k. No assemblage species were recorded utilising the development area (Matrix 44) and no displacement effects are predicted.

Stage 1 Matrix 46: Firth Tay & Eden Estuary SPA

Name of European site: Firth Tay & Eden Estuary SPA												
Distance to Hornsea Project One: 275.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×ee**	
Marsh Harrier *Circus aeruginosus*		**×d**			**×d**			**×d**			**×ee**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×ee**	
Article 4.2 – Migratory Species (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Greylag Goose *Anser anser*		**×i**			**×j**			**×g**			**×ee**	
Pink-footed Goose *Anser brachyrhynchus*		**×k**			**×l**			**×g**			**×ee**	
Redshank *Tringa totanus*		**×h**			**×h**			**×h**			**×ee**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Velvet Scoter *Melanitta fusca*		**×d**			**×d**			**×d**			**×ee**	
Pink-footed Goose *Anser brachyrhynchus*		**×k**			**×l**			**×g**			**×ee**	
Greylag Goose *Anser anser*		**×i**			**×j**			**×g**			**×ee**	
Redshank *Tringa totanus*		**×h**			**×h**			**×h**			**×ee**	
Cormorant *Phalacrocorax carbo*		**×m**			**×n**			**×o**			**×ee**	
Shelduck *Tadorna tadorna*		**×bb**			**×cc**			**×cc**			**×ee**	
Eider *Somateria mollissima*		**×p**			**×q**			**×g**			**×ee**	
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×ee**	
Common Scoter *Melanitta nigra*		**×r**			**×s**			**×g**			**×ee**	
Black-tailed Godwit *Limosa limosa islandica*		**×d**			**×d**			**×d**			**×ee**	
Goldeneye *Bucephala clangula*		**×t**			**×t**			**×t**			**×ee**	
Red-breasted Merganser *Mergus serrator*		**×u**			**×u**			**×u**			**×ee**	
Goosander *Mergus merganser*		**×dd**			**×dd**			**×g**			**×ee**	
Oystercatcher *Haematopus ostralegus*		**×v**			**×w**			**×g**			**×ee**	
Grey Plover *Pluvialis squatarola*		**×z**			**×aa**			**×g**			**×ee**	
Sanderling *Calidris alba*		**×d**			**×d**			**×d**			**×ee**	
Dunlin *Calidris alpina alpina*		**×x**			**×y**			**×g**			**×ee**	
Long-tailed duck *Clangula hyemalis*		**×d**			**×d**			**×d**			**×ee**	

Evidence supporting conclusions (Ref: Table A33 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. These species were not recorded during Project One surveys.

e. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

f. Migrating bar-tailed godwit may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. Only seven redshank were recorded during two years of surveys.

i. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

j. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

k. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

l. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c*. 32 km is considered negligible.

m. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

n. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

o. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

p. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

q. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

r. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

s. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

t. Only one goldeneye was recorded during two years of surveys.

u. Only two red-breasted merganser were recorded during two years of surveys.

v. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

w. Migrating birds may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

x. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

y. Migrating dunlin may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to overall distance flown during migration.

z. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

aa. Migrating grey plover may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

bb. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

cc. Only one shelduck was recorded during two years of surveys.

dd. Three goosander were recorded outwith the Hornsea Project One in Year 2.

ee. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A33 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 47: Firth Tay & Eden Estuary Ramsar

Name of European site: Firth Tay & Eden Estuary Ramsar												
Distance to Hornsea Project One: 275.8 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×a**			**×a**			**×a**			**×j**	
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×b**			**×c**			**×d**			**×j**	
Greylag Goose *Anser anser*		**×e**			**×f**			**×d**			**×j**	
Pink-footed Goose *Anser brachyrhynchus*		**×g**			**×h**			**×d**			**×j**	
Ramsar species 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Goosander *Mergus merganser*		**×i**			**×i**			**×d**			**×j**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×k**			**×l**			**×m**			**×j**	

Evidence supporting conclusions (Ref: Table A33 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only seven redshank were recorded during two years of surveys.

b. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

c. Migrating bar-tailed godwit may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

g. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

h. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional *c*. 32 km is considered negligible.

i. Three goosander were recorded outwith the Hornsea Project One in Year 2.

j. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A33 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

k. Low numbers of assemblage species were recorded (see Matrix 46) and with the majority of wader and duck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

l. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

m. No assemblage species were recorded utilising the development area (Matrix 46, with the exception of very low numbers of some seaduck species) and no displacement effects are predicted.

Stage 1 Matrix 48: Forth Islands SPA

Name of European site: Forth Islands SPA

Distance to Hornsea Project One: 308.5 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Arctic Tern *Sterna paradisaea*		**×a**			**×b**			**×c**			**×ee**	
Common Tern *Sterna hirundo*		**×d**			**×e**			**×c**			**×ee**	
Roseate Tern *Sterna dougallii*		**×f**			**×f**			**×f**			**×ee**	
Sandwich Tern *Sterna sandvicensis*		**×g**			**×h**			**×c**			**×ee**	
Article 4.2 – Migratory Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gannet *Morus bassanus*		**✓i**			**×j**			**✓k**			**×ee**	
Lesser Black-backed Gull *Larus fuscus*		**×l**			**×m**			**×c**			**×ee**	
Puffin *Fratercula arctica*		**×n**			**×m**			**×o**			**×ee**	
Shag *Phalacrocorax aristotelis*		**×p**			**×q**			**×r**			**×ee**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda*		**×s**			**×m**			**×t**			**×ee**	
Guillemot *Uria aalge*		**×u**			**×m**			**×v**			**×ee**	
Kittiwake *Rissa tridactyla*		**×w**			**×m**			**×c**			**×ee**	
Herring Gull *Larus argentatus*		**×x**			**×m**			**×c**			**×ee**	
Cormorant *Phalacrocorax carbo*		**×y**			**×z**			**×aa**			**×ee**	
Fulmar *Fulmarus glacialis*		**×bb**			**×cc**			**×dd**			**×ee**	
Puffin *Fratercula arctica*		**×n**			**×m**			**×o**			**×ee**	
Lesser Black-backed Gull *Larus fuscus*		**×n**			**×m**			**×c**			**×ee**	
Shag *Phalacrocorax aristotelis*		**×p**			**×q**			**×r**			**×ee**	
Gannet *Morus bassanus*		**✓i**			**×j**			**✓k**			**×ee**	
Arctic Tern *Sterna paradisaea*		**×a**			**×b**			**×c**			**×ee**	
Common Tern *Sterna hirundo*		**×d**			**×e**			**×c**			**×ee**	
Roseate Tern *Sterna dougallii*		**×g**			**×g**			**×g**			**×ee**	
Sandwich Tern *Sterna sandvicensis*		**×h**			**×i**			**×j**			**×ee**	

Evidence supporting conclusions (Ref: Table A34 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

b. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

e. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. No roseate terns were recorded.

g. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

h. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

i. A total of 13,034 gannets were recorded; with peak numbers between August and November. Of those recorded in flight the large majority were below rotor height and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore birds at this site may occur in the area but at a low risk of being impacted. Outwith the breeding season gannets from this SPA may disperse widely. Collision risk modelling predicted some mortality may be from the Forth Islands. Screening (**Annex A and Table 4.3 of the HRA Report (Doc ref No 12.6)**) identified a potential likely significant effect alone and/or in combination.

j. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect does occur, be a small incremental increase in overall distance flown by this highly pelagic species.

k. There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere. Screening (**Annex A and Table 4.3 of the HRA Report (Doc ref No 12.6)**) identified a potential likely significant effect alone and/or in-combination.

l. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding lesser black-backed gulls disperse away from their colonies. It is estimated that none of the collision impacts during the non-breeding season will be from this SPA (**Annex B of the HRA Report (Doc ref No 12.6)**).

m. The SPA is outwith the mean maximum foraging range for these species during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in distance flown.

n. A total of 2,495 puffins were recorded in Year 1 and 4,733 in Year 2. Peak numbers occurred from August to October. Of those recorded in flight all were below rotor height and therefore not at risk of collision.

o. There is little evidence from constructed offshore wind farms on whether puffins may be displaced or not. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

p. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

q. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

r. There are a no records of shags using the area and therefore no displacement impacts are predicted.

s. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

t. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

u. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

v. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

w. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

x. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

y. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

z. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

aa. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

bb. A total of 6,608 fulmars were recorded in Year 1 and 8,300 in Year 2; with peak numbers in May. Of those in flight 99.9% were below 22.5 m and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore birds at this site are at a low risk of being impacted. Outwith the breeding season fulmars from this SPA may disperse widely. Collision risk modelling predicted zero collisions. Therefore the risk is very low.

cc. The SPA is outwith the mean maximum foraging range but within the maximum range for fulmar during the breeding season and therefore barrier effects may occur. However, the additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

dd. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

ee. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A34 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 49: Firth of Forth SPA

Name of European site: Firth of Forth SPA												
Distance to Hornsea Project One: 299.2 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding (Passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Sandwich Tern *Sterna sandvicensis*		**×a**			**×b**			**×c**			**×nn**	
Article 4.1 – Breeding (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×d**			**×e**			**×f**			**×nn**	
Golden Plover *Pluvialis apricaria*		**×g**			**×e**			**×f**			**×nn**	
Red-throated *Diver Gavia stellata*		**×h**			**×e**			**×i**			**×nn**	
Slavonian Grebe *Podiceps auritus*		**×j**			**×j**			**×j**			**×nn**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Knot *Calidris canutus*		**×k**			**×e**			**×f**			**×nn**	
Pink-footed Goose *Anser brachyrhynchus*		**×l**			**×m**			**×f**			**×nn**	
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×nn**	
Shelduck *Tadorna tadorna*		**×o**			**×o**			**×o**			**×nn**	
Turnstone *Arenaria interpres*		**×p**			**×e**			**×f**			**×nn**	

Name of European site: Firth of Forth SPA

Distance to Hornsea Project One: 299.2 km

European site features	**Likely Effects of Project One**											
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Scaup Aythya marila		**×q**			**×q**			**×q**			**×nn**	
Slavonian Grebe Podiceps auritus		**×j**			**×j**			**×j**			**×nn**	
Golden Plover *Pluvialis apricaria*		**×g**			**×e**			**×f**			**×nn**	
Bar-tailed Godwit *Limosa lapponica*		**×d**			**×e**			**×f**			**×nn**	
Pink-footed Goose *Anser brachyrhynchus*		**×l**			**×m**			**×f**			**×nn**	
Shelduck *Tadorna tadorna*		**×o**			**×o**			**×o**			**×nn**	
Knot *Calidris canutus*		**×k**			**×e**			**×f**			**×nn**	
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×nn**	
Turnstone *Arenaria interpres*		**×p**			**×e**			**×f**			**×nn**	
Great Crested Grebe *Podiceps cristatus*		**×r**			**×e**			**×s**			**×nn**	
Cormorant *Phalacrocorax carbo*		**×t**			**×u**			**×v**			**×nn**	
Red-throated Diver *Gavia stellata*		**×h**			**×e**			**×i**			**×nn**	
Mallard *Anas platyrhynchos*		**×w**			**×e**			**×f**			**×nn**	
Curlew *Numenius arquata*		**×x**			**×e**			**×f**			**×nn**	
Eider *Somateria mollissima*		**×ll**			**×mm**			**×f**			**×nn**	
Long-tailed duck *Clangula hyemalis*		**×q**			**×q**			**×q**			**×nn**	
Common Scoter *Melanitta nigra*		**×y**			**×z**			**×aa**			**×nn**	
Velvet Scoter *Melanitta fusca*		**×q**			**×q**			**×q**			**×nn**	
Goldeneye *Bucephala clangula*		**×bb**			**×bb**			**×bb**			**×nn**	
Red-breasted Merganser *Mergus serrator*		**×cc**			**×cc**			**×cc**			**×nn**	
Oystercatcher *Haematopus ostralegus*		**×dd**			**×e**			**×f**			**×nn**	
Ringed Plover *Charadrius hiaticula*		**×ee**			**×e**			**×f**			**×nn**	
Grey Plover *Pluvialis squatarola*		**×ff**			**×e**			**×f**			**×nn**	
Lapwing *Vanellus vanellus*		**×gg**			**×hh**			**×f**			**×nn**	
Dunlin *Calidris alpina alpina*		**×ii**			**×e**			**×f**			**×nn**	
Wigeon *Anas penelope*		**×jj**			**×kk**			**×f**			**×nn**	

Evidence supporting conclusions (Ref: Table A35 of Annex A of the HRA Report (Doc ref No 12.6)):

a. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

b. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that Sandwich terns are not displaced by wind farms (e.g. Petersen *et al.* 2006).

d. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

e. Migrating birds from these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

f. These species were not recorded using the development area and no displacement effects are predicted.

g. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

h. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. The SPA is outwith the mean maximum foraging range for red-throated diver during the breeding season. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

i. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

j. Only one Slavonian grebe was recorded, flying below turbine height.

k. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

l. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

m. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

n. Only seven redshank were recorded during two years of surveys.

o. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

p. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

q. These species were not recorded during Project One surveys.

r. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision

s. No great-crested grebes were recorded using the development area and no displacement effects are predicted.

t. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

u. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

v. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

w. A total of ten mallard were recorded during two years of surveys. The low numbers recorded and reported relatively high levels of avoidance behaviour by wildfowl indicate very low risk of collision

x. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

y. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

z. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

aa. There are a no records of common scoter using the Hornsea Project One and therefore no displacement impacts are predicted.

bb. Only one goldeneye was recorded during two years of surveys.

cc. Only two red-breasted merganser were recorded during two years of surveys.

dd. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

ee. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

ff. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

gg. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 mand therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

hh. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

ii. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

jj. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

kk. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

ll. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

mm. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

nn. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A35 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 50: Firth of Forth Ramsar

Name of European site: Firth of Forth Ramsar												
Distance to Hornsea Project One: 299.2 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - Species with peak counts in Spring/Autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×a**			**×c**			**×c**			**×m**	
Shelduck *Tadorna tadorna*		**×d**			**×d**			**×d**			**×m**	
Redshank *Tringa totanus*		**×e**			**×e**			**×e**			**×m**	
Turnstone *Arenaria interpres*		**×f**			**×g**			**×h**			**×m**	
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Knot *Calidris canutus*		**×i**			**×g**			**×h**			**×m**	
Slavonian Grebe *Podiceps auritus*		**×j**			**×j**			**×j**			**×m**	
Goldeneye *Bucephala clangula*		**×k**			**×k**			**×k**			**×m**	
Bar-tailed Godwit *Limosa lapponica*		**×l**			**×g**			**×h**			**×m**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common tern (*Sterna hirundo hirundo*)		**×n**			**×o**			**×p**			**×m**	
Goosander (*Mergus merganser merganser*)		**×q**			**×q**			**×q**			**×m**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×r**			**×s**			**×t**			**×m**	

Evidence supporting conclusions (Ref: Table A35 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible

b. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

e. Only seven redshank were recorded during two years of surveys.

f. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

g. Migrating birds from these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

h. These species were not recorded using the development area and no displacement effects are predicted.

i. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

j. Only one Slavonian grebe was recorded, flying below turbine height.

k. Only one goldeneye was recorded during two years of surveys.

l. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A35 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

n. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The Ramsar site is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

o. No barrier effects on these species have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The Ramsar is outwith the mean maximum or maximum foraging range for these species and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

p. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005) (Ref: **Annex A, Table A40 of the HRA Report (Doc ref No 12.6)**).

q. Three goosander were recorded outwith the Hornsea Project One in Year 2.

r. Low numbers of assemblage species were recorded (see Matrix 49) and with the majority of diver, wader and duck flights below rotor height, the high goose avoidance rates and the distance to Project One, the risk of a significant impact is very low.

s. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

t. No assemblage species were recorded utilising the development area (Matrix 49, with the exception of very small numbers of red-throated diver and seaducks) and no displacement effects are predicted.

Stage 1 Matrix 51: Imperial Dock Lock, Leith SPA

Name of European site: Imperial Dock Lock, Leith SPA												
Distance to Hornsea Project One: 319.6 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×d**	

Evidence supporting conclusions (Ref: Table A36 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A36 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 52: St Abb's Head to Fast Castle SPA

Name of European site: St Abb's Head to Fast Castle SPA												
Distance to Hornsea Project One: 277 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda*		**×a**			**×b**			**×c**			**×m**	
Guillemot *Uria aalge*		**×d**			**×e**			**×f**			**×m**	
Kittiwake *Rissa tridactyla*		**×g**			**×h**			**×i**			**×m**	
Herring Gull *Larus argentatus*		**×g**			**×h**			**×i**			**×m**	
Shag *Phalacrocorax aristotelis*		**×j**			**×k**			**×l**			**×m**	

Evidence supporting conclusions (Ref: Table A37 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

b. The SPA is beyond the mean maximum foraging range for razorbill during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

d. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

e. The SPA is outwith the maximum foraging range for guillemot during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

g. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

h. The SPA is outwith the mean maximum or maximum foraging range for kittiwake during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

i. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (Petersen *et al.* 2006).

j. The SPA is outwith the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

k. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

l. There are a no records of shags using the area and therefore no displacement impacts are predicted.

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A37 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 53: Lindisfarne SPA

Name of European site: Lindisfarne SPA												
Distance to Hornsea Project One: 237.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding (Passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×cc**	
Roseate tern *Sterna douga*		**×d**			**×d**			**×d**			**×cc**	
Article 4.1 – Breeding (Over Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×e**			**×f**			**×g**			**×cc**	
Golden Plover *Pluvialis apricaria*		**×h**			**×f**			**×g**			**×cc**	
Whooper Swan *Cygnus cygnus*		**×d**			**×d**			**×d**			**×cc**	
Article 4.2 – Migratory (On Passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×cc**	
Article 4.2 – Migratory (Over Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×j**			**×f**			**×g**			**×cc**	
Greylag Goose *Anser anser*		**×k**			**×l**			**×g**			**×cc**	
Knot *Calidris canutus*		**×m**			**×f**			**×g**			**×cc**	
Light-bellied Brent Goose *Branta bernicla hrota*		**×n**			**×n**			**×n**			**×cc**	
Wigeon *Anas penelope*		**×o**			**×p**			**×f**			**×cc**	
Long-tailed duck *Clangula hyemalis*		**×d**			**×d**			**×d**			**×cc**	
Sanderling *Calidris alba*		**×d**			**×d**			**×d**			**×cc**	
Red-breasted Merganser *Mergus serrator*		**×q**			**×q**			**×q**			**×cc**	
Article 4.2 – Assemblage	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×r**			**×s**			**×g**			**×cc**	
Golden Plover *Pluvialis apricaria*		**×g**			**×f**			**×g**			**×cc**	
Bar-tailed Godwit *Limosa lapponica*		**×d**			**×f**			**×g**			**×cc**	
Greylag Goose *Anser anser*		**×k**			**×l**			**×f**			**×cc**	
Light-bellied Brent Goose *Branta bernicla hrota*		**×n**			**×n**			**×n**			**×cc**	
Wigeon *Anas penelope*		**×o**			**×p**			**×g**			**×cc**	

Name of European site: Lindisfarne SPA												
Distance to Hornsea Project One: 237.8 km												
European site features	**Likely Effects of Project One**											
Whooper Swan *Cygnus cygnus*		**×h**			**×h**			**×h**			**×cc**	
Knot *Calidris canutus*		**×m**			**×f**			**×g**			**×cc**	
Redshank *Tringa totanus*		**×t**			**×t**			**×t**			**×cc**	
Shelduck *Tadorna tadorna*		**×u**			**×u**			**×g**			**×cc**	
Eider *Somateria mollissima*		**×v**			**×w**			**×g**			**×cc**	
Common Scoter *Melanitta nigra*		**×x**			**×y**			**×g**			**×cc**	
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×cc**	
Lapwing *Vanellus vanellus*		**×z**			**×aa**			**×g**			**×cc**	
Dunlin *Calidris alpina alpina*		**×bb**			**×f**			**×g**			**×cc**	
Grey Plover *Pluvialis squatarola*		**×j**			**×f**			**×g**			**×cc**	

Evidence supporting conclusions (Ref: Table A38 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. These species were not recorded.

e. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

i. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

j. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

k. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

l. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

m. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

n. No light bellied brent geese were recorded in Year 1.

o. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

p. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

q. Only two red-breasted merganser were recorded during two years of surveys.

r. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

s. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

t. Only seven redshank were recorded during two years of surveys.

u. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

v. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

w. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

x. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

y. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

z. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

aa. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

bb. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

cc. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A38 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 54: Lindisfarne Ramsar

Name of European site: Lindisfarne Ramsar

Distance to Hornsea Project One: 237.8 km

European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×m**	
Greylag Goose *Anser anser*		**×d**			**×e**			**×c**			**×m**	
Ramsar criterion 6 - Species with peak counts in Spring/Autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×f**			**×b**			**×c**			**×m**	
Light-bellied Brent Goose *Branta bernicla hrota*		**×g**			**×g**			**×g**			**×m**	
Wigeon *Anas penelope*		**×h**			**×i**			**×c**			**×m**	
Redshank *Tringa totanus*		**×j**			**×j**			**×j**			**×m**	
Ramsar criterion 6 - Species/populations identified subsequent ot designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×k**			**×l**			**×c**			**×m**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×o**			**×p**			**×q**			**×m**	
Ramsar criterion 1												
Site has important intertidal flats, together with a large area of saltmarsh, and major sand dune system with well developed dune slacks; see footnote **n**.												

Evidence supporting conclusions (Ref: Table A38 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

e. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

f. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

g. No light bellied brent geese were recorded in Year 1.

h. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

i. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

j. Only seven redshank were recorded during two years of surveys.

k. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

l. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A38 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

n. These habitats have been screened out for this Ramsar site as it is 237.8 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

o. Low numbers of assemblage species were recorded (see Matrix 53) and with the majority of wader and duck flights below rotor height, the high goose avoidance rates and the distance to Project One, the risk of a significant impact is very low.

p. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

q. No assemblage species were recorded utilising the development area (Matrix 53) and no displacement effects are predicted.

Stage 1 Matrix 55: Northumbria Coast SPA

Name of European site: Northumbria Coast SPA												
Distance to Hornsea Project One: 136.2 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×h**	
Article 4.2 – Migratory	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Purple Sandpiper *Calidris maritima*		**×d**			**×d**			**×d**			**×h**	
Turnstone *Arenaria interpres*		**×g**			**×h**			**×i**			**×h**	

Evidence supporting conclusions (Ref: Table A41 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. Only one purple sandpiper was recorded during two years of surveys.

e. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

f. Migrating turnstone may fly around the wind farm but the incremental increase in flight distance to or from the SPA is likely to be negligible.

g. No turnstone were recorded using the development area and no displacement effects are predicted.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A41 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 56: Northumbria Coast Ramsar

Name of European site: Northumbria Coast Ramsar												
Distance to Hornsea Project One: 136.2 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - Species regularly supported during the breeding season	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×h**	
Ramsar criterion 6 – Species with peak winter counts	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Purple Sandpiper *Calidris maritima*		**×d**			**×d**			**×d**			**×h**	
Turnstone *Arenaria interpres*		**×g**			**×h**			**×i**			**×h**	

Evidence supporting conclusions (Ref: Table A41 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. Only one purple sandpiper was recorded during two years of surveys.

e. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

f. Migrating turnstone may fly around the wind farm but the incremental increase in flight distance to or from the Ramsar is likely to be negligible.

g. No turnstone were recorded using the development area and no displacement effects are predicted.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A41 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 57: Teesmouth and Cleveland SPA

Name of European site: Teesmouth and Cleveland SPA												
Distance to Hornsea Project One: 119.1 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×r**	
Article 4.1 – Breeding (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Sandwich Tern *Sterna sandvicensis*		**×d**			**×e**			**×c**			**×r**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×f**			**×g**			**×h**			**×r**	
Article 4.2 – Migratory (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Knot *Calidris canutus*		**×i**			**×g**			**×h**			**×r**	
Redshank *Tringa tetanus*		**×j**			**×j**			**×j**			**×r**	
Article 4.2 – Assemblage (Waterfowl)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Sanderling *Calidris alba*		**×k**			**×k**			**×k**			**×r**	
Lapwing *Vanellus vanellus*		**×p**			**×q**			**×h**			**×r**	
Shelduck *Tadorna tadorna*		**×l**			**×l**			**×l**			**×r**	
Cormorant *Phalacrocorax carbo*		**×m**			**×n**			**×o**			**×r**	
Redshank *Tringa totanus*		**×j**			**×j**			**×j**			**×r**	
Knot *Calidris canutus*		**×i**			**×g**			**×h**			**×r**	

Evidence supporting conclusions (Ref: Table A42 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006).

d. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

e. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

f. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

g. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

h. These species were not recorded using the development area and no displacement effects are predicted.

i. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

j. Only seven redshank were recorded during two years of surveys.

k. No sanderling were recorded.

l. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

m. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

n. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

o. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

p. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

q. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

r. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A42 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 58: Teesmouth and Cleveland Ramsar

Name of European site: Teesmouth and Cleveland Ramsar												
Distance to Hornsea Project One: 119.1 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Knot *Calidris canutus*		**×a**			**×b**			**×c**			**×e**	
Ramsar criterion 6 – Species with peak counts inspring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa tetanus*		**×d**			**×d**			**×d**			**×e**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×f**			**×g**			**×h**			**×e**	

Evidence supporting conclusions (Ref: Table A42 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Only seven redshank were recorded during two years of surveys.

e. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A42**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6) f**or Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

f. Low numbers of assemblage species were recorded (see Matrix 57) and with the majority of wader, cormorant and duck flights below rotor height, and the distance to Project One, the risk of a significant impact is very low.

g. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

h. No assemblage species were recorded utilising the development area (Matrix 57) and no displacement effects are predicted.

Stage 1 Matrix 60: Hornsea Mere SPA

Name of European site: Hornsea Mere SPA												
Distance to Hornsea Project One: 28.8 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall		**×a**			**×a**			**×a**			**×b**	
Mute swan		**×c**			**×c**			**×c**			**×b**	

Evidence supporting conclusions (Ref: Table A44 of Annex A):

a. Only one gadwall was recorded during two years of surveys.

b. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A44**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

c. No mute swans were recorded during offshore baseline surveys.

Stage 1 Matrix 61: Gibraltar Point SPA

Name of European site: Gibraltar Point SPA												
Distance to Hornsea Project One: 39.6 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×k**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×d**			**×e**			**×f**			**×k**	
Article 4.2 – Migratory (Overwinter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×g**			**×e**			**×f**			**×k**	
Knot *Calidris canutus*		**×h**			**×e**			**×f**			**×k**	
Article 4.2 – Assemblage (Waterfowl)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Oystercatcher *Haematopus ostralegus*		**×i**			**×e**			**×f**			**×k**	
Knot *Calidris canutus*		**×h**			**×e**			**×f**			**×k**	
Grey Plover *Pluvialis squatarola*		**×g**			**×e**			**×f**			**×k**	
Bar-tailed Godwit *Limosa lapponica*		**×d**			**×e**			**×f**			**×k**	
Sanderling *Calidris alba*		**×j**			**×j**			**×j**			**×k**	

Evidence supporting conclusions (Ref: Table A46 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

e. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

f. No birds of these species were recorded using the development area and no displacement effects are predicted.

g. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

h. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

i. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

j. No sanderling were recorded.

k. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A46 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 62: Gibraltar Point Ramsar

Name of European site: Gibraltar Point Ramsar												
Distance to Hornsea Project One: 39.6 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×a**			**×b**			**×c**			**×i**	
Bar-tailed Godwit *Limosa lapponica*		**×d**			**×b**			**×c**			**×i**	
Sanderling *Calidris alba*		**×e**			**×e**			**×e**			**×i**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Knot *Calidris canutus*		**×f**			**×b**			**×c**			**×i**	
Ramsar criterion 6 - Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied brent goose *Branta bernicla bernicla*		**×g**			**×h**			**×c**			**×i**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×k**			**×l**			**×m**			**×i**	
Ramsar criterion 2												
Wetland invertebrate species listed as rare in theBritish Red Data Book ; see footnote **j**.												
Ramsar criterion 1												
Representative and nationally-rare dune and saltmarsh habitats, and freshwater marsh communities; see footnote **j**.												

Evidence supporting conclusions (Ref: Table A46 of Annex A of the HRA Report (Doc ref No 12.6)):

a. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. No birds of these species were recorded using the development area and no displacement effects are predicted.

d. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

e. No sanderling were recorded.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

h. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

i. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A46 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

j. These habitats have been screened out for this Ramsar site as it is 39.6 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

k. Low numbers of assemblage species were recorded (see Matrix 61) and with the majority of wader flights below rotor height, and the distance to Project One, the risk of a significant impact is very low.

l. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

m. No assemblage species were recorded utilising the development area (Matrix 61) and no displacement effects are predicted.

Stage 1 Matrix 63: The Wash SPA

Name of European site: The Wash SPA												
Distance to Hornsea Project One: 42.7 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common Tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×jj**	
Little Tern *Sterna albifrons*		**×d**			**×e**			**×f**			**×jj**	
Marsh Harrier *Circus aeruginosus*		**×g**			**×g**			**×g**			**×jj**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×h**			**×h**			**×h**			**×jj**	
Bar-tailed Godwit *Limosa lapponica*		**×i**			**×j**			**×k**			**×jj**	
Golden Plover *Pluvialis apricaria*		**×l**			**×j**			**×k**			**×jj**	
Whooper Swan *Cygnus cygnus*		**×g**			**×g**			**×g**			**×jj**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×m**			**×j**			**×k**			**×jj**	
Knot *Calidris canutus*		**×n**			**×j**			**×k**			**×jj**	
Article 4.2 – Migratory (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×g**			**×g**			**×g**			**×jj**	
Curlew *Numenius arquata*		**×o**			**×j**			**×k**			**×jj**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×p**			**×q**			**×k**			**×jj**	
Dunlin *Calidris alpina alpina*		**×r**			**×j**			**×k**			**×jj**	
Grey Plover *Pluvialis squatarola*		**×m**			**×j**			**×k**			**×jj**	
Knot *Calidris canutus*		**×n**			**×j**			**×k**			**×jj**	
Oystercatcher *Haematopus ostralegus*		**×ii**			**×j**			**×k**			**×jj**	
Pink-footed Goose *Anser brachyrhynchus*		**×s**			**×t**			**×k**			**×jj**	
Pintail *Anas acuta*		**×g**			**×g**			**×g**			**×jj**	
Redshank *Tringa totanus*		**×u**			**×u**			**×u**			**×jj**	
Shelduck *Tadorna tadorna*		**×v**			**×w**			**×w**			**×jj**	
Turnstone *Arenaria interpres*		**×x**			**×j**			**×k**			**×jj**	

Name of European site: The Wash SPA												
Distance to Hornsea Project One: 42.7 km												
European site features	**Likely Effects of Project One**											
Bewick's swans *Cygnus columbianus bewickii*		**×g**			**×g**			**×g**			**×jj**	
Goldeneye *Bucephala clangula*		**×kk**			**×kk**			**×kk**			**×jj**	
Gadwall *Anas strepera*		**×ll**			**×ll**			**×ll**			**×jj**	
Common scoter *Melanitta nigra*		**×mm**			**×nn**			**×k**			**×jj**	
Article 4.2 – Assemblage (Waterfowl)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×g**			**×g**			**×g**			**×jj**	
Avocet *Recurvirostra avosetta*		**×h**			**×h**			**×h**			**×jj**	
Golden Plover *Pluvialis apricaria*		**×l**			**×j**			**×k**			**×jj**	
Bar-tailed Godwit *Limosa lapponica*		**×i**			**×j**			**×k**			**×jj**	
Pink-footed Goose *Anser brachyrhynchus*		**×s**			**×t**			**×k**			**×jj**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×p**			**×q**			**×k**			**×jj**	
Shelduck *Tadorna tadorna*		**×v**			**×w**			**×w**			**×jj**	
Pintail *Anas acuta*		**×g**			**×g**			**×g**			**×jj**	
Oystercatcher *Haematopus ostralegus*		**×ii**			**×j**			**×k**			**×jj**	
Grey Plover *Pluvialis squatarola*		**×m**			**×j**			**×k**			**×jj**	
Whooper Swan *Cygnus cygnus*		**×g**			**×g**			**×g**			**×jj**	
Dunlin *Calidris alpina alpina*		**×r**			**×j**			**×k**			**×jj**	
Sanderling *Calidris alba*		**×g**			**×g**			**×g**			**×jj**	
Curlew *Numenius arquata*		**×o**			**×j**			**×k**			**×jj**	
Redshank *Tringa totanus*		**×u**			**×u**			**×u**			**×jj**	
Turnstone *Arenaria interpres*		**×x**			**×j**			**×k**			**×jj**	
Little Grebe *Tachybaptus ruficollis*		**×g**			**×g**			**×g**			**×jj**	
Cormorant *Phalacrocorax carbo*		**×y**			**×z**			**×aa**			**×jj**	
White-fronted Goose *Anser albifrons albifrons*		**×g**			**×g**			**×g**			**×jj**	
Wigeon *Anas penelope*		**×bb**			**×cc**			**×k**			**×jj**	
Mallard *Anas platyrhynchos*		**×dd**			**×j**			**×k**			**×jj**	
Ringed Plover *Charadrius hiaticula*		**×ee**			**×j**			**×k**			**×jj**	

Name of European site: The Wash SPA												
Distance to Hornsea Project One: 42.7 km												
European site features	**Likely Effects of Project One**											
Lapwing *Vanellus vanellus*		**×ff**			**×gg**			**×k**			**×jj**	
Knot *Calidris canutus*		**×n**			**×j**			**×k**			**×jj**	
Whimbrel *Numenius phaeopus*		**×hh**			**×j**			**×k**			**×jj**	

Evidence supporting conclusions (Ref: Table A47 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6.% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Three little terns were recorded, all flying below 5 m.

e. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

f. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

g. These species were not recorded during Project One surveys.

h. Only two avocets were recorded during two years of surveys.

i. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

j. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

k. These species were not recorded using the development area and no displacement effects are predicted.

l. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

m. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

n. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

o. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

p. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

q. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

r. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

s. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

t. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

u. Only seven redshank were recorded during two years of surveys.

v. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

w. Only one shelduck was recorded during two years of surveys.

x. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

y. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

z. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

aa. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

bb. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

cc. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

dd. A total of ten mallard were recorded during two years of surveys. The low numbers recorded and reported relatively high levels of avoidance behaviour by wildfowl indicate very low risk of collision.

ee. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

ff. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

gg. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

hh. Eleven out of a total of 49 whimbrel recorded were in the Hornsea Project One. 55.1% of all whimbrel recorded were flying above 22.5 m and therefore at potential risk of collision. However, the number of whimbrel recorded in the development zone was low and therefore at low risk of a significant effect.

ii. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

jj. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A47 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

kk. Only one goldeneye was recorded during two years of surveys.

ll. Only one gadwall was recorded during two years of surveys.

mm. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

nn. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA however indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

Stage 1 Matrix 64: The Wash Ramsar

Name of European site: The Wash Ramsar												
Distance to Hornsea Project One: 42.7 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in Spring/Autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Oystercatcher *Haematopus ostralegus*		**×a**			**×b**			**×c**			**×x**	
Grey Plover *Pluvialis squatarola*		**×d**			**×b**			**×c**			**×x**	
Knot *Calidris canutus*		**×e**			**×b**			**×c**			**×x**	
Sanderling *Calidris alba*		**×f**			**×f**			**×f**			**×x**	
Curlew *Numenius arquata*		**×g**			**×b**			**×c**			**×x**	
Redshank *Tringa totanus*		**×h**			**×h**			**×h**			**×x**	
Turnstone *Arenaria interpres*		**×i**			**×b**			**×c**			**×x**	
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×j**			**×k**			**×c**			**×x**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×l**			**×m**			**×c**			**×x**	
Shelduck *Tadorna tadorna*		**×n**			**×o**			**×o**			**×x**	
Pintail *Anas acuta*		**×p**			**×p**			**×p**			**×x**	
Dunlin *Calidris alpina alpina*		**×q**			**×b**			**×c**			**×x**	
Bar-tailed Godwit *Limosa lapponica*		**×r**			**×b**			**×c**			**×x**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration. Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×s**			**×b**			**×c**			**×x**	
Black-tailed Godwit *Limosa limosa islandica*		**×t**			**×t**			**×t**			**×x**	
Ramsar criterion 6 – Species/populations identified subsequent to designation for possible future consideration - Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Golden Plover *Pluvialis apricaria*		**×u**			**×b**			**×c**			**×x**	
Lapwing *Vanellus vanellus*		**×v**			**×w**			**×c**			**×x**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D

Name of European site: The Wash Ramsar												
Distance to Hornsea Project One: 42.7 km												
European site features	**Likely Effects of Project One**											
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×z**			**×aa**			**×bb**			**×x**	
Ramsar criterion 3												
Inter-relationship between various components including saltmarshes, intertidal sand and mud flats and the estuarine waters; see footnote .												
Ramsar criterion 1												
Site has extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels.												

Evidence supporting conclusions (Ref: Table A47 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. No birds of these species were recorded using the development area and no displacement effects are predicted.

d. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

e. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

f. No sanderling were recorded.

g. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

h. Only seven redshank were recorded during two years of surveys.

i. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

j. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

k. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

l. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

m. in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

n. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

o. Only one shelduck was recorded during two years of surveys.

p. These species were not recorded during Project One surveys.

q. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

r. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

s. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

t. These species were not recorded during Project One surveys.

u. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

v. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

w. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

x. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A47 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

y. These habitats have been screened out for this Ramsar site as it is 42.7 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

z. Low numbers of assemblage species were recorded (see Matrix 63) and with the majority of wader and seaduck flights below rotor height, and the distance to Project One, the risk of a significant impact is very low.

aa. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

bb. No assemblage species were recorded utilising the development area (Matrix 63, with the exception of small numbers of common scoter) and no displacement effects are predicted.

Stage 1 Matrix 65: North Norfolk Coast SPA

Name of European site: North Norfolk Coast SPA												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×kk**	
Bittern *Botaurus stellaris*		**×b**			**×b**			**×b**			**×kk**	
Common Tern *Sterna hirundo*		**×c**			**×d**			**×e**			**×kk**	
Little Tern *Sterna albifrons*		**×f**			**×g**			**×e**			**×kk**	
Marsh Harrier *Circus aeruginosus*		**×a**			**×a**			**×a**			**×kk**	
Mediterranean Gull *Larus melanocephalus*		**×a**			**×a**			**×a**			**×kk**	
Roseate Tern *Sterna dougallii*		**×b**			**×b**			**×b**			**×kk**	
Sandwich Tern *Sterna sandvicensis*		**×h**			**×i**			**×e**			**×kk**	
Montagu's harrier *Circus pygargus*		**×ll**			**×ll**			**×ll**			**×kk**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×kk**	
Bar-tailed Godwit *Limosa lapponica*		**×j**			**×k**			**×l**			**×kk**	
Bittern *Botaurus stellaris*		**×b**			**×b**			**×b**			**×kk**	
Golden Plover *Pluvialis apricaria*		**×m**			**×k**			**×l**			**×kk**	
Hen Harrier *Circus cyaneus*		**×b**			**×b**			**×b**			**×kk**	
Ruff *Philomachus pugnax*		**×b**			**×b**			**×b**			**×kk**	
Article 4.2 – Migratory (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×kk**	
Ringed Plover *Charadrius hiaticula*		**×o**			**×k**			**×l**			**×kk**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×o**			**×k**			**×l**			**×kk**	

Name of European site: North Norfolk Coast SPA												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×p**			**×q**			**×l**			**×kk**	
Knot *Calidris canutus*		**×r**			**×k**			**×l**			**×kk**	
Pink-footed Goose *Anser brachyrhynchus*		**×s**			**×t**			**×l**			**×kk**	
Pintail *Anas acuta*		**×a**			**×a**			**×a**			**×kk**	
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×kk**	
Wigeon *Anas penelope*		**×u**			**×v**			**×l**			**×kk**	
Article 4.2 – Assemblage (Waterfowl)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Shelduck *Tadorna tadorna*		**×w**			**×w**			**×w**			**×kk**	
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×kk**	
Golden Plover *Pluvialis apricaria*		**×m**			**×k**			**×l**			**×kk**	
Ruff *Philomachus pugnax*		**×b**			**×b**			**×b**			**×kk**	
Bar-tailed Godwit *Limosa lapponica*		**×j**			**×k**			**×l**			**×kk**	
Pink-footed Goose *Anser brachyrhynchus*		**×s**			**×t**			**×l**			**×kk**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×p**			**×q**			**×l**			**×kk**	
Wigeon *Anas penelope*		**×u**			**×v**			**×l**			**×kk**	
Pintail *Anas acuta*		**×a**			**×a**			**×a**			**×kk**	
Knot *Calidris canutus*		**×r**			**×k**			**×l**			**×kk**	
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×kk**	
Bittern *Botaurus stellaris*		**×b**			**×b**			**×b**			**×kk**	
White-fronted Goose *Anser albifrons albifrons*		**×b**			**×b**			**×b**			**×kk**	
Dunlin *Calidris alpina alpina*		**×x**			**×k**			**×l**			**×kk**	
Gadwall *Anas strepera*		**×y**			**×y**			**×y**			**×kk**	
Teal *Anas crecca*		**×z**			**×k**			**×l**			**×kk**	
Shoveler *Anas clypeata*		**×aa**			**×aa**			**×aa**			**×kk**	
Common Scoter *Melanitta nigra*		**×bb**			**×cc**			**×l**			**×kk**	

Name of European site: North Norfolk Coast SPA												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Velvet Scoter *Melanitta fusca*		**×b**			**×b**			**×b**			**×kk**	
Oystercatcher *Haematopus ostralegus*		**×dd**			**×k**			**×l**			**×kk**	
Ringed Plover *Charadrius hiaticula*		**×o**			**×k**			**×l**			**×kk**	
Grey Plover *Pluvialis squatarola*		**×ee**			**×k**			**×l**			**×kk**	
Lapwing *Vanellus vanellus*		**×ff**			**×gg**			**×l**			**×kk**	
Sanderling *Calidris alba*		**×b**			**×b**			**×b**			**×kk**	
Cormorant *Phalacrocorax carbo*		**×hh**			**×ii**			**×jj**			**×kk**	

Evidence supporting conclusions (Ref: Table A48 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

c. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

d. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

e. Three little terns were recorded, all flying below 5 m.

f. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

g. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

h. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

i. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

j. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

k. These species were not recorded using the development area and no displacement effects are predicted.

l. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. None were recorded flying above 22.5 m and therefore at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

m. Only seven redshank were recorded during two years of surveys.

n. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

o. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

p. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

q. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

r. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

s. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

t. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

u. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

v. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

w. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

x. Only one gadwall was recorded during two years of surveys.

y. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

z. Only four shoveler were recorded during two years of surveys.

aa. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

bb. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

cc. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

dd. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

ee. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

ff. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

gg. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

hh. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

ii. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

jj. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A48 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

kk. This species was not recorded during baseline surveys.

Stage 1 Matrix 66: North Norfolk Coast Ramsar

Name of European site: North Norfolk Coast Ramsar												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - Species regularly supported during the breeding season	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common Tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×t**	
Little Tern *Sterna albifrons*		**×d**			**×e**			**×c**			**×t**	
Sandwich Tern *Sterna sandvicensis*		**×f**			**×g**			**×e**			**×t**	
Ramsar criterion 6 - Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Knot *Calidris canutus*		**×h**			**×i**			**×j**			**×t**	
Ramsar criterion 6 - Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×k**			**×l**			**×j**			**×t**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×m**			**×n**			**×j**			**×t**	
Wigeon *Anas penelope*		**×o**			**×p**			**×j**			**×t**	
Pintail *Anas acuta*		**×q**			**×q**			**×q**			**×t**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×r**			**×i**			**×j**			**×t**	
Sanderling *Calidris alba*		**×q**			**×q**			**×q**			**×t**	
Bar-tailed Godwit *Limosa lapponica*		**×s**			**×i**			**×j**			**×t**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×v**			**×w**			**×x**			**×t**	
Ramsar criterion 2												
Red data book and nationally scarce vascular plants, lichen and invertebrates; see footnote **u**.												

Name of European site: North Norfolk Coast Ramsar												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 1												
Site has undeveloped coastal habitat, good examples of marshland coast with intertidal sand and mud, saltmarshes, shingle banks and sand dunes. Brackish lagoons with freshwater grazing marsh and reedbeds; see footnote **u**.												

Evidence supporting conclusions (Ref: Table A48 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The Ramsar is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The Ramsar is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Three little terns were recorded, all flying below 5 m.

e. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

f. One sandwich tern was recorded in Year 1 and six in Year 2. The Ramsar is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

g. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

h. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

i. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

j. These species were not recorded using the development area and no displacement effects are predicted.

k. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

l. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

m. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

n. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

o. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

p. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

q. These species were not recorded during Project One surveys.

r. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

s. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

t. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A48 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

u. These habitats have been screened out for this Ramsar site as it is 57.9 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

v. Low numbers of assemblage species were recorded (see Matrix 65) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

w. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

x. No assemblage species were recorded utilising the development area (Matrix 65) and no displacement effects are predicted.

Stage 1 Matrix 67: Breydon Water SPA

Name of European site: Breydon Water SPA												
Distance to Hornsea Project One: 120.7 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Common Tern *Sterna hirundo*		**×a**			**×b**			**×c**			**×r**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×r**	
Bewick's Swan *Cygnus columbianus bewickii*		**×e**			**×e**			**×e**			**×r**	
Golden Plover *Pluvialis apricaria*		**×f**			**×g**			**×h**			**×r**	
Ruff *Philomachus pugnax*		**×e**			**×e**			**×e**			**×r**	
Article 4.2 – Assemblage (Waterfowl)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×e**			**×e**			**×e**			**×r**	
Dunlin *Calidris alpina alpina*		**×i**			**×g**			**×h**			**×r**	
Lapwing *Vanellus vanellus*		**×j**			**×k**			**×h**			**×r**	
Shoveler *Anas clypeata*		**×l**			**×l**			**×l**			**×r**	
Wigeon *Anas penelope*		**×m**			**×n**			**×h**			**×r**	
White-fronted Goose *Anser albifrons albifrons*		**×e**			**×e**			**×e**			**×r**	
Cormorant *Phalacrocorax carbo*		**×o**			**×p**			**×q**			**×r**	
Golden Plover *Pluvialis apricaria*		**×f**			**×g**			**×h**			**×r**	
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×r**	
Bewick's Swan *Cygnus columbianus bewickii*		**×e**			**×e**			**×e**			**×r**	

Evidence supporting conclusions (Ref: Table A49 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

b. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

d. Only two avocets were recorded during two years of surveys.

e. These species were not recorded during Project One surveys.

f. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No goldenplover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

g. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

h. These species were not recorded using the development area and no displacement effects are predicted.

i. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

j. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

k. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

l. Only four shoveler were recorded during two years of surveys.

m. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

n. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

o. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

p. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

q. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

r. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A49 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 68: Breydon Water Ramsar

Name of European site: Breydon Water Ramsar												
Distance to Hornsea Project One: 120.7 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bewick's Swan *Cygnus columbianus bewickii*		**×a**			**×a**			**×a**			**×m**	
Lapwing *Vanellus vanellus*		**×b**			**×c**			**×d**			**×m**	
Ramsar criterion 6 - species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed goose, *Anser brachyrhynchus*		**×e**			**×f**			**×d**			**×m**	
Wigeon *Anas penelope*		**×g**			**×h**			**×d**			**×m**	
Shoveler *Anas clypeata*		**×i**			**×i**			**×i**			**×m**	
Golden Plover *Pluvialis apricaria*		**×j**			**×k**			**×d**			**×m**	
Black-tailed Godwit *Limosa limosa islandica*		**×l**			**×l**			**×l**			**×m**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×n**			**×o**			**×p**			**×m**	

Evidence supporting conclusions (Ref: Table A49 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

c. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

f. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

g. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

h. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

i. Only four shoveler were recorded during two years of surveys.

j. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No goldenplover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

k. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

l. These species were not recorded during Project One surveys.

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A49 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

n. Low numbers of assemblage species were recorded (see Matrix 67) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

o. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

p. No assemblage species were recorded utilising the development area (Matrix 67) and no displacement effects are predicted.

Stage 1 Matrix 69: Great Yarmouth and North Denes SPA

Name of European site: Great Yarmouth and North Denes SPA												
Distance to Hornsea Project One: 107 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×d**	

Evidence supporting conclusions (Ref: Table A50 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A50 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 70: Broadland SPA

Name of European site: Broadland SPA												
Distance to Hornsea Project One: 99.1 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bittern *Botaurus stellaris*		**×a**			**×a**			**×a**			**×t**	
Marsh Harrier *Circus aeruginosus*		**×a**			**×a**			**×a**			**×t**	
Article 4.1 – Over winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bewick's Swan *Cygnus columbianus bewickii*		**×a**			**×a**			**×a**			**×t**	
Bittern *Botaurus stellaris*		**×a**			**×a**			**×a**			**×t**	
Hen Harrier *Circus cyaneus*		**×a**			**×a**			**×a**			**×t**	
Ruff *Philomachus pugnax*		**×a**			**×a**			**×a**			**×t**	
Whooper Swan *Cygnus cygnus*		**×a**			**×a**			**×a**			**×t**	
Article 4.2 – Migratory (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall *Anas strepera*		**×b**			**×b**			**×b**			**×t**	
Pink-footed Goose *Anser brachyrhynchus*		**×c**			**×d**			**×e**			**×t**	
Shoveler *Anas clypeata*		**×f**			**×f**			**×f**			**×t**	
Article 4.2 – Assemblage (Waterfowl)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Cormorant *Phalacrocorax carbo*		**×g**			**×h**			**×i**			**×t**	
Bewick's Swan *Cygnus columbianus bewickii*		**×a**			**×a**			**×a**			**×t**	
Whooper Swan *Cygnus cygnus*		**×a**			**×a**			**×a**			**×t**	
Ruff *Philomachus pugnax*		**×a**			**×a**			**×a**			**×t**	
Pink-footed Goose *Anser brachyrhynchus*		**×c**			**×d**			**×e**			**×t**	
Bittern *Botaurus stellaris*		**×a**			**×a**			**×a**			**×t**	
Great Crested Grebe *Podiceps cristatus*		**×j**			**×k**			**×e**			**×t**	
Coot *Fulica atra*		**×a**			**×a**			**×a**			**×t**	
Bean Goose *Anser fabalis*		**×l**			**×m**			**×e**			**×t**	
White-fronted Goose *Anser albifrons albifrons*		**×a**			**×a**			**×a**			**×t**	
Wigeon *Anas penelope*		**×n**			**×o**			**×e**			**×t**	

Name of European site: Broadland SPA												
Distance to Hornsea Project One: 99.1 km												
European site features	**Likely Effects of Project One**											
Teal *Anas crecca*		**×p**			**×k**			**×e**			**×t**	
Pochard *Aythya ferina*		**×q**			**×k**			**×e**			**×t**	
Tufted Duck *Aythya fuligula*		**×r**			**×r**			**×r**			**×t**	
Shoveler *Anas clypeata*		**×k**			**×k**			**×k**			**×t**	
Gadwall *Anas strepera*		**×s**			**×s**			**×s**			**×t**	

Evidence supporting conclusions (Ref: Table A51 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. Only one gadwall was recorded during two years of surveys.

c. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

d. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

e. These species were not recorded using the Hornsea Project One and therefore no displacement effects are predicted to occur.

f. Only four shoveler were recorded during two years of surveys.

g. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

h. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

i. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

j. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

k. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to or from the SPA is negligible.

l. Three bean geese were recorded in year 2, one of which was in Hornsea Project One.

m. The incremental increase in flight distance will be negligible compared to the overall distance flown during migration.

n. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

o. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

p. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

q. Three pochard were recorded flying at 10 m in height in the development area but outwith the Hornsea Project One in Year 1 and two birds were recorded in Year 2. Therefore, at very low risk of collision.

r. Only seven tufted duck were recorded during two years of surveys.

s. Only one gadwall was recorded during two years of surveys.

t. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A51 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 71: Broadland Ramsar

Name of European site: Broadland Ramsar												
Distance to Hornsea Project One: 99.1 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bewick's Swan *Cygnus columbianus bewickii*		**×a**			**×a**			**×a**			**×k**	
Wigeon *Anas penelope*		**×b**			**×c**			**×d**			**×k**	
Gadwall *Anas strepera*		**×e**			**×e**			**×e**			**×k**	
Shoveler *Anas clypeata*		**×f**			**×f**			**×f**			**×k**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pink-footed Goose *Anser brachyrhynchus*		**×g**			**×h**			**×d**			**×k**	
Greylag goose *Anser anser anser*		**×i**			**×j**			**×d**			**×k**	
Ramsar criterion 2												
Site supports a number of rare species and habitats within the biogeographical zone context including Habitats Directive Annex I features. Site also supports outstanding assemblages of British Red Data Book plants and invertebrates; see footnote **l**.												

Evidence supporting conclusions (Ref: Table A51 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

c. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

d. These species were not recorded using the Hornsea Project One and therefore no displacement effects are predicted to occur.

e. Only one gadwall was recorded during two years of surveys.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to or from the Ramsar is negligible.

g. Twenty-two pink-footed geese were recorded on the eastern boundary of the Hornsea Zone in Year 1 and three in Year 2. Known migration routes are mainly from Iceland to North-east Scotland, across to Lancashire and on to Norfolk (Mitchell & Hearn 2004; WWT 2007). A smaller passage also occurs through Yorkshire in the autumn (Thomas 2011). All birds were at rotor height but the very small numbers recorded indicate that should there be a collision risk the significance will be negligible.

h. Pink-footed geese are known to fly around or over offshore wind farms (e.g. BOW 2007). The incremental increase in overall migration distance due to flying an additional c. 32 km is considered negligible.

i. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas, 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

j. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

k. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A51 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

l. These habitats have been screened out for this Ramsar site as it is 99.1 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 72: Minsmere and Walberswick SPA

Name of European site: Minsmere and Walberswick SPA												
Distance to Hornsea Project One: 146.9 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*,		**×a**			**×a**			**×a**			**×k**	
Bittern *Botaurus stellarius*		**×b**			**×b**			**×b**			**×k**	
Little Tern *Sterna albifrons*		**×c**			**×d**			**×e**			**×k**	
Marsh Harrier *Circus aeruginosus*		**×b**			**×b**			**×b**			**×k**	
Nightjar *Camprimulgus europaeus*		**×b**			**×b**			**×b**			**×k**	
Woodlark *Lullula arborea*		**×b**			**×b**			**×b**			**×b**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*,		**×a**			**×a**			**×a**			**×k**	
Bittern *Botaurus stellarius*		**×b**			**×b**			**×b**			**×k**	
Hen harrier *Circus cyaneus*		**×b**			**×b**			**×b**			**×k**	
Article 4.2 – Migratory (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall *Anas strepera*		**×f**			**×f**			**×f**			**×k**	
Shoveler *Anas clypeata*		**×g**			**×g**			**×g**			**×k**	
Teal *Anas crecca*		**×h**			**×i**			**×j**			**×k**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall *Anas strepera*		**×f**			**×f**			**×f**			**×k**	
Shoveler *Anas clypeata*		**×g**			**×g**			**×g**			**×k**	
White-fronted goose *Anser albifrons albifrons*		**×b**			**×b**			**×b**			**×k**	

Evidence supporting conclusions (Ref: Table A52 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two avocets were recorded during two years of surveys.

b. These species were not recorded during Project One surveys.

c. Three little terns were recorded, all flying below 5 m.

d. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

e. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

f. Only one gadwall was recorded during two years of surveys.

g. Only four shoveler were recorded during two years of surveys.

h. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

i. Migrating birds may fly around the wind farm but the incremental increase in flight distance is likely to be negligible compared to the overall distance flown during migration.

j. No birds were recorded using the area and no displacement effects are predicted.

k. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A52 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 73: Minsmere and Walberswick Ramsar

Name of European site: Minsmere and Walberswick Ramsar												
Distance to Hornsea Project One: 146.9 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 1												
The site contains a mosaic of marine, freshwater, marshland and associated habitats and transition areas. Contains the largest continuous stand of reedbeds in England and Wales, and rare transition from grazing marsh ditch plants to brackish to fresh water; see footnote **a**.												
Ramsar criterion 2	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	D	C	C	O	D	C
Important assemblages of rare breeding birds associated with marshland and reedbeds		**×b**			**×b**			**×b**			**×c**	
Site supports nationally scarce plants , red data book invertebrates and Habitats Directive Annex II species; see footnote **a**.												

Evidence supporting conclusions (Ref: Table A52 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 146.9 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

b. Breeding species listed in Matrix 72 were not recorded.

c. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A52 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 74: Alde Ore Estuary SPA

Name of European site: Alde Ore Estuary SPA

Distance to Hornsea Project One: 161.8 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×x**	
Little Tern *Sterna albifrons*		**×b**			**×c**			**×d**			**×x**	
Marsh Harrier *Circus aeruginosus*		**×e**			**×e**			**×e**			**×x**	
Sandwich Tern Sterna sandvicensis		**×f**			**×g**			**×d**			**×x**	
Article 4.2 – Migratory (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Lesser Black-backed Gull *Larus fuscus*		**×h**			**×i**			**×j**			**×x**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×k**			**×k**			**×k**			**×x**	
Ruff *Philomachus pugnax*		**×e**			**×e**			**×e**			**×x**	
Article 4.2 – Assemblage (Seabirds)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Herring Gull *Larus argentatus*		**×l**			**×j**			**×k**			**×x**	
Black-headed Gull *Larus ridibundus*		**×m**			**×j**			**×k**			**×x**	
Lesser Black-backed Gull *Larus fuscus*		**×h**			**×i**			**×j**			**×x**	
Little Tern *Sterna albifrons*		**×b**			**×c**			**×d**			**×x**	
Sandwich Tern *Sterna sandvicensis*		**×f**			**×g**			**×d**			**×x**	
Article 4.2 – Assemblage (Waterbirds)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×e**			**×e**			**×e**			**×x**	
Dunlin *Calidris alpina alpina*		**×n**			**×o**			**×p**			**×x**	
Lapwing *Vanellus vanellus*		**×q**			**×r**			**×p**			**×x**	
Shoveler *Anas clypeata*		**×s**			**×s**			**×s**			**×x**	
Teal *Anas crecca*		**×t**			**×o**			**×p**			**×x**	
Wigeon *Anas penelope*		**×u**			**×v**			**×p**			**×x**	
Shelduck *Tadorna tadorna*		**×w**			**×w**			**×w**			**×x**	
White-fronted Goose *Anser albifrons albifrons*		**×e**			**×e**			**×e**			**×x**	

Name of European site: Alde Ore Estuary SPA												
Distance to Hornsea Project One: 161.8 km												
European site features	**Likely Effects of Project One**											
Redshank *Tringa totanus*		✕k			✕k			✕k			✕x	
Avocet *Recurvirostra avosetta*		✕a			✕a			✕a			✕x	

Evidence supporting conclusions (Ref: Table A53 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two avocets were recorded during two years of surveys.

b. Three little terns were recorded, all flying below 5 m.

c. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

d. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006).

e. These species were not recorded during Project One surveys.

f. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

g. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

h. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. During the non-breeding period none of the collisions are predicted to be of birds from this SPA (see Annex B).

i. The SPA is outwith the mean maximum foraging range for these species gull during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in distance flown.

j. Evidence from constructed offshore wind farms indicates that these species are not significantly displaced by wind farms (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006).

k. Only seven redshank were recorded during two years of surveys.

l. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. Birds from this SPA may be at risk of a significant impact either alone or in-combination with other potential future developments.

m. A total of 388 black-headed gulls were recorded. Of those in flight 99.7% were below 22.5 m and therefore at low risk of collision. The distance this SPA is from the proposed development and the low usage of the site indicates low risk of a significant impact.

n. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

o. Migrating birds may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to overall distance flown during migration.

p. These species were not recorded using the development area and no displacement effects are predicted.

q. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

r. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

s. Only four shoveler were recorded during two years of surveys.

t. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

u. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

v. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

w. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

x. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A53 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 75: Alde Ore Estuary Ramsar

Name of European site: Alde Ore Estuary Ramsar												
Distance to Hornsea Project One: 161.8 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×f**	
Redshank *Tringa totanus*		**×b**			**×b**			**×b**			**×f**	
Ramsar criterion 6 - Species regularly supported during the breeding season	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Lesser Black-backed Gull *Larus fuscus*		**×c**			**×d**			**×e**			**×f**	
Ramsar criterion 3	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Site supports a notable assemblage of breeding and wintering wetland birds.		**×h**			**×i**			**×j**			**×f**	
Ramsar criterion 2												
Site supports a number of nationally-scarce plant species and British Red Data Book invertebrates; see footnote **g**.												

Evidence supporting conclusions (Ref: Table A53 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two avocets were recorded during two years of surveys.

b. Only seven redshank were recorded during two years of surveys.

c. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The Ramsar is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. During the non-breeding period none of the collisions are predicted to be of birds from this Ramsar (see Annex B).

d. The Ramsar is outwith the mean maximum foraging range for these species gull during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in distance flown.

e. Evidence from constructed offshore wind farms indicates that these species are not significantly displaced by wind farms (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006).

f. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A53 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

g. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 161.8 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

h. Low numbers of assemblage species were recorded (see Matrix 74) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

i. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

j. No assemblage species were recorded utilising the development area (Matrix 74, with the exception of small numbers of seaducks) and no displacement effects are predicted.

Stage 1 Matrix 76: Stour and Orwell Estuaries SPA

Name of European site: Stour and Orwell Estuaries SPA												
Distance to Hornsea Project One: 169.5 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Hen Harrier *Circus cyaneus*		**×a**			**×a**			**×a**			**×z**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*,		**×a**			**×a**			**×a**			**×z**	
Dunlin *Calidris alpina alpina*,		**×b**			**×c**			**×d**			**×z**	
Grey Plover *Pluvialis squatarola*,		**×e**			**×c**			**×d**			**×z**	
Pintail *Anas acuta*,		**×a**			**×a**			**×a**			**×z**	
Redshank *Tringa totanus*,		**×f**			**×f**			**×f**			**×z**	
Shelduck *Tadorna tadorna*,		**×g**			**×h**			**×h**			**×z**	
Turnstone *Arenaria interpres*,		**×i**			**×c**			**×d**			**×z**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×d**			**×z**	
Knot *Calidris canutus*		**×l**			**×c**			**×d**			**×z**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Cormorant *Phalacrocorax carbo*		**×m**			**×n**			**×o**			**×z**	
Ringed Plover *Charadrius hiaticula*,		**×p**			**×c**			**×d**			**×z**	
Pintail *Anas acuta*		**×a**			**×a**			**×a**			**×z**	
Grey Plover *Pluvialis squatarola*		**×e**			**×c**			**×d**			**×z**	
Dunlin *Calidris alpina alpina*		**×b**			**×c**			**×d**			**×z**	
Black-tailed Godwit *Limosa limosa islandica*		**×a**			**×a**			**×a**			**×z**	
Redshank *Tringa totanus*		**×f**			**×f**			**×f**			**×z**	
Shelduck *Tadorna tadorna*		**×g**			**×h**			**×h**			**×z**	
Great Crested Grebe *Podiceps cristatus*		**×q**			**×c**			**×d**			**×z**	
Curlew *Numenius arquata*		**×r**			**×c**			**×d**			**×z**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×d**			**×z**	
Wigeon *Anas penelope*		**×s**			**×t**			**×d**			**×z**	
Goldeneye *Bucephala clangula*		**×u**			**×u**			**×u**			**×z**	
Oystercatcher *Haematopus ostralegus*		**×v**			**×c**			**×d**			**×z**	
Lapwing *Vanellus vanellus*		**×w**			**×x**			**×d**			**×z**	
Knot *Calidris canutus*		**×l**			**×c**			**×d**			**×z**	

Name of European site: Stour and Orwell Estuaries SPA												
Distance to Hornsea Project One: 169.5 km												
European site features	**Likely Effects of Project One**											
Turnstone *Arenaria interpres*		**×i**			**×c**			**×d**			**×z**	
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avovcet *Recurvirostra avosetta*		**×y**			**×y**			**×y**			**×z**	

Evidence supporting conclusions (Ref: Table A54 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

c. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to overall distance flown during migration.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

f. Only seven redshank were recorded during two years of surveys.

g. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

h. Only one shelduck was recorded during two years of surveys.

i. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

j. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

k. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

l. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

m. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

n. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

o. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

p. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

q. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

r. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

s. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

t. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

u. Only one goldeneye was recorded during two years of surveys.

v. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

w. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

x. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

y. Only two avocets were recorded during two years of surveys.

z. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A54 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 77: Stour and Orwell Estuaries Ramsar

Name of European site: Stour and Orwell Estuaries Ramsar												
Distance to Hornsea Project One: 169.5 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*,		**×a**			**×a**			**×a**			**×j**	
Dunlin *Calidris alpina alpina*,		**×b**			**×c**			**×d**			**×j**	
Grey Plover *Pluvialis squatarola*,		**×e**			**×c**			**×d**			**×j**	
Pintail *Anas acuta*,		**×a**			**×a**			**×a**			**×j**	
Redshank *Tringa totanus*,		**×f**			**×f**			**×f**			**×j**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×g**			**×h**			**×d**			**×j**	
Knot *Calidris canutus*		**×i**			**×c**			**×d**			**×j**	
Ramsar criterion 6 - Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*,		**×f**			**×f**			**×f**			**×j**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×k**			**×l**			**×m**			**×j**	
Ramsar criterion 2												
Nationally scarce plants (stiff saltmarsh-grass *Puccinellia rupestris*; small cord-grass *Spartina maritima*; perennial glasswort *Sarcocornia perennis*; lax-flowered sea lavender *Limonium humile*; and the eelgrasses *Zostera angustifolia*, *Z. marina* and *Z. noltei*.); see footnote **n**.												

Evidence supporting conclusions (Ref: Table A54 of Annex A of the HRA Report (Doc ref No 12.6)):

a. These species were not recorded during Project One surveys.

b. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

c. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to overall distance flown during migration.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

f. Only seven redshank were recorded during two years of surveys.

g. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

h. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

i. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

j. In-combination LSE informed by the footnotes above for the individual receptors as presented **in Annex A, Table A54 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects**.**

k. Low numbers of assemblage species were recorded (see Matrix 76) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

l. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

m. No assemblage species were recorded utilising the development area (Matrix 76) and no displacement effects are predicted.

n. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 169.5 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 78: Hamford Water SPA

Name of European site: Hamford Water SPA												
Distance to Hornsea Project One: 183.3 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×v**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×v**	
Golden Plover *Pluvialis apricaria*		**×e**			**×f**			**×g**			**×v**	
Ruff *Philomachus pugnax*		**×h**			**×h**			**×h**			**×v**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×v**	
Article 4.2 – Migratory (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×h**			**×h**			**×h**			**×v**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×g**			**×v**	
Grey Plover *Pluvialis squatarola*		**×l**			**×f**			**×g**			**×v**	
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×v**	
Teal *Anas crecca*		**×m**			**×f**			**×g**			**×v**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×v**	
Dunlin *Calidris alpina alpina*		**×o**			**×f**			**×g**			**×v**	
Lapwing *Vanellus vanellus*		**×p**			**×q**			**×g**			**×v**	
Wigeon *Anas penelope*		**×r**			**×s**			**×g**			**×v**	
Shelduck *Tadorna tadorna*		**×t**			**×u**			**×u**			**×v**	
Black-tailed Godwit *Limosa limosa islandica*		**×h**			**×h**			**×h**			**×v**	
Grey Plover *Pluvialis squatarola*		**×l**			**×f**			**×g**			**×v**	
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×v**	
Teal *Anas crecca*		**×m**			**×f**			**×g**			**×v**	

Dark-bellied Brent Goose *Branta bernicla bernicla*		×j			×k			×g			×v	
Ruff *Philomachus pugnax*		×h			×h			×h			×v	
Golden Plover *Pluvialis apricaria*		×e			×f			×g			×v	
Avocet *Recurvirostra avosetta*		×d			×d			×d			×v	

Evidence supporting conclusions (Ref: Table A55 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. Only two avocets were recorded during two years of surveys.

e. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. These species were not recorded during Project One surveys.

i. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

j. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

k. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

l. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

m. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

n. Only seven redshank were recorded during two years of surveys.

o. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

p. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

q. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

r. A total of 19 wigeon were recorded during two years of surveys. The low numbers recorded and predicted high avoidance rates indicate low risk of collision.

s. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

t. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

u. Only one shelduck was recorded during two years of surveys.

v. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A55 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 79: Hamford Water Ramsar

Name of European site: Hamford Water Ramsar												
Distance to Hornsea Project One: 183.3 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×a**			**×b**			**×c**			**×i**	
Redshank *Tringa totanus*		**×d**			**×d**			**×d**			**×i**	
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×e**			**×f**			**×c**			**×i**	
Black-tailed Godwit *Limosa limosa islandica*		**×g**			**×g**			**×g**			**×i**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×h**			**×b**			**×c**			**×i**	

Evidence supporting conclusions (Ref: Table A55 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Only seven redshank were recorded during two years of surveys.

e. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

g. These species were not recorded during Project One surveys.

h. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

i. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A55 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 80: Colne Estuary SPA

Name of European site: Colne Estuary SPA												
Distance to Hornsea Project One: 185.9 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little Tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×x**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×x**	
Golden Plover *Pluvialis apricaria*		**×e**			**×f**			**×g**			**×x**	
Hen Harrier *Circus cyaneus*		**×h**			**×h**			**×h**			**×x**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×i**			**×j**			**×g**			**×x**	
Redshank *Tringa totanus*		**×k**			**×k**			**×k**			**×x**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×h**			**×h**			**×h**			**×x**	
Dunlin *Calidris alpina alpina*		**×l**			**×f**			**×g**			**×x**	
Lapwing *Vanellus vanellus*		**×m**			**×n**			**×g**			**×x**	
Grey Plover *Pluvialis squatarola*		**×o**			**×f**			**×g**			**×x**	
Ringed Plover *Charadrius hiaticula*		**×p**			**×f**			**×g**			**×x**	
Shelduck *Tadorna tadorna*		**×q**			**×r**			**×r**			**×x**	
Cormorant *Phalacrocorax carbo*		**×s**			**×t**			**×u**			**×x**	
Great Crested Grebe *Podiceps cristatus*		**×v**			**×f**			**×g**			**×x**	
Redshank *Tringa totanus*		**×k**			**×k**			**×k**			**×x**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×f**			**×x**	
Golden Plover *Pluvialis apricaria*		**×e**			**×f**			**×g**			**×x**	
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×x**	
Article 4.2 – Migratory (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×p**			**×f**			**×g**			**×x**	

Pochard *Aythya ferina*		×w			×f			×g			×x	

Evidence supporting conclusions (Ref: Table A56 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. Only two avocets were recorded during two years of surveys.

e. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

g. These species were not recorded using the development area and no displacement effects are predicted.

h. These species were not recorded during Project One surveys.

i. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

j. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

k. Only seven redshank were recorded during two years of surveys.

l. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

m. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

n. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

o. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

p. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

q. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

r. Only one shelduck was recorded during two years of surveys.

s. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

t. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

u. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

v. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

w. Three pochard were recorded flying at 10 m in height in the development area but outwith the Hornsea Project One in Year 1 and two birds were recorded in Year 2. Therefore, at very low risk of collision.

x. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A56 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 81: Colne Estuary Ramsar

Name of European site: Colne Estuary Ramsar												
Distance to Hornsea Project One: 185.9 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×a**			**×b**			**×c**			**×f**	
Redshank *Tringa totanus*		**×d**			**×d**			**×d**			**×f**	
Ramsar criterion 6 - Species/populations identified subsequent to designation for possible future consideration	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×e**			**×e**			**×e**			**×f**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×g**			**×h**			**×i**			**×f**	
Ramsar criterion 1												
Saltmarsh; see footnote **g**.												
Ramsar criterion 2												
Site supports 12 species of nationally scarce plants and at least 38 British Red Data Book invertebrate species; see footnote **g**.												
Ramsar criterion 3												
Site supports a full and representative sequences of saltmarsh plant communities; see footnote **j**.												

Evidence supporting conclusions (Ref: Table A56 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

b. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Only seven redshank were recorded during two years of surveys.

e. These species were not recorded during Project One surveys.

f. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A56 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

g. Low numbers of assemblage species were recorded (see Matrix 80) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

h. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

i. No assemblage species were recorded utilising the development area (Matrix 80) and no displacement effects are predicted.

j. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 185.9 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 82: Foulness SPA

Name of European site: Foulness SPA												
Distance to Hornsea Project One: 208.4 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×bb**	
Common Tern *Sterna hirundo*		**×b**			**×c**			**×d**			**×bb**	
Little Tern *Sterna albifrons*		**×e**			**×f**			**×d**			**×bb**	
Sandwich Tern *Sterna sandvicensis*		**×g**			**×h**			**×d**			**×bb**	
Ringed Plover *Charadrius hiaticula*		**×aa**			**×j**			**×k**			**×bb**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×bb**	
Bar-tailed Godwit *Limosa lapponica*		**×i**			**×j**			**×k**			**×bb**	
Golden Plover *Pluvialis apricaria*		**×l**			**×j**			**×k**			**×bb**	
Hen Harrier *Circus cyaneus*		**×m**			**×m**			**×m**			**×bb**	
Article 4.2 – Migratory (Winter on passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×bb**	
Article 4.2 – Migratory (Over winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*,		**×o**			**×p**			**×k**			**×bb**	
Grey Plover *Pluvialis squatarola*,		**×q**			**×j**			**×k**			**×bb**	
Knot *Calidris canutus*,		**×r**			**×j**			**×k**			**×bb**	
Oystercatcher *Haematopus ostralegus*		**×s**			**×j**			**×k**			**×bb**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×bb**	
Curlew *Numenius arquata*		**×t**			**×j**			**×k**			**×bb**	
Black-tailed Godwit *Limosa limosa islandica*		**×m**			**×m**			**×m**			**×bb**	
Dunlin *Calidris alpina alpina*		**×u**			**×j**			**×k**			**×bb**	
Lapwing *Vanellus vanellus*		**×v**			**×w**			**×k**			**×bb**	
Wigeon *Anas penelope*		**×x**			**×y**			**×k**			**×bb**	

Shelduck *Tadorna tadorna*		×z			×z			×z			×bb	
Little Grebe *Tachybaptus ruficollis*		×m			×m			×m			×bb	
Knot *Calidris canutus*		×r			×j			×k			×bb	
Grey Plover *Pluvialis squatarola*		×q			×j			×k			×bb	
Oystercatcher *Haematopus ostralegus*		×s			×j			×k			×bb	
Dark-bellied Brent Goose *Branta bernicla bernicla*		×o			×p			×k			×bb	
Bar-tailed Godwit *Limosa lapponica*		×i			×j			×k			×bb	
Golden Plover *Pluvialis apricaria*		×l			×j			×k			×bb	
Avocet *Recurvirostra avosetta*		×a			×a			×a			×bb	

Evidence supporting conclusions (Ref: Table A57 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two avocets were recorded during two years of surveys.

b. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

c. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

d. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

e. Three little terns were recorded, all flying below 5 m.

f. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

g. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

h. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

i. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

j. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

k. These species were not recorded using the development area and no displacement effects are predicted.

l. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

m. These species were not recorded during Project One surveys.

n. Only seven redshank were recorded during two years of surveys.

o. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

p. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

q. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

r. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

s. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

t. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

u. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

v. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

w. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

x. A total of 19 wigeon were recorded during two years of surveys. The low numbers recorded and predicted high avoidance rates indicate low risk of collision.

y. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

z. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

aa. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

bb. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A57 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 83: Foulness Ramsar

Name of European site: Foulness Ramsar												
Distance to Hornsea Project One: 208.4 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 – Species with peak counts in winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×j**	
Knot *Calidris canutus*,		**×d**			**×b**			**×c**			**×j**	
Grey Plover *Pluvialis squatarola*,		**×e**			**×b**			**×c**			**×j**	
Oystercatcher *Haematopus ostralegus*		**×f**			**×b**			**×c**			**×j**	
Dark-bellied Brent Goose *Branta bernicla bernicla*,		**×g**			**×h**			**×c**			**×j**	
Ramsar criterion 6 – Species with peak counts in spring/autumn	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×i**			**×i**			**×i**			**×j**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter		**×k**			**×l**			**×m**			**×j**	
Ramsar criterion 1												
Saltmarsh; see footnote **n**.												
Ramsar criterion 2												
The site supports a number of nationally-rare and nationally-scarce plant species, and British Red Data Book invertebrates; see footnote **n.**												
Ramsar criterion 3												
Site contains extensive saltmarsh habitat, with areas supporting full and representative sequences of saltmarsh plant communities covering the range of variation in Britain; see footnote **n.**												

Evidence supporting conclusions (Ref: Table A57 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

e. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

f. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

g. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

h. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

i. Only seven redshank were recorded during two years of surveys.

j. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A57 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

k. Low numbers of assemblage species were recorded (see Matrix 82) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

l. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

m. No assemblage species were recorded utilising the development area (Matrix 82) and no displacement effects are predicted.

n. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 185.9 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 84: Abberton Reservoir SPA

Name of European site: Abberton Reservoir SPA

Distance to Hornsea Project One: 185.6 km

European site features	**Likely Effects of Project One**											
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Golden Plover *Pluvialis apricaria*		**×a**			**×b**			**×c**			**×c**	
Article 4.2 – Migratory (Breeding)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Cormorant *Phalacrocorax carbo*		**×d**			**×e**			**×f**			**×c**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall *Anas strepera*,		**×g**			**×g**			**×g**			**×c**	
Shoveler *Anas clypeata*,		**×h**			**×h**			**×h**			**×c**	
Teal *Anas crecca*		**×i**			**×b**			**×c**			**×c**	
Mute Swan *Cygnus olor*		**×j**			**×j**			**×j**			**×c**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×j**			**×j**			**×j**			**×c**	
Lapwing *Vanellus vanellus*		**×k**			**×l**			**×c**			**×c**	
Coot *Fulica atra*		**×j**			**×j**			**×j**			**×c**	
Goldeneye *Bucephala clangula*		**×m**			**×m**			**×m**			**×c**	
Tufted Duck *Aythya fuligula*		**×n**			**×n**			**×n**			**×c**	
Pochard *Aythya ferina*		**×o**			**×b**			**×c**			**×c**	
Pintail *Anas acuta*		**×j**			**×j**			**×j**			**×c**	
Wigeon *Anas penelope*		**×p**			**×q**			**×c**			**×c**	
Cormorant *Phalacrocorax carbo*		**×d**			**×e**			**×f**			**×c**	
Great Crested Grebe *Podiceps cristatus*		**×r**			**×b**			**×c**			**×c**	
Shoveler *Anas clypeata*		**×h**			**×h**			**×h**			**×c**	
Teal *Anas crecca*		**×i**			**×b**			**×c**			**×c**	
Gadwall *Anas strepera*		**×g**			**×g**			**×g**			**×c**	
Golden Plover *Pluvialis apricaria*		**×a**			**×b**			**×c**			**×c**	

Evidence supporting conclusions (Ref: Table A58 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

e. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

f. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

g. Only one gadwall was recorded during two years of surveys.

h. Only four shoveler were recorded during two years of surveys.

i. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

j. These species were not recorded during Project One surveys.

k. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

l. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

m. Only one goldeneye was recorded during two years of surveys.

n. Only seven tufted duck were recorded during two years of surveys.

o. Three pochard were recorded flying at 10 m in height in the development area but outwith the Hornsea Project One in Year 1 and two birds were recorded in Year 2. Therefore, at very low risk of collision.

p. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

q. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

r. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

s. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A58 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 85: Abberton Reservoir Ramsar

Name of European site: Abberton Reservoir Ramsar												
Distance to Hornsea Project One: 185.6 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall *Anas strepera*,		**×a**			**×a**			**×a**			**×h**	
Shoveler *Anas clypeata*,		**×b**			**×b**			**×b**			**×h**	
Wigeon *Anas penelope*		**×c**			**×d**			**×e**			**×h**	
Ramsar criterion 6 - species/populations identified subsequent to designation for possible future consideration under criterion 6.	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pochard *Aythya ferina*		**×f**			**×g**			**×e**			**×h**	
Mute swan *Cygnus olor*		**×i**			**×i**			**×e**			**×h**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×j**			**×k**			**×l**			**×h**	

Evidence supporting conclusions (Ref: Table A58 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only one gadwall was recorded during two years of surveys.

b. Only four shoveler were recorded during two years of surveys.

c. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

d. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

e. These species were not recorded using the development area and no displacement effects are predicted.

f. Three pochard were recorded flying at 10 m in height in the development area but outwith the Hornsea Project One in Year 1 and two birds were recorded in Year 2. Therefore, at very low risk of collision.

g. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in Annex A, Table A58. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq*. of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq***. for Displacement Effects and **paragraphs 4.3.229 *et seq*.** for Barrier Effects.

i. This species was not recorded during Project One surveys.

j. Low numbers of assemblage species were recorded (see Matrix 84) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

k. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

l. No assemblage species were recorded utilising the development area (Matrix 84) and no displacement effects are predicted.

Stage 1 Matrix 86: Blackwater Estuary SPA

Name of European site: Blackwater Estuary SPA												
Distance to Hornsea Project One: 189.9 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×ee**	
Pochard *Aythya ferina*		**×d**			**×e**			**×f**			**×ee**	
Article 4.2 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×g**			**×g**			**×g**			**×ee**	
Golden Plover *Pluvialis apricaria*		**×h**			**×e**			**×f**			**×ee**	
Hen Harrier *Circus cyaneus*		**×i**			**×i**			**×i**			**×ee**	
Ruff *Philomachus pugnax*		**×i**			**×i**			**×i**			**×ee**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×j**			**×e**			**×f**			**×ee**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×i**			**×i**			**×i**			**×ee**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×k**			**×l**			**×f**			**×ee**	
Dunlin *Calidris alpina alpina*		**×m**			**×e**			**×f**			**×ee**	
Grey Plover *Pluvialis squatarola*		**×n**			**×e**			**×f**			**×ee**	
Redshank *Tringa totanus*		**×o**			**×o**			**×o**			**×ee**	
Ringed Plover *Charadrius hiaticula*		**×j**			**×e**			**×f**			**×ee**	
Shelduck *Tadorna tadorna*		**×p**			**×q**			**×q**			**×ee**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Great Crested Grebe *Podiceps cristatus*		**×r**			**×e**			**×f**			**×ee**	
Golden Plover *Pluvialis apricaria*		**×h**			**×e**			**×f**			**×ee**	
Ruff *Philomachus pugnax*		**×i**			**×i**			**×i**			**×ee**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×k**			**×l**			**×f**			**×ee**	
Shelduck *Tadorna tadorna*		**×p**			**×q**			**×q**			**×ee**	

Ringed Plover *Charadrius hiaticula*		×j			×e			×f			×ee	
Grey Plover *Pluvialis squatarola*		×n			×e			×f			×ee	
Dunlin *Calidris alpina alpina*		×m			×e			×f			×ee	
Avocet *Recurvirostra avosetta*		×g			×g			×g			×ee	
Redshank *Tringa totanus*		×o			×o			×o			×ee	
Curlew *Numenius arquata*		×s			×e			×f			×ee	
Cormorant *Phalacrocorax carbo*		×t			×u			×v			×ee	
Wigeon *Anas penelope*		×w			×x			×f			×ee	
Teal *Anas crecca*		×y			×e			×f			×ee	
Pintail *Anas acuta*		×i			×i			×i			×ee	
Shoveler *Anas clypeata*		×z			×z			×z			×ee	
Goldeneye *Bucephala clangula*		×aa			×aa			×aa			×ee	
Red-breasted Merganser *Mergus serrator*		×bb			×bb			×bb			×ee	
Lapwing *Vanellus vanellus*		×cc			×dd			×f			×ee	
Black-tailed Godwit *Limosa limosa islandica*		×i			×i			×i			×ee	

Evidence supporting conclusions (Ref: Table A59 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. Three pochard were recorded flying at 10 m in height in the development area but outwith the Hornsea Project One in Year 1 and two birds were recorded in Year 2. Therefore, at very low risk of collision.

e. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

f. These species were not recorded using the development area and no displacement effects are predicted.

g. Only two avocets were recorded during two years of surveys.

h. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

i. These species were not recorded during Project One surveys.

j. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

k. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

l. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

m. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

n. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

o. Only seven redshank were recorded during two years of surveys.

p. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

q. Only one shelduck was recorded during two years of surveys.

r. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

s. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

t. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

u. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

v. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

w. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

x. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

y. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

z. Only four shoveler were recorded during two years of surveys.

aa. Only one goldeneye was recorded during two years of surveys.

bb. Only two red-breasted merganser were recorded during two years of surveys.

cc. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen et al. 2006). Therefore the risk of an impact is low and will not be significant.

dd. A total of 148 lapwing were recorded. Any additional distance required to fly around Project One will be negligible relative to the overall distance migrated.

ee. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A59 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 87: Blackwater Estuary Ramsar

Name of European site: Blackwater Estuary Ramsar												
Distance to Hornsea Project One: 189.9 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 - species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×a**			**×b**			**×c**			**×l**	
Grey Plover *Pluvialis squatarola*		**×d**			**×e**			**×f**			**×l**	
Black-tailed Godwit *Limosa limosa islandica*		**×g**			**×g**			**×g**			**×l**	
Dunlin *Calidris alpina alpina*		**×h**			**×e**			**×f**			**×l**	
Ramsar criterion 6 - species/populations identified subsequent to designation for possible future consideration under criterion 6.	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Shelduck *Tadorna tadorna*		**×i**			**×j**			**×j**			**×l**	
Golden Plover *Pluvialis apricaria*		**×k**			**×e**			**×f**			**×l**	
Ramsar criterion 1												
Saltmarsh; see footnote **m**.												
Ramsar criterion 2												
The site supports a number British Red Data Book invertebrates; see footnote **m**.												
Ramsar criterion 3												
Saltmarsh plant communities; see footnote **m**.												
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×n**			**×o**			**×p**			**×l**	

Evidence supporting conclusions (Ref: Table A59 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

b. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

c. No brent geese were recorded using the development area and no displacement effects are predicted.

d. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

e. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

f. These species were not recorded using the development area and no displacement effects are predicted.

g. These species were not recorded during Project One surveys.

h. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

i. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

j. Only one shelduck was recorded during two years of surveys.

k. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

l. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A59 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)**for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

m. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 189.9 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

n. Low numbers of assemblage species were recorded (see Matrix 86) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

o. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

p. No assemblage species were recorded utilising the development area (Matrix 86) and no displacement effects are predicted.

Stage 1 Matrix 88: Dengie Marshes SPA

Name of European site: Dengie Marshes SPA												
Distance to Hornsea Project One: 196.4 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×r**	
Hen Harrier *Circus cyaneus*		**×d**			**×d**			**×d**			**×r**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×e**			**×b**			**×c**			**×r**	
Knot *Calidris canutus*		**×f**			**×b**			**×c**			**×r**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×g**			**×g**			**×g**			**×r**	
Dunlin *Calidris alpina alpina*		**×h**			**×b**			**×c**			**×r**	
Lapwing *Vanellus vanellus*		**×i**			**×j**			**×c**			**×r**	
Oystercatcher *Haematopus ostralegus*		**×k**			**×b**			**×c**			**×r**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×l**			**×m**			**×c**			**×r**	
Cormorant *Phalacrocorax carbo*		**×n**			**×o**			**×p**			**×r**	
Great Crested Grebe *Podiceps cristatus*		**×q**			**×b**			**×c**			**×r**	
Knot *Calidris canutus*		**×f**			**×b**			**×c**			**×r**	
Grey Plover *Pluvialis squatarola*		**×e**			**×b**			**×c**			**×r**	
Bar-tailed Godwit *Limosa lapponica*		**×a**			**×b**			**×c**			**×r**	

Evidence supporting conclusions (Ref: Table A60 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. No hen harriers were recorded.

e. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. No black-tailed godwits were recorded.

h. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

i. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

j. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

k. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

l. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

m. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

n. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

o. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

p. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

q. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

r. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A60 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 89: Dengie Marshes Ramsar

Name of European site: Dengie Marshes Ramsar												
Distance to Hornsea Project One: 196.4 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 1 and 3												
Saltmarsh habitat and plants												
Ramsar criterion 2												
The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates.												
Ramsar criterion 6 - species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×a**			**×b**			**×c**			**×h**	
Grey Plover *Pluvialis squatarola*		**×d**			**×e**			**×c**			**×h**	
Knot *Calidris canutus*		**×f**			**×e**			**×c**			**×h**	
Ramsar criterion 6 - species/populations identified subsequent to designation for possible future consideration under criterion 6.	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×g**			**×g**			**×g**			**×h**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×i**			**×j**			**×k**			**×h**	
Ramsar criterion 1												
Saltmarsh; see footnote **i**.												
Ramsar criterion 2												
The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates; see footnote **i**.												
Ramsar criterion 3												
Saltmarsh plants; see footnote **i**.												

Evidence supporting conclusions (Ref: Table A60 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

b. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

e. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. No black-tailed godwits were recorded.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A60 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

i. Low numbers of assemblage species were recorded (see Matrix 88) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

j. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

k. No assemblage species were recorded utilising the development area (Matrix 88) and no displacement effects are predicted.

l. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 196.4 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 90: Benfleet and Southend Marshes SPA

Name of European site: Benfleet and Southend Marshes SPA												
Distance to Hornsea Project One: 215.9 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory (Passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×a**			**×b**			**×c**			**×j**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×d**			**×e**			**×c**			**×j**	
Knot *Calidris canutus*		**×f**			**×b**			**×c**			**×j**	
Grey Plover *Pluvialis squatarola*		**×g**			**×b**			**×c**			**×j**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*		**×h**			**×b**			**×c**			**×j**	
Ringed Plover *Charadrius hiaticula*		**×a**			**×b**			**×c**			**×j**	
Oystercatcher *Haematopus ostralegus*		**×i**			**×b**			**×c**			**×j**	
Knot *Calidris canutus*		**×f**			**×b**			**×c**			**×j**	
Grey Plover *Pluvialis squatarola*		**×g**			**×b**			**×c**			**×j**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×d**			**×e**			**×c**			**×j**	

Evidence supporting conclusions (Ref: Table A61 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

e. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

h. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

i. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

j. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A61 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 91: Benfleet and Southend Marshes Ramsar

Name of European site: **Benfleet and Southend Marshes Ramsar**												
Distance to Hornsea Project One: 215.9 km												
European site features	Likely Effects of Project One											
Ramsar criterion 6 species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×a**			**×b**			**×c**			**×h**	
Grey Plover *Pluvialis squatarola*		**×d**			**×e**			**×c**			**×h**	
Knot *Calidris canutus*		**×f**			**×e**			**×c**			**×h**	
Ramsar criterion 6 species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Dunlin *Calidris alpina alpina*		**×g**			**×e**			**×c**			**×h**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×i**			**×j**			**×k**			**×h**	

Evidence supporting conclusions (Ref: Table A61 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

b. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

e. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A61 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.* of the HRA Report (Doc ref No 12.6)** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

i. Low numbers of assemblage species were recorded (see Matrix 90) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

j. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

k. No assemblage species were recorded utilising the development area (Matrix 90) and no displacement effects are predicted.

Stage 1 Matrix 92: Thames Estuary Marshes SPA

Name of European site: Thames Estuary Marshes SPA												
Distance to Hornsea Project One: 219.4 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×p**	
Hen Harrier *Circus cyaneus*		**×b**			**×b**			**×b**			**×p**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×c**			**×d**			**×e**			**×p**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×c**			**×d**			**×e**			**×p**	
Knot *Calidris canutus islandica*		**×f**			**×d**			**×e**			**×p**	
Redshank *Tringa totanus*		**×g**			**×g**			**×g**			**×p**	
Dunlin *Calidris alpina alpina*		**×h**			**×d**			**×e**			**×p**	
Grey Plover *Pluvialis squatarola*		**×k**			**×d**			**×e**			**×p**	
Black-tailed Godwit *Limosa limosa islandica*		**×b**			**×b**			**×b**			**×p**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×g**			**×g**			**×g**			**×p**	
Black-tailed Godwit *Limosa limosa islandica*		**×b**			**×b**			**×b**			**×p**	
Dunlin *Calidris alpina alpina*		**×h**			**×d**			**×e**			**×p**	
Lapwing *Vanellus vanellus*		**×i**			**×j**			**×e**			**×p**	
Grey Plover *Pluvialis squatarola*		**×k**			**×d**			**×e**			**×p**	
Shoveler *Anas clypeata*		**×l**			**×l**			**×l**			**×p**	
Pintail *Anas acuta*		**×b**			**×b**			**×b**			**×p**	
Gadwall *Anas strepera*		**×m**			**×m**			**×m**			**×p**	
Shelduck *Tadorna tadorna*		**×n**			**×o**			**×o**			**×p**	
White-fronted Goose *Anser albifrons albifrons*		**×b**			**×b**			**×b**			**×p**	
Little Grebe *Tachybaptus ruficollis*		**×b**			**×b**			**×b**			**×p**	
Ringed Plover *Charadrius hiaticula*		**×c**			**×d**			**×e**			**×p**	

Avocet *Recurvirostra avosetta*		×a			×a			×a			×p	

Evidence supporting conclusions (Ref: Table A62 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two avocets were recorded during two years of surveys.

b. These species were not recorded during Project One surveys.

c. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

d. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

e. These species were not recorded using the development area and no displacement effects are predicted.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. Only seven redshank were recorded during two years of surveys.

h. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

i. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

j. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

k. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

l. Only four shoveler were recorded during two years of surveys.

m. Only one gadwall was recorded during two years of surveys.

n. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

o. Only one shelduck was recorded during two years of surveys.

p. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A62 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6) f**or Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 93: Thames Estuary Marshes Ramsar

Name of European site: **Thames Estuary Marshes Ramsar**												
Distance to Hornsea Project One: 219.4 km												
European site features	Likely Effects of Project One											
Ramsar criterion 6 species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×a**			**×b**			**×c**			**×i**	
Black-tailed Godwit *Limosa limosa islandica*		**×d**			**×d**			**×d**			**×i**	
Grey Plover *Pluvialis squatarola*		**×e**			**×b**			**×c**			**×i**	
Knot *Calidris canutus*		**×f**			**×b**			**×c**			**×i**	
Dunlin *Calidris alpina alpina*		**×g**			**×b**			**×e**			**×i**	
Redshank *Tringa totanus*		**×h**			**×h**			**×h**			**×i**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×j**			**×k**			**×l**			**×i**	
Ramsar criterion 2												
The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates; see footnote **m**.												

Evidence supporting conclusions (Ref: Table A62 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

b. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. These species were not recorded during Project One surveys.

e. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

f. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

g. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

h. Only seven redshank were recorded during two years of surveys.

i. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A62 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

j. Low numbers of assemblage species were recorded (see Matrix 92) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

k. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

l. No assemblage species were recorded utilising the development area (Matrix 92) and no displacement effects are predicted.

m. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 196.4 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 94: Medway Estuary and Marshes SPA

Name of European site: Medway Estuary and Marshes SPA												
Distance to Hornsea Project One: 227.5 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Little tern *Sterna albifrons*		**×a**			**×b**			**×c**			**×cc**	
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×cc**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×cc**	
Golden Plover *Pluvialis apricaria*		**×e**			**×f**			**×g**			**×cc**	
Hen Harrier *Circus cyaneus*		**×h**			**×h**			**×h**			**×cc**	
Ruff *Philomachus pugnax*		**×h**			**×h**			**×h**			**×cc**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×cc**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×h**			**×h**			**×h**			**×cc**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×g**			**×cc**	
Dunlin *Calidris alpina alpina*		**×l**			**×f**			**×g**			**×cc**	
Grey Plover *Pluvialis squatarola*		**×m**			**×f**			**×g**			**×cc**	
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×cc**	
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×cc**	
Shelduck *Tadorna tadorna*		**×o**			**×o**			**×o**			**×cc**	
Knot *Calidris canutus islandica*		**×p**			**×f**			**×g**			**×cc**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Great Crested Grebe *Podiceps cristatus*		**×q**			**×f**			**×g**			**×cc**	
Golden Plover *Pluvialis apricaria*		**×e**			**×f**			**×g**			**×cc**	
Ruff *Philomachus pugnax*		**×h**			**×h**			**×h**			**×cc**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×g**			**×cc**	

Name of European site: Medway Estuary and Marshes SPA												
Distance to Hornsea Project One: 227.5 km												
European site features	**Likely Effects of Project One**											
Shelduck *Tadorna tadorna*		**×o**			**×o**			**×o**			**×cc**	
Ringed Plover *Charadrius hiaticula*		**×i**			**×f**			**×g**			**×cc**	
Grey Plover *Pluvialis squatarola*		**×m**			**×f**			**×g**			**×cc**	
Dunlin *Calidris alpina alpina*		**×l**			**×f**			**×g**			**×cc**	
Avocet *Recurvirostra avosetta*		**×d**			**×d**			**×d**			**×cc**	
Redshank *Tringa totanus*		**×n**			**×n**			**×n**			**×cc**	
Curlew *Numenius arquata*		**×r**			**×f**			**×g**			**×cc**	
Cormorant *Phalacrocorax carbo*		**×s**			**×t**			**×u**			**×cc**	
Wigeon *Anas penelope*		**×v**			**×w**			**×g**			**×cc**	
Teal *Anas crecca*		**×x**			**×f**			**×g**			**×cc**	
Pintail *Anas acuta*		**×h**			**×h**			**×h**			**×cc**	
Shoveler *Anas clypeata*		**×h**			**×h**			**×h**			**×cc**	
Goldeneye *Bucephala clangula*		**×y**			**×y**			**×y**			**×cc**	
Red-breasted Merganser *Mergus serrator*		**×z**			**×z**			**×z**			**×cc**	
Lapwing *Vanellus vanellus*		**×aa**			**×bb**			**×g**			**×cc**	
Black-tailed Godwit *Limosa limosa islandica*		**×h**			**×h**			**×h**			**×cc**	

Evidence supporting conclusions (Ref: Table A63 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Three little terns were recorded, all flying below 5 m.

b. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

c. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

d. Only two avocets were recorded during two years of surveys.

e. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

g. These species were recorded using the development area and no displacement effects are predicted.

h. These species were not recorded during Project One surveys.

i. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

j. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

k. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

l. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

m. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

n. Only seven redshank were recorded during two years of surveys.

o. Only one shelduck was recorded during two years of surveys.

p. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

q. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

r. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

s. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

t. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

u. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

v. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

w. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

x. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

y. Only one goldeneye was recorded during two years of surveys.

z. Only two red-breasted merganser were recorded during two years of surveys.

aa. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

bb. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

cc. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A63 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 95: Medway Estuary and Marshes Ramsar

Name of European site: **Medway Estuary and Marshes Ramsar**												
Distance to Hornsea Project One: 227.**5** km												
European site features	Likely Effects of Project One											
Ramsar criterion 6 species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey Plover *Pluvialis squatarola*		**×a**			**×b**			**×c**			**×m**	
Redshank *Tringa totanus*		**×d**			**×d**			**×d**			**×m**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×j**			**×k**			**×c**			**×m**	
Shelduck *Tadorna tadorna*		**×g**			**×g**			**×g**			**×m**	
Pintail *Anas acuta*		**×h**			**×h**			**×h**			**×m**	
Ringed Plover *Charadrius hiaticula*		**×i**			**×j**			**×c**			**×m**	
Knot *Calidris canutus*		**×k**			**×j**			**×c**			**×m**	
Dunlin *Calidris alpina alpina*		**×l**			**×j**			**×c**			**×m**	
Ramsar criterion 6 Species/populations identified subsequent to designation for possible future consideration under criterion 6.	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×h**			**×h**			**×h**			**×m**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports an assemblage of international importance of waterfowl with peak counts in winter.		**×n**			**×o**			**×p**			**×m**	
Ramsar criterion 2												
The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates; see footnote **q**.												

Evidence supporting conclusions (Ref: Table A63 of Annex A of the HRA Report (Doc ref No 12.6)):

a. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

b. Migrating golden plover may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Only seven redshank were recorded during two years of surveys.

e. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

f. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

g. Only one shelduck was recorded during two years of surveys.

h. These species were not recorded during Project One surveys.

i. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

j. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

k. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

l. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A63 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

n. Low numbers of assemblage species were recorded (see Matrix 94) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

o. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

p. No assemblage species were recorded utilising the development area (Matrix 94) and no displacement effects are predicted.

q. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 227.5 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 96: The Swale SPA

Name of European site: The Swale SPA												
Distance to Hornsea Project One: 235.8 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×bb**	
Marsh Harrier *Circus aeruginosus*		**×b**			**×b**			**×b**			**×bb**	
Mediterranean Gull *Larus melanocephalus*		**×b**			**×b**			**×b**			**×bb**	
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×bb**	
Bar-tailed Godwit *Limosa lapponica*		**×c**			**×d**			**×e**			**×bb**	
Golden Plover *Pluvialis apricaria*		**×f**			**×d**			**×e**			**×bb**	
Hen Harrier *Circus cyaneus*		**×b**			**×b**			**×b**			**×bb**	
Article 4.2 – Migratory (On passage)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed Plover *Charadrius hiaticula*		**×g**			**×d**			**×e**			**×bb**	
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed Godwit *Limosa limosa islandica*		**×b**			**×b**			**×b**			**×bb**	
Grey Plover *Pluvialis squatarola*		**×h**			**×d**			**×e**			**×bb**	
Knot *Calidris canutus*		**×i**			**×d**			**×e**			**×bb**	
Pintail *Anas acuta*		**×b**			**×b**			**×b**			**×bb**	
Redshank *Tringa totanus*		**×j**			**×j**			**×j**			**×bb**	
Shoveler *Anas clypeata*		**×k**			**×k**			**×k**			**×bb**	
Article 4.2 – Assemblage (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
White-fronted Goose *Anser albifrons albifrons*		**×b**			**×b**			**×b**			**×bb**	
Golden Plover *Pluvialis apricaria*		**×f**			**×d**			**×e**			**×bb**	
Bar-tailed Godwit *Limosa lapponica*		**×c**			**×d**			**×e**			**×bb**	
Pintail *Anas acuta*		**×b**			**×b**			**×b**			**×bb**	
Shoveler *Anas clypeata*		**×k**			**×k**			**×k**			**×bb**	
Grey Plover *Pluvialis squatarola*		**×h**			**×d**			**×e**			**×bb**	

Name of European site: The Swale SPA												
Distance to Hornsea Project One: 235.8 km												
European site features	**Likely Effects of Project One**											
Knot *Calidris canutus*		**×i**			**×d**			**×e**			**×bb**	
Black-tailed Godwit *Limosa limosa islandica*		**×b**			**×b**			**×b**			**×bb**	
Redshank *Tringa totanus*		**×j**			**×j**			**×j**			**×bb**	
Avocet *Recurvirostra avosetta*		**×a**			**×a**			**×a**			**×bb**	
Cormorant *Phalacrocorax carbo*		**×l**			**×m**			**×n**			**×bb**	
Curlew *Numenius arquata*		**×o**			**×d**			**×e**			**×bb**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×p**			**×q**			**×e**			**×bb**	
Shelduck *Tadorna tadorna*		**×r**			**×s**			**×s**			**×bb**	
Wigeon *Anas penelope*		**×t**			**×u**			**×e**			**×bb**	
Gadwall *Anas strepera*		**×v**			**×v**			**×v**			**×bb**	
Teal *Anas crecca*		**×w**			**×d**			**×e**			**×bb**	
Oystercatcher *Haematopus ostralegus*		**×x**			**×d**			**×e**			**×bb**	
Lapwing *Vanellus vanellus*		**×y**			**×z**			**×e**			**×bb**	
Dunlin *Calidris alpina alpina*		**×aa**			**×d**			**×e**			**×bb**	
Little Grebe *Tachybaptus ruficollis*		**×b**			**×b**			**×b**			**×bb**	

Evidence supporting conclusions (Ref: Table A64 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two avocets were recorded during two years of surveys.

b. These species were not recorded during Project One surveys.

c. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

d. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible compared to the overall distance flown during migration.

e. These species were not recorded using the development area and no displacement effects are predicted.

f. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

g. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

h. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

i. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

j. Only seven redshank were recorded during two years of surveys.

k. Only four shoveler were recorded during two years of surveys.

l. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

m. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

n. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

o. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

p. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

q. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

r. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

s. Only one shelduck was recorded during two years of surveys.

t. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

u. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

v. Only one gadwall was recorded during two years of surveys.

w. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

x. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

y. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

z. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

aa. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

bb. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A64 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 97: The Swale Ramsar

Name of European site: The Swale Ramsar												
Distance to Hornsea Project One: 235.8 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6 species/populations occurring at levels of international importance	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Redshank *Tringa totanus*		**×a**			**×a**			**×a**			**×m**	
Dark-bellied Brent Goose *Branta bernicla bernicla*		**×b**			**×c**			**×d**			**×m**	
Grey plover *Pluvialis squatarola*		**×e**			**×f**			**×d**			**×m**	
Ramsar criterion 6 Species/populations identified subsequent to designation for possible future consideration under criterion 6.	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Ringed plover *Charadrius hiaticula*		**×g**			**×f**			**×d**			**×m**	
Wigeon *Anas penelope*		**×h**			**×i**			**×d**			**×m**	
Pintail *Anas acuta*		**×j**			**×j**			**×j**			**×m**	
Shoveler *Anas clypeata*		**×k**			**×k**			**×k**			**×m**	
Black-tailed Godwit *Limosa limosa islandica*		**×l**			**×l**			**×l**			**×m**	
Ramsar criterion 5	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
The site supports a assemblage of international importance of waterfowl with peak counts in winter.		**×n**			**×o**			**×p**			**×m**	
Ramsar criterion 2												
The site supports nationally scarce plants and at least seven British Red data book invertebrates; see footnote **q**.												

Evidence supporting conclusions (Ref: Table A64 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only seven redshank were recorded during two years of surveys.

b. A total of seven dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

c. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

d. These species were not recorded using the development area and no displacement effects are predicted.

e. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

f. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to the overall distance flown during migration.

g. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

h. A total of 19 wigeon were recorded during two years of surveys. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

i. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

j. These species were not recorded during Project One surveys.

k. Only four shoveler were recorded during two years of surveys.

l. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in Annex A, Table A64. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq*. of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq***. for Displacement Effects and **paragraphs 4.3.229 *et seq***. for Barrier Effects.

n. Low numbers of assemblage species were recorded (see Matrix 96) and with the majority of wader and seaduck flights below rotor height, the high avoidance rates of geese and the distance to Project One, the risk of a significant impact is very low.

o. Migrating assemblage species may fly around the wind farm but the incremental increase in flight distance to the Ramsar site is likely to be negligible compared to the overall distance flown during migration.

p. No assemblage species were recorded utilising the development area (Matrix 96) and no displacement effects are predicted.

q. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 227.5 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 98: Thanet Coast and Sandwich Bay SPA

Name of European site: Thanet Coast and Sandwich Bay SPA												
Distance to Hornsea Project One: 239.3 km												
European site features	**Likely Effects of Project One**											
Article 4.2 – Migratory (Winter)	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Turnstone *Arenaria interpres*		**×a**			**×b**			**×c**			**×h**	
Little tern *Sterna albifrons*		**×d**			**×e**			**×f**			**×h**	
Golden plover *Pluvialis apricaria*		**×g**			**×b**			**×c**			**×h**	

Evidence supporting conclusions (Ref: Table A65 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

b. Migrating birds from these species may fly around the wind farm but the incremental increase in flight distance to or from the SPA is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. Three little terns were recorded, all flying below 5 m.

e. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

f. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

g. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

h. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A65 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 99: Thanet Coast and Sandwich Bay Ramsar

Name of European site: Thanet Coast and Sandwich Bay Ramsar												
Distance to Hornsea Project One: 239.3 km												
European site features	**Likely Effects of Project One**											
Ramsar criterion 6	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Turnstone *Arenaria interpres*		**×a**			**×b**			**×c**			**×d**	
Ramsar criterion 2												
Supports 15 British Red Data Book wetland invertebrates; see footnote **e**.												

Evidence supporting conclusions (Ref: Table A65 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

b. Migrating turnstone may fly around the wind farm but the incremental increase in flight distance to or from the Ramsar is likely to be negligible.

c. No turnstones were recorded using the development area and no displacement effects are predicted.

d. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A65 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

e. These habitats (or for species, habitats supporting these species) have been screened out for this Ramsar site as it is 227.5 km away from the closest point of Project One. Therefore, no LSEs are anticipated on these features and consequently this site.

Stage 1 Matrix 100: Outer Thames Estuary SPA

Name of European site: Outer Thames Estuary SPA												
Distance to Hornsea Project One: 121.2 km												
European site features	**Likely Effects of Project One**											
Article 4.1 – Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver *Gavia stellata*		**×a**			**×b**			**×c**			**×d**	

Evidence supporting conclusions (Ref: Table A66 of Annex A of the HRA Report (Doc ref No 12.6)):

a. All red-throated divers recorded in flight were flying below turbine height and evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA which is 121.2 km away is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently, any potential impacts will be negligible.

d. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A66 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 101: Ramsar-Gebiet S-H Wattenmeer und angrenzende Küstengebiete

Name of European site: Ramsar-Gebiet S-H Wattenmeer und angrenzende Küstengebiete

Distance to Hornsea Project One: 430 km

European site features	**Likely Effects of Project One**											
Breeding	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Shoveler *Anas clypeata*		**×a**			**×a**			**×a**			**×fff**	
Gadwall *Anas strepera*		**×b**			**×b**			**×b**			**×fff**	
Dunlin *Calidris alpina alpina*		**×c**			**×d**			**×e**			**×fff**	
Ringed plover *Charadrius hiaticula*		**×f**			**×d**			**×e**			**×fff**	
Black tern *Chlidonias niger*		**×g**			**×g**			**×g**			**×fff**	
Snipe *Gallinago gallinago*		**×h**			**×h**			**×h**			**×fff**	
Oystercatcher *Haematopus ostralegus*		**×i**			**×d**			**×e**			**×fff**	
Herring gull *Larus argentatus*		**×j**			**×k**			**×l**			**×fff**	
Common gull *Larus canus*		**×m**			**×k**			**×l**			**×fff**	
Lesser black-backed gull *Larus fuscus*		**×n**			**×k**			**×l**			**×fff**	
Great black backed gull *Larus marinus*		**×o**			**×k**			**×l**			**×fff**	
Black-headed gull *Larus ridibundus*		**×p**			**×k**			**×l**			**×fff**	
Red-breasted merganser *Mergus serrator*		**×q**			**×q**			**×q**			**×fff**	
Black-necked grebe *Podiceps nigricollis*		**×r**			**×r**			**×r**			**×fff**	
Avocet *Recurvirostra avosetta*		**×s**			**×s**			**×s**			**×fff**	
Eider *Somateria mollissima*		**×t**			**×u**			**×e**			**×fff**	
Little tern *Hydrocoloeus minutus*		**×v**			**×w**			**×l**			**×fff**	
Common tern *Sterna hirundo*		**×x**			**×y**			**×l**			**×fff**	
Arctic tern *Sterna paradisaea*		**×z**			**×aa**			**×l**			**×fff**	
Sandwich tern *Sterna sandvicensis*		**×bb**			**×w**			**×l**			**×fff**	
Shelduck *Tadorna tadorna*		**×cc**			**×cc**			**×cc**			**×fff**	
Winter	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda*		**×dd**			**×ee**			**×ff**			**×fff**	
Shoveler *Anas clypeata*		**×a**			**×a**			**×a**			**×fff**	
Mallard *Anas platyrhynchos*		**×gg**			**×d**			**×e**			**×fff**	

Gadwall *Anas strepera*		×b			×b			×b			×fff	
Grey heron *Ardea cinerea*		×hh			×d			×e			×fff	
Turnstone *Arenaria interpres*		×ii			×d			×e			×fff	
Dunlin *Calidris alpina alpina*		×c			×d			×e			×fff	
Knot *Calidris canutus*		×jj			×d			×e			×fff	
Fulmar *Fulmarus glacialis*		×kk			×ll			×mm			×fff	
Snipe *Gallinago gallinago*		×h			×h			×h			×fff	
Red-throated diver *Gavia stellata*		×nn			×d			×oo			×fff	
Oystercatcher *Haematopus ostralegus*		×i			×d			×m			×fff	
Herring gull *Larus argentatus*		×j			×k			×l			×fff	
Common gull *Larus canus*		×m			×k			×l			×fff	
Great black backed gull *Larus marinus*		×o			×k			×l			×fff	
Little gull *Hydrocoloeus minutus*		×pp			×qq			×rr			×fff	
Black headed gull *Larus ridibundus*		×p			×k			×l			×fff	
Common scoter *Melanitta nigra*		×ss			×tt			×e			×fff	
Grey plover *Pluvialis squatarola*		×uu			×d			×e			×fff	
Red-necked grebe *Podiceps nigricollis*		×r			×r			×r			×fff	
Avocet *Recurvirostra avosetta*		×s			×s			×s			×fff	
Eider *Somateria mollissima*		×t			×u			×e			×fff	
Guillemot *Uria aalge*		×vv			×d			×ww			×fff	
Staging	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Shoveler *Anas clypeata*		×a			×a			×a			×fff	
Mallard *Anas platyrhynchos*		×gg			×d			×e			×fff	
Gadwall *Anas strepera*		×b			×b			×b			×fff	
Grey heron *Ardea cinerea*		×hh			×d			×e			×fff	
Turnstone *Arenaria interpres*		×ii			×d			×e			×fff	
Dunlin *Calidris alpina alpina*		×c			×d			×e			×fff	
Knot *Calidris canutus*		×jj			×d			×e			×fff	
Ringed plover *Charadrius hiaticula*		×f			×d			×e			×fff	
Snipe *Gallinago gallinago*		×h			×h			×h			×fff	

Oystercatcher *Haematopus ostralegus*		**×i**			**×d**			**×e**			**×fff**	
Herring gull *Larus argentatus*		**×j**			**×k**			**×l**			**×fff**	
Common gull *Larus canus*		**×m**			**×k**			**×l**			**×fff**	
Lesser black-backed gull *Larus fuscus*		**×n**			**×k**			**×l**			**×fff**	
Great black backed gull *Larus marinus*		**×o**			**×k**			**×l**			**×fff**	
Little gull *Hydrocoloeus minutus*		**×pp**			**×qq**			**×rr**			**×fff**	
Black-headed gull *Larus ridibundus*		**×p**			**×k**			**×l**			**×fff**	
Whimbrel *Numenius phaeopus*		**×xx**			**×d**			**×e**			**×fff**	
Cormorant *Phalacrocorax carbo*		**×zz**			**×aaa**			**×bbb**			**×fff**	
Golden plover *Pluvialis apricaria*		**×ccc**			**×k**			**×e**			**×fff**	
Grey plover *Pluvialis squatarola*		**×uu**			**×d**			**×e**			**×fff**	
Eider *Somateria mollissima*		**×t**			**×u**			**×e**			**×fff**	
Arctic tern *Sterna paradisaea*		**×z**			**×aa**			**×l**			**×fff**	
Greenshank *Tringa nebularia*		**×yy**			**×yy**			**×yy**			**×fff**	
Lapwing *Vanellus vanellus*		**×ddd**			**×eee**			**×e**			**×fff**	

Evidence supporting conclusions (Ref: Table A67 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only four shoveler were recorded during two years of surveys.

b. Only one gadwall was recorded during two years of surveys.

c. A total of 23 dunlin were recorded in the Hornsea Project One. All were flying below 22.5 m and therefore not at risk of collision.

d. Migrating birds of these species may fly around the wind farm but the incremental increase in flight distance to the Ramsar is likely to be negligible compared to overall distance flown during migration.

e. These species were not recorded using the development area and no displacement effects are predicted.

f. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

g. Only one black tern was recorded during two years of surveys.

h. Only two snipe were recorded during two years of surveys.

i. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

j. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The Ramsar is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Screening (**Annex A and B of the HRA Report (Doc ref No 12.6)**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

k. The Ramsar is outwith the mean maximum foraging range for these species during the breeding season and therefore no barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

l. Evidence from constructed offshore wind farms indicate that these species are not displaced by wind farms (Zucco *et al.* 2006; Petersen *et al.* 2006).

m. A total of 741 common gulls were recorded during the two years of surveys. Of which 93.3% were recorded flying below 22.5 m. Collision risk modelling predicts on average up to 6 collisions per year in Hornsea Project One (at a 98% avoidance rate). Outwith the breeding season numbers recorded were higher and birds from this Ramsar may disperse widely. However, collision risk modelling predicts a low number of mortalities that would not cause an adverse effect.

n. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The Ramsar is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. During the non-breeding period one collision may be of a bird from this site out of a population of 7,285 pairs (see **Annex B of the HRA Report (Doc ref No 12.6)**).

o. A total of 4,906 great black-backed gulls were recorded in in flight; with peak numbers occurring in January. The Ramsar is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris 1962) and are therefore unlikely to occur in the Hornsea Project One.

p. A total of 388 black-headed gulls were recorded. Of those in flight 99.7% were below 22.5 m and therefore at low risk of collision. The distance this Ramsar is from the proposed development and the low usage of the site indicates low risk of a significant impact

q. Only two red-breasted merganser were recorded during two years of surveys.

r. One black-necked grebe was recorded.

s. Only two avocets were recorded during two years of surveys.

t. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

u. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the Ramsar indicate that impacts from any additional distance flown will be negligible.

v. Three little terns were recorded, all flying below 5 m.

w. These species are rarely recorded within the development area and no barrier effects have been reported for these species (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006.

x. Collision risk modelling predicts up to one common tern collision per year (at a 98% avoidance rate). The Ramsar is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding birds from this Ramsar may disperse widely and some may occur in the Hornsea Project One. However, the predicted number of collisions is very low and there is a very low risk of a significant impact.

y. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The Ramsar is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

z. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

aa. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The Ramsar is outwith the mean maximum or maximum foraging range for Arctic tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

bb. One sandwich tern was recorded in Year 1 and six in Year 2. The Ramsar is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

cc. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

dd. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

ee. During migration razorbills will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

ff. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). However, the site is 430 km away and therefore at very low risk of displacement effects.

gg. A total of ten mallard were recorded during two years of surveys. The low numbers recorded and reported relatively high levels of avoidance behaviour by wildfowl indicate very low risk of collision.

hh. A total of 2 grey herons were recorded in the Hornsea survey.

ii. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

jj. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

kk. Of those fulmar recorded in flight 99.8% were below rotor height and therefore not at risk of collision. Collision risk modelling predicted zero collisions.

ll. The additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

mm. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

nn. All red-throated divers recorded in flight were flying below turbine height and evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

oo. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently, any potential impacts will be negligible.

pp. A total of 3,522 little gulls were recorded, with nearly all birds flying below 22.5 m. The Ramsar is 430 km from the proposed development and therefore the risk of a significant effect is negligible.

qq. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the Ramsar is negligible.

rr. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.* 2006, Barton *et al.* 2010).

ss. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

tt. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the Ramsar indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

uu. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

vv. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

ww. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). However, the Ramsar is 430 km away and therefore the potential for a likely significant effect is very remote.

xx. Eleven out of a total of 49 whimbrel recorded were in the Hornsea Project One. 55.1% of all whimbrel recorded were flying above 22.5 m and therefore at potential risk of collision. However, the number of whimbrel recorded in the development zone was low and therefore at low risk of a significant effect.

yy. Only one greenshank was recorded during two years of surveys.

zz. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

aaa. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the Ramsar is small compared to the overall distance flown during migration.

bbb. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

ccc. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

ddd. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

eee. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

fff. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A67 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 102: Östliche Deutsche Bucht (Eastern German Bight) SPA

Name of European site: Östliche Deutsche Bucht (Eastern German Bight) SPA												
Distance to Hornsea Project One : 347 km												
European site features	**Likely Effects of Project One**											
Species – Annex I	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver *Gavia stellate (Winter)*		**×a**			**×b**			**×c**			**×zz**	
Black-throated diver *Gavia arctica (Winter)*		**×d**			**×d**			**×d**			**×zz**	
Little gull *Hydrocoloeus minutus (Winter)*		**×e**			**×f**			**×g**			**×zz**	
Common tern *Sterna hirundo (Passage)*		**×h**			**×i**			**×j**			**×zz**	
Arctic tern *Sterna paradisaea (Passage)*		**×k**			**×l**			**×m**			**×zz**	
Sandwich tern *Sterna sandvicensis (Passage)*		**×n**			**×o**			**×p**			**×zz**	
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda (Winter)*		**×q**			**×r**			**×s**			**×zz**	
Herring gull *Larus argentatus (Winter)*		**×t**			**×u**			**×v**			**×zz**	
Common gull *Larus canus (Winter)*		**×w**			**×y**			**×z**			**×zz**	
Great black-backed gull *Larus marinus (Winter)*		**×aa**			**×bb**			**×cc**			**×zz**	
Common Scoter *Melanitta nigra (Winter)*		**×dd**			**×ee**			**×ff**			**×zz**	
Guillemot *Uria aalge* (*Winter*)		**×gg**			**×hh**			**×ii**			**×zz**	
Lesser black-backed gull *Larus fuscus (Passage)*		**×jj**			**×kk**			**×ll**			**×zz**	
Black-headed gull (*Passage)*		**×mm**			**×nn**			**×oo**			**×zz**	
Gannet *Morus bassanus* (*Passage*)		**×pp**			**×qq**			**×rr**			**×zz**	
Kittwake *Rissa tridactyla* (*Passage)*		**×ss**			**×tt**			**×uu**			**×zz**	
Great-crested grebe *Podiceps cristatus (Passge)*		**×vv**			**×ww**			**×yy**			**×zz**	

Evidence supporting conclusions (Ref: Table A68 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL, 2006).

b. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use Hornsea Project One. Consequently any potential impacts will be negligible.

d. A total of 13 black-throated divers were recorded of which nine were within Project One.

e. A total of 3,522 little gulls were recorded, with nearly all records during October with the large majority flying below 22.5 m. The SPA is 347 km from the proposed development and therefore the risk of a significant effect is negligible.

f. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the SPA is negligible.

g. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.,* 2006, Barton *et al.,* 2010).

h. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

i. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

j. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g. Zucco *et al.,* 2006, Pettersson, 2005).

k. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

l. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.,* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.,* 2006, Pettersson, 2005).

n. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact

o. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.,* 2006).

p. Evidence from constructed offshore wind farms indicates that sandwich terns are not displaced by wind farms (e.g. Petersen *et al.,* 2006).

q. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

r. The SPA is beyond the mean maximum foraging range for razorbill during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

s. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al*. 2006). However, this SPA holds relatively few razorbill estimated as being 700 individuals and is 387 km away.

t. A total of 590 herring gulls were recorded in Year 1 and 562 in Year 2; with peak numbers during the non-breeding season. Of those in flight 58.6% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely but the site is 347 km away and therefore birds are at very low risk of collision.

u. During migration herring gulls will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

v. Evidence from constructed offshore wind farms indicate that herring gulls are not displaced by wind farms (Petersen *et al*. 2006).

w. A total of 741 common gulls were recorded during the two years of surveys. Of which 93.3% were recorded flying below 22.5 m. Collision risk modelling predicts on average up to six collisions per year in Hornsea Project One (at a 98% avoidance rate). Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. However, collision risk modelling predicts a low number of mortalities that would not cause an adverse effect.

y. During migration common gulls will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown from an SPA 347 km away.

z. Evidence from constructed offshore wind farms indicates that Gulls are not displaced by wind farms (Petersen *et al*. 2006).

aa. A total of 4,906 great black-backed gulls were recorded in in flight; with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris 1962) and are therefore unlikely to occur in Project One.

bb. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown to or from the SPA.

cc. Evidence from constructed offshore wind farms indicate that great black-backed gulls are not displaced by wind farms (Petersen *et al*. 2006).

dd. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

ee. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

ff. There are a no records of common scoter using the Hornsea Project One and therefore no displacement impacts are predicted.

gg. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

hh. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

ii. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al*. 2006). However, birds associated with this SPA during the winter will not be impacted and therefore there is no significant effect.

jj. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding lesser black-backed gulls disperse away from their colonies. However, the distance this SPA is from the proposed development indicates low risk of a significant impact.

kk. During migration lesser black-backed gulls will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in distance flown.

ll. Evidence from constructed offshore wind farms indicates that lesser black-backed gulls are not significantly displaced by wind farms (e.g. Zucco *et al.* 2006; Petersen *et al*. 2006).

mm. A total of 388 black-headed gulls were recorded. Of those in flight 99.7% were below 22.5 m and therefore at low risk of collision. The distance this SPA is from the proposed development and the low usage of the Hornsea Project One indicates low risk of a significant impact

nn. The SPA is 347 km away and black-headed gulls will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in energetic costs during migration.

oo. Evidence from constructed offshore wind farms indicates that black-headed gulls are not displaced by wind farms (Zucco *et al*. 2006).

pp. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is 387 km from the Hornsea Project One and low risk.

qq. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

rr. Evidence from constructed offshore wind farms indicates that kittiwakes are not displaced by wind farms (e.g. Petersen *et al*. 2006). The site is 387 km from the proposed development and therefore the risk of a potential for LSE is negligible.

ss. The site is 387 km from the proposed development and holds up to 230 gannets during passage (BFN 2012b). Therefore the risk of a LSE is negligible.

tt. If a barrier effect should occur the additional estimated distance of up to 36 km will be a small incremental increase in overall distance flown by this highly pelagic species.

uu. There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere.

vv. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

ww. Migrating great-crested grebes may fly around the wind farm but the incremental increase in flight distance to or from the SPA is negligible.

yy. No great-crested grebes were recorded using the development area and no displacement effects are predicted.

zz. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A68 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 103: Sylter Außenriff (Sylt Outer Reef) SPA

Name of European site: Sylter Außenriff (Sylt Outer Reef) SPA												
Distance to Hornsea Project One : 354 km												
European site features	**Likely Effects of Project One**											
Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver *Gavia stellate (Winter)*		**×a**			**×b**			**×c**			**×q**	
Black-throated diver *Gavia arctica (Winter)*		**×d**			**×d**			**×d**			**×q**	
Little gull *Hydrocoloeus minutus (Migrant)*		**×e**			**×f**			**×g**			**×q**	
Common tern *Sterna hirundo (Migrant)*		**×h**			**×i**			**×j**			**×q**	
Arctic tern *Sterna paradisaea (Migrant)*		**×k**			**×l**			**×m**			**×q**	
Sandwich tern *Sterna sandvicensis (Migrant)*		**×n**			**×o**			**×p**			**×q**	

Evidence supporting conclusions (Ref: Table A69 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use Hornsea Project One. Consequently any potential impacts will be negligible.

d. A total of 13 black-throated divers were recorded of which nine were within Hornsea Project One.

e. A total of 3,522 little gulls were recorded, with nearly all records of birds flying below 22.5 m. The SPA is 354 km from the proposed development and therefore the risk of a significant effect is negligible.

f. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the SPA is negligible.

g. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.* 2006, Barton *et al.* 2010).

h. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

i. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

j. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

k. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

l. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

n. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact

o. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

p. Evidence from constructed offshore wind farms indicates that Sandwich terns are not displaced by wind farms (e.g. Petersen *et al.* 2006).

q. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A68 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in the HRA report, **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 104: Seevogelschutzgebiet Helgoland SPA

Name of European site: Seevogelschutzgebiet Helgoland SPA												
Distance to Hornsea Project One: 408 km												
European site features	**Likely Effects of Project One**											
Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda (BreedingWinter)*		**×a**			**×b**			**×c**			**×gg**	
Fulmar *Fulmarus glacialis (Winter)*		**×d**			**×e**			**×f**			**×gg**	
Red-throated diver *Gavia stellata (Winter)*		**×g**			**×h**			**×i**			**×gg**	
Black-throated diver *(Winter)*		**×j**			**×j**			**×j**			**×gg**	
Herring gull *Larus argentatus (Breeding)*		**×k**			**×b**			**×l**			**×gg**	
Common gull *Larus canus (Winter)*		**×m**			**×h**			**×l**			**×gg**	
Lesser black-backed gull *Larus fuscus (Breeding)*		**×n**			**×h**			**×l**			**×gg**	
Little gull *Hydrocoloeus minutus (Winter/Passage)*		**×o**			**×p**			**×l**			**×gg**	
Common Scoter *Melanitta nigra (Winter)*		**×q**			**×r**			**×s**			**×gg**	
Red-necked grebe *Podiceps grisegena (Winter)*		**×t**			**×t**			**×t**			**×gg**	
Kittiwake *Rissa tridactyla (Breeding/Winter)*		**×u**			**×h**			**×l**			**×gg**	
Eider *Somateria mollissima (Breeding/Winter)*		**×v**			**×w**			**×s**			**×gg**	
Common tern *Sterna hirundo (Passage)*		**×x**			**×h**			**×l**			**×gg**	
Arctic tern *Sterna paradisaea (Passage)*		**×y**			**×h**			**×l**			**×gg**	
Sandwich tern *Sterna sandvicensis (Passage)*		**×z**			**×ss**			**×l**			**×gg**	
Gannet *Morus bassanus (Passage)*		**×bb**			**×cc**			**×dd**			**×gg**	
Guillemot *Uria aalge (Winter)*		**×ee**			**×b**			**×ff**			**×gg**	

Evidence supporting conclusions (Ref: Table A70 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

b. The SPA is beyond the mean maximum foraging range for these species during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

c. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). However, this SPA holds relatively few razorbill estimated as being 200 individuals outside the breeding season and is 408 km away.

d. Of those fulmar recorded in flight 99.8% were below rotor height and therefore not at risk of collision. Collision risk modelling predicted zero collisions.

e. The additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

f. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

g. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

h. Migrating birds of these species may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

i. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

j. A total of 13 black-throated divers were recorded of which nine were within The Hornsea Project One.

k. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. This SPA is 408 km away and therefore the risk of collision impacts are remote and no significant impacts will occur.

l. Evidence from constructed offshore wind farms indicate that these species are not displaced by wind farms (Zucco *et al.* 2006; Petersen *et al.* 2006).

m. A total of 741 common gulls were recorded during the two years of surveys. Of which 93.3% were recorded flying below 22.5 m. Collision risk modelling predicts on average up to 6 collisions per year in Hornsea Project One (at a 98% avoidance rate). Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. However, collision risk modelling predicts a low number of mortalities that would not cause an adverse effect.

n. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4 % were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding lesser black-backed gulls disperse away from their colonies. No collisions per year are predicted to occur from this colony (see Annex B).However, the distance this SPA is from the proposed development and the small breeding population of 37 pairs indicates low risk of a significant impact.

o. A total of 3,522 little gulls were recorded, with nearly all birds flying below 22.5 m. The SPA is 408 km from the proposed development and therefore the risk of a significant effect is negligible.

p. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the SPA is negligible.

q. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

r. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

s. There are a no records of common scoter using the Hornsea Project One and therefore no displacement impacts are predicted.

t. Only one red-necked grebe was recorded.

u. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact.

v. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

w. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible

x. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is outwith the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

y. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

z. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

aa. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

bb. A total of 13,034 gannets were recorded; with peak numbers between August and November. Of those recorded in flight the large majority were below rotor height and therefore not at risk of collision. The SPA is outwith the mean maximum foraging range but within the maximum range for gannet during the breeding season and therefore birds at this site may occur in the area but at a low risk of being impacted. Outwith the breeding season gannets from this SPA may disperse widely.

cc. If a barrier effect should occur the additional estimated distance of up to 36 km will be a small incremental increase in overall distance flown by this highly pelagic species.

dd. There is little evidence from constructed offshore wind farms on whether gannets may be displaced or not. However, should it occur the overall area of displacement would be relatively small for this widespread pelagic species and the survey results indicate that that the proposed development area is not proportionally of greater importance to gannet compared to elsewhere.

ee. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

ff. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). However, the SPA is 408 km away and therefore the potential for a likely significant effect is very remote.

gg. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A70 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 105: Borkum-Riffgrund SPA

Name of European site: Borkum-Riffgrund SPA												
Distance to Hornsea Project One : 293 km												
European site features	**Likely Effects of Project One**											
Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver *Gavia stellata (Winter)*		**×a**			**×b**			**×c**			**×q**	
Black-throated diver *Gavia arctica (Winter)*		**×d**			**×d**			**×d**			**×q**	
Little gull *Hydrocoloeus minutus (Winter)*		**×e**			**×f**			**×g**			**×q**	
Common tern *Sterna hirundo (Migrant)*		**×h**			**×i**			**×j**			**×q**	
Arctic tern *Sterna paradisaea (Migrant)*		**×k**			**×l**			**×m**			**×q**	
Sandwich tern *Sterna sandvicensis (Migrant)*		**×n**			**×o**			**×p**			**×q**	

Evidence supporting conclusions (Ref: Table A71 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. Migrating red-throated diver may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

d. A total of 13 black-throated divers were recorded of which nine were within The Hornsea Project One.

e. A total of 3,522 little gulls were recorded, with nearly all records during October. 98.9% were flying below 22.5 m. Collision risk modelling predicts that on average up to 10 collisions per year (based on a 98% avoidance rate) may occur. The SPA is 293 km from the proposed development and therefore the risk of a significant effect is negligible.

f. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the SPA is negligible.

g. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.* 2006, Barton *et al.* 2010).

h. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is out with the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

i. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

j. Evidence from constructed offshore wind farms indicates that common terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

k. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

l. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. Evidence from constructed offshore wind farms indicates that Arctic terns are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

n. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is out with the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

o. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

p. Evidence from constructed offshore wind farms indicates that Sandwich terns are not displaced by wind farms (e.g. Petersen *et al.* 2006).

q. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A71 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 106: Littoral Seino-Marin SPA

Name of European site: Littoral Seino-Marin SPA												
Distance to Hornsea Project One : 460 km												
European site features	**Likely Effects of Project One**											
Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver *Gavia stellata (Winter/Migrant)*		**×a**			**×b**			**×c**			**×ooo**	
Slavonian Grebe *Podiceps auritus (Winter/Assemblage)*		**×d**			**×d**			**×d**			**×ooo**	
Storm petrol *Hydrobates pelagicus (Migrant)*		**×e**			**×f**			**×g**			**×ooo**	
Leach's petrol *Oceanodroma leucorhoa (Migrant)*		**×h**			**×i**			**×j**			**×ooo**	
Little gull *Hydrocoloeus minutus (Winter/Migrant*		**×k**			**×b**			**×l**			**×ooo**	
Balearic shearwater *Puffinus mauretanicus (Migrant)*		**×m**			**×n**			**×o**			**×ooo**	
Little tern *Sternula albifrons (Migrant)*		**×p**			**×q**			**×r**			**×ooo**	
Common tern *Sterna hirundo (Migrant)*		**×s**			**×b**			**×t**			**×ooo**	
Arctic tern *Sterna paradisaea (Breeding/Migrant)*		**×u**			**×b**			**×t**			**×ooo**	
Sandwich tern *Sterna sandvicensis (Breeding)*		**×v**			**×w**			**×t**			**×ooo**	
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda (Winter)*		**×x**			**×b**			**×y**			**×ooo**	
Fulmar *Fulmarus glacialis (Winter)*		**×z**			**×aa**			**×bb**			**×ooo**	
Herring gull *Larus argentatus (Winter/Migrant)*		**×cc**			**×b**			**×t**			**×ooo**	
Lesser black-backed gull *Larus fuscus (Breeding/Migrant)*		**×dd**			**×b**			**×t**			**×ooo**	
Great black-backed gull *Larus marinus (Breeding/Winter/Migrant)*		**×ee**			**×b**			**×t**			**×ooo**	
Sabine's Gull *Xema sabini (Migrant)*		**×ff**			**×g**			**×hh**			**×ooo**	
Greylag Goose *Anser anser (Winter migrant/Assemblage)*		**×ii**			**×jj**			**×kk**			**×ooo**	
Common Scoter *Melanitta nigra (Winter)*		**×ll**			**×mm**			**×kk**			**×ooo**	
Red-breasted Merganser *Mergus serrator (Assemblage)*		**×nn**			**×nn**			**×nn**			**×ooo**	
Eider *Somateria mollissima (Winter)*		**×oo**			**×pp**			**×qq**			**×ooo**	
Great-crested grebe *Podiceps cristatus (Passge)*		**×rr**			**×ss**			**×kk**			**×ooo**	

Red-necked grebe *Podiceps grisegena (Winter)*		**×tt**			**×tt**			**×tt**			**×ooo**	
Black-necked grebe *Podiceps nigricollis (Winter)*		**×uu**			**×uu**			**×uu**			**×ooo**	
Common sandpiper *Actitis hypoleucos (Migrant)*		**×vv**			**×vv**			**×vv**			**×ooo**	
Cormorant *Phalacrocorax carbo (Breeding/Winter)*		**×ww**			**×xx**			**×yy**			**×ooo**	
Manx shearwater *Puffinus puffinus (Migrant)*		**×zz**			**×aaa**			**×bbb**			**×ooo**	
Kittiwake *Rissa tridactyla (Winter)*		**×ccc**			**×b**			**×t**			**×ooo**	
Arctic skua *Stercorarius parasiticus (Assemblage)*		**×ddd**			**×eee**			**×fff**			**×ooo**	
Pomarine skua *Stercorarius pomarinus (Migrant)*		**×ggg**			**×hhh**			**×iii**			**×ooo**	
Great skua *Stercorarius skua (Migrant/Assemblage)*		**×jjj**			**×kkk**			**×lll**			**×ooo**	
Guillemot *Uria aalge (Winter)*		**×mmm**			**×b**			**×nnn**			**×ooo**	

Evidence supporting conclusions (Ref: Table A72 of Annex A of the HRA Report (Doc ref No 12.6)):

a. All red-throated divers recorded in flight were flying below turbine height and evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. Migrating birds from these species may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA, which is 460 km away, is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently, any potential impacts will be negligible

d. Only one Slavonian grebe was recorded flying below turbine height/Only one Slavonian grebe was recorded.

e. Storm petrels are an uncommon to scarce migrant off the Yorkshire coast (Thomas, 2011). A total of 29 storm petrels were recorded across both years and all were recorded flying below 2.5 m and therefore not at risk of collision.

f. There's no evidence of whether or not storm petrels fly around offshore wind farms. However, the incremental increase in distance required should they do so is negligible compared to the distances this highly pelagic species flies to and from breeding or wintering grounds.

g. There's no evidence of whether a displacement effect may occur or not. However, the total area avoided should they be displaced compared to the potential total foraging area is very small and there is no evidence based on the low number of observations that the area is a favoured foraging location for this species.

h. Leach's petrel is a scarce to rare migrant off the Yorkshire coast (Thomas 2011). Two Leach's petrels were recorded in Year 1 and three in Year 2. All were recorded flying below 2.5 m and therefore not at risk of collision.

i. There's no evidence of whether or not Leach's petrels fly around offshore wind farms. However, the incremental increase in distance required should they do so is negligible compared to the distances this highly pelagic species flies to and from breeding or wintering grounds.

j. There's no evidence of whether a displacement effect may occur or not. However, the total area avoided should they be displaced compared to the potential total foraging area is very small and there is no evidence, based on the low number of observations, that the area is a favoured foraging location for this species.

k. A total of 3,522 little gulls were recorded, with nearly all records during October. 98.9% were flying below 22.5 m. Collision risk modelling predicts that on average up to 10 collisions per year (based on a 98% avoidance rate) may occur. The SPA is 460 km from the proposed development and therefore the risk of a significant effect is negligible.

l. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.* 2006, Barton *et al.* 2010).

m. A total of five Balearic shearwaters were recorded. All were flying below 22.5 m in height and therefore not at risk of collision.

n. There is no evidence from existing offshore wind farms as to whether wind farms cause a barrier to Balearic shearwaters. However, should they do so the additional distance of an estimated 36 km will cause a negligible increase in distance flown compared to the overall distance this pelagic species regularly flies.

o. It is not known whether there will be a displacement effect. However only five birds were recorded and therefore there will be no adverse effect should displacement occur.

p. Three little terns were recorded, all flying below 5 m.

q. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

r. Evidence from constructed offshore wind farms indicates that little terns are not displaced by wind farms (e.g. Zucco *et al.* 2006).

s. Collision risk modelling predicts up to one common tern collision per year (at a 98% avoidance rate). The predicted number of collisions and the distance this SPA is from the proposed development make the risk of a significant impact negligible.

t. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

u. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

v. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is out with the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

w. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

x. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

y. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). However, the site is 460 km away and therefore at very low risk of displacement effects.

z. Of those fulmar recorded in flight 99.8% were below rotor height and therefore not at risk of collision. Collision risk modelling predicted zero collisions.

aa. The additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

bb. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

cc. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is out with the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Out with the breeding season numbers recorded were higher and birds from this SPA may disperse widely. This SPA is 460 km away and therefore collision risk is very low and no significant impacts will occur.

dd. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding lesser black-backed gulls disperse away from their colonies. However, the distance this SPA is from the proposed development and the small breeding population of five pairs, indicates low risk of a significant impact alone but may be increased in-combination with potential future developments.

ee. A total of 4,906 great black-backed gulls were recorded in in flight; with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris 1962) and are therefore unlikely to occur in the Hornsea Project One.

ff. Two Sabine's gull were recorded in the Hornsea Study Area in Year 1. No flight height data are available for Sabine's gull but the low usage of the site and the distance for the SPA indicate low risk of an adverse effect.

gg. There are no data on whether a barrier effect may occur on Sabine's gulls but the low usage of the site and the distance for the SPA indicate low risk of an adverse effect

hh. There are no data on whether a barrier effect may occur on Sabine's gulls but the low usage of the site and the distance for the SPA indicate low risk of an adverse effect.

ii. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

jj. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

kk. These species were not recorded using the development area and no displacement effects are predicted.

ll. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

mm. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

nn. Only two red-breasted merganser were recorded during two years of surveys.

oo. Two eider were recorded in the 10 km buffer area and outwith the Hornsea Project One Zones, both were flying below 20 m and therefore not at risk of collision. Therefore, there is a low risk of collision.

pp. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

qq. There are a no records of eiders using the area and therefore no displacement impacts are predicted.

rr. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

ss. Migrating great-crested grebes may fly around the wind farm but the incremental increase in flight distance to or from the SPA is negligible.

tt. One red-necked grebe was recorded outwith the Hornsea Project One.

uu. One black-necked grebe was recorded.

vv. One common sandpiper was recorded.

ww. Only 11 cormorants were recorded, of which three were within Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

xx. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

yy. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

zz. A total of 184 Manx shearwaters were recorded across both years in the Hornsea Study Area. All were flying below turbine height and therefore not at risk of collision.

aaa. There is no evidence from existing offshore wind farms as to whether they cause a barrier to Manx shearwaters. However, should they do so, the additional distance of an estimated 36 km will cause a negligible increase in distance flown compared to the overall distance this pelagic species regularly flies.

bbb. It is not known whether there will be a displacement effect. However, only 44 Manx shearwaters were recorded in the Hornsea Project One and the SPA is 460 km away.

ccc. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those the large majority of flights were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Screening (see HRA, **Annex A and B**) predicted no potential likely significant effect alone and/or in combination due to the low numbers affected, the distance of the site from Project One during the breeding season. Outside of the breeding season birds disperse widely.

ddd. A total of 127 Arctic skuas were recorded in flight, with 99.2% of flights recorded below 22.5 m. The SPA is outwith the maximum foraging range during the breeding season and therefore not at risk during this period. Outwith the breeding season Arctic skuas disperse widely and there is a very low risk of collision.

eee. Data from post-construction monitoring studies undertaken in Denmark indicate that Arctic skuas do not avoid entering wind farms, consequently there is not thought to be a significant barrier effect (Zucco *et al.* 2006).

fff. There are no data available from constructed wind farms to determine whether Arctic skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

ggg. A total of 50 pomarine skuas were recorded in the Hornsea Study Area in Year 1. 85.7% were recorded flying below turbine height. The SPA is 460 km from the proposed development and the risk of collision for a pomarine skua from this SPA is negligible.

hhh. There are no data from post-construction monitoring studies to determine whether pomarine skuas avoid entering wind farms. However, should they do so the additional distance flown will not be significant compared to the overall distance flown to or from this SPA.

iii. There are no data available from constructed wind farms to determine whether pomarine skuas are displaced but the relatively low usage of the Hornsea Project One and the wide usage of other areas indicate that should displacement occur its effects are predicted to be negligible.

jjj. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates no mortalities associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

kkk. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

lll. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

mmm. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

nnn. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). However, the SPA is 460 km away and therefore the potential for a likely significant effect is very remote.

ooo. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A72 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 107: Baie de Seine Occidentale SPA

Name of European site: Baie de Seine Occidentale SPA

Distance to Hornsea Project One : 534 km

European site features	**Likely Effects of Project One**											
Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Black tern *Chlidonias niger (Breeding)*		**×a**			**×a**			**×a**			**×mm**	
Red-throated diver *Gavia stellate (Winter)*		**×b**			**×c**			**×d**			**×mm**	
Slavonian Grebe *Podiceps auritus (Winter/Assemblage)*		**×e**			**×f**			**×f**			**×mm**	
Little gull *Hydrocoloeus minutus (Winter/Migrant)*		**×g**			**×h**			**×i**			**×mm**	
Little tern *Sternula albifrons (Migrant)*		**×j**			**×k**			**×l**			**×mm**	
Common tern *Sterna hirundo (Migrant)*		**×m**			**×c**			**×l**			**×mm**	
Arctic tern *Sterna paradisaea (Breeding/Migrant)*		**×n**			**×c**			**×l**			**×mm**	
Sandwich tern *Sterna sandvicensis (Breeding)*		**×o**			**×p**			**×l**			**×mm**	
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda (Winter)*		**×q**			**×c**			**×r**			**×mm**	
Turnstone *Arenaria interpres (Migrant – winter)*		**×s**			**×c**			**×t**			**×mm**	
Purple sandpiper *Calidris maritima (Winter)*		**×u**			**×u**			**×u**			**×mm**	
Fulmar *Fulmarus glacialis (Winter)*		**×v**			**×w**			**×x**			**×mm**	
Herring gull *Larus argentatus (Breeding/Winter)*		**×y**			**×c**			**×l**			**×mm**	
Great black-backed gull *Larus marinus (Breeding/Winter)*		**×z**			**×c**			**×l**			**×mm**	
Common Scoter *Melanitta nigra (Winter)*		**×aa**			**×bb**			**×t**			**×mm**	
Red-breasted Merganser *Mergus serrator (Assemblage)*		**×cc**			**×cc**			**×cc**			**×mm**	
Eider *Somateria mollissima (Winter)*		**×dd**			**×ee**			**×t**			**×mm**	
Great-crested grebe *Podiceps cristatus (Migrant)*		**×ff**			**×c**			**×t**			**×mm**	
Cormorant *Phalacrocorax carbo (Breeding/Winter)*		**×gg**			**×hh**			**×ii**			**×mm**	
Kittiwake *Rissa tridactyla (Winter)*		**×jj**			**×c**			**×l**			**×mm**	
Guillemot *Uria aalge (Winter)*		**×kk**			**×c**			**×ll**			**×mm**	

Evidence supporting conclusions (Ref: Table A73 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only one black tern was recorded during two years of surveys.

b. All red-throated divers recorded in flight were flying below turbine height and evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

c. Migrating birds of these species may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA, which is 534 km away, is negligible.

d. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use Project One. Consequently, any potential impacts are likely to be negligible.

e. Only one Slavonian grebe was recorded flying below turbine height.

f. Only one Slavonian grebe was recorded.

g. A total of 3,522 little gulls were recorded, with nearly all records during October and the large majority flying below 22.5 m. The SPA is 534 km from the proposed development and therefore the risk of a significant effect is negligible.

h. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the SPA is negligible.

i. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.* 2006, Barton *et al.* 2010).

j. Three little terns were recorded, all flying below 5 m.

k. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

l. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006; Pettersson 2005)

m. Collision risk modelling predicts up to one common tern collision per year (at a 98% avoidance rate). The predicted number of collisions and the distance this SPA is from the proposed development make the risk of a significant impact negligible.

n. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

o. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

p. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006

q. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

r. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). However, the site is 460 km away and therefore at very low risk of displacement effects.

s. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

t. These species were not recorded using the development area and no displacement effects are predicted.

u. Only one purple sandpiper was recorded during two years of surveys.

v. Of those fulmar recorded in flight 99.8% were below rotor height and therefore not at risk of collision. Collision risk modelling predicted zero collisions.

w. The additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

x. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

y. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is outwith the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were higher and birds from this SPA may disperse widely. This site is 534 km away and no significant impacts will occur.

z. A total of 4,906 great black-backed gulls were recorded in in flight; with peak numbers occurring in January. The SPA is outwith the mean maximum foraging range for great black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding, numbers recorded were higher and birds from this SPA may disperse widely. Following breeding, great black-backed gulls disperse but remain largely within 100 km of their breeding colonies (Harris 1962) and are therefore unlikely to occur in the Hornsea Project One.

aa. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

bb. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

cc. Only two red-breasted merganser were recorded during two years of surveys.

dd. Two eider were recorded in the 10 km buffer area and outwith the Hornsea Project One Zones, both were flying below 20 m and therefore not at risk of collision. Therefore, there is a low risk of collision.

ee. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

ff. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

gg. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

hh. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

ii. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

jj. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is outwith the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Outwith the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact.

kk. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

ll. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). However, the SPA is 534 km away and therefore the potential for a likely significant effect is very remote.

mm. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A73 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 108: Falaise du Bessin Occidental SPA

Name of European site: Falaise du Bessin Occidental SPA												
Distance to Hornsea Project One: 540 km												
European site features	**Likely Effects of Project One**											
Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	C	C	O	D	C	O	D
Red-throated diver *Gavia stellata*		**×a**			**×b**			**×c**			**×v**	
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Razorbill *Alca torda (Winter)*		**×d**			**×b**			**×e**			**×v**	
Fulmar *Fulmarus glacialis (Breeding/Winter)*		**×f**			**×g**			**×h**			**×v**	
Herring gull *Larus argentatus (Breeding)*		**×i**			**×b**			**×j**			**×v**	
Lesser black-backed gull *Larus fuscus (Breeding)*		**×k**			**×b**			**×j**			**×v**	
Red-breasted merganser *(Assemblage)*		**×l**			**×l**			**×l**			**×v**	
Cormorant *Phalacrocorax carbo (Winter)*		**×m**			**×n**			**×o**			**×v**	
Shag *Phalacrocorax aristotelis (Assemblage)*		**×p**			**×q**			**×r**			**×v**	
Kittiwake *Rissa tridactyla (Breeding)*		**×s**			**×b**			**×j**			**×v**	
Guillemot *Uria aalge (Winter)*		**×t**			**×b**			**×u**			**×v**	

Evidence supporting conclusions (Ref: Table A74 of Annex A of the HRA Report (Doc ref No 12.6)):

a. All red-throated divers recorded in flight were flying below turbine height and evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. During migration, birds may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA, which is 540 km away, is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently, any potential impacts will be negligible.

d. A total of 15,437 razorbills were recorded in Year 1 and 18,880 in Year 2; with peak numbers from July to October. Of those in flight all were below rotor height and therefore not at risk of collision.

e. Some evidence from constructed offshore wind farms indicates that razorbills may be displaced (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006). However, the site is 540 km away and therefore at very low risk of displacement effects.

f. Of those fulmar recorded in flight 99.8% were below rotor height and therefore not at risk of collision. Collision risk modelling predicted zero collisions.

g. The additional estimated distance of up to 36 km will, if a barrier effect occurs, be a small incremental increase in overall distance flown by this highly pelagic species.

h. There is little evidence from constructed offshore wind farms on whether fulmars may be displaced or not. However, should it occur the overall area displaced would be relatively small for this widespread pelagic species.

i. A total of 940 herring gulls were recorded in flight, of which 73.9% were below rotor height. Collision risk modelling predicts on average up to 63 collisions per year in Hornsea Project One (at a 98% avoidance rate). The SPA is out with the mean maximum foraging range for herring gull during the breeding season and therefore birds at this site are at low risk of being impacted. Out with the breeding season numbers recorded were higher and birds from this SPA may disperse widely. This SPA is 540 km away and no significant impacts will occur.

j. Evidence from constructed offshore wind farms indicate that these species are not displaced by wind farms (Petersen *et al.* 2006).

k. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding lesser black-backed gulls disperse away from their colonies. However, the distance this SPA is from the proposed development and the small breeding population of 35 pairs, indicates low risk of a significant impact alone but may be increased in-combination with potential future developments. No collisions are predicted to be on birds from this SPA (see Annex B).

l. Only two red-breasted merganser were recorded during two years of surveys.

m. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

n. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

o. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

p. The SPA is out with the maximum foraging range for shag during the breeding season and there were only five records of shags from two years of surveys. All birds were flying below 7.5 m. Evidence from existing offshore wind farms recorded 1.4% of flights as below 20 m (e.g. npower 2006). Therefore there is a low risk of collision.

q. There is no evidence as to whether a barrier effect may occur or not but the low usage of the site and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

r. There are a no records of shags using the area and therefore no displacement impacts are predicted.

s. A total of 28,818 kittiwakes were recorded in Year 1 and 41,896 in Year 2; with peak numbers during July, August and September. Of those in flight the large majority were below 22.5m. The SPA is out with the maximum foraging range for kittiwake during the breeding season and therefore birds at this site are at low risk of being impacted. Out with the breeding season numbers recorded were lower but birds from this SPA may disperse widely. In-combination impacts with other future proposed developments may increase the risk of a significant impact.

t. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

u. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). However, the SPA is 540 km away and therefore the potential for a likely significant effect is very remote.

v. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A74 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 109: Frisian Front SPA

Name of European site: Frisian Front SPA												
Distance to Hornsea Project One: 130 km												
European site features	**Likely Effects of Project One**											
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	C	C	O	D	C	O	D
Great skua *Catharacta skua (Migrant)*		**×a**			**×b**			**×c**			**×m**	
Great black-backed gull *Larus marinus (Migrant)*		**×d**			**×e**			**×f**			**×m**	
Lesser black-backed gull *Larus fuscus (Migrant)*		**×g**			**×h**			**×i**			**×m**	
Guillemot *Uria aalge (Migrant)*		**×j**			**×k**			**×l**			**×m**	

Evidence supporting conclusions (Ref: Table A75 of Annex A of the HRA Report (Doc ref No 12.6)):

a. A total of 151 great skuas were recorded in flight. The majority (87.4%) were recorded flying below 22.5m. The low number of great skua recorded and their relatively low flight height indicate low collision risk. Collision risk modelling undertaken indicates one mortality per year associated with Project One. Furthermore, the distance this SPA is from the proposed development suggests a low likelihood of birds from this site interacting with the proposed development during the breeding season.

b. There are no data from any constructed wind farms to determine whether or not a barrier effect may occur for great skuas. Should it occur, the additional flight of up to 36 km would not cause a significant increase in energetic expenditure for a species that migrates from the North Atlantic to the Bay of Biscay and West Africa.

c. Great skuas are primarily an aerial species, only spending time on the sea surface when feeding, preening or during periods of calm weather. There are no data available from constructed wind farms to determine whether great skuas are displaced but the relatively low usage of the Hornsea Project One and the wider usage of other areas indicate that should displacement occur, its effects will be negligible.

d. A total of 4,906 great black-backed gulls were recorded in in flight; with peak numbers occurring in January. The SPA is selected for its migratory population of great black-backed gulls with an average population of 180 birds between August and September. (Derenberg *et al.* 2010). Birds occurring at the site may be from the wider North Sea population and there is low risk of birds from this site interacting with Project One.

e. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

f. Evidence from constructed offshore wind farms indicate that great black-backed gulls are not displaced by wind farms (Petersen *et al.* 2006).

g. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. Following breeding lesser black-backed gulls disperse away from their colonies and the SPA is a site for non-breeding migrating lesser black-backed gulls. The population is unknown (Deerenberg *et al.* 2010). The distance this SPA is from the proposed development and the small risk of collision, indicates low risk of a significant effect on birds from this SPA that will be part of the wider European population of more than 300,000 pairs (BLI 2013) many of which could occur in the SPA.

h. The SPA is out with the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in distance flown.

i. Evidence from constructed offshore wind farms indicates that lesser black-backed gulls are not significantly displaced by wind farms (e.g. Zucco *et al.* 2006; Petersen *et al.* 2006).

j. 46,403 guillemots were recorded in Year 1 and 47,632 in Year 2. Of those recorded in flight 99.9% were below 22.5 m. Collision risk modelling predicts less than one collision per year (at a 98% avoidance rate).

k. During migration guillemots will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

l. Some evidence from constructed offshore wind farms indicates that guillemots may be displaced (e.g. Petersen *et al.* 2006). However, the SPA is 130 km away and therefore the potential for a likely significant effect is very remote.

m. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A75 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects**.**

Stage 1 Matrix 110: Waddenzee (Wadden Sea) SPA

Name of European site: Waddenzee SPA												
Distance to Hornsea Project One: 417 km												
European site features	**Likely Effects of Project One**											
Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	C	C	O	D	C	O	D
Short-eared owl *Asio flammeus (Breeding)*		**×a**			**×b**			**×c**			**×zz**	
Barnacle goose *Branta leucopsis (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Kentish plover *(Breeding)*		**×d**			**×d**			**×d**			**×zz**	
Black-tern *(Migrant – winter)*		**×e**			**×e**			**×e**			**×zz**	
Marsh harrier *Circus aeruginosus (Breeding)*		**×d**			**×d**			**×d**			**×zz**	
Hen harrier *Circus cyaneus (Breeding)*		**×d**			**×d**			**×d**			**×zz**	
Bewick's swan *Cygnus columbianus bewickii (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Peregrine falcon *Falco peregrinus (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Bar-tailed godwit *Limosa lapponica (Migrant – winter)*		**×f**			**×b**			**×c**			**×zz**	
Spoonbill *(Breeding)*		**×d**			**×d**			**×d**			**×zz**	
Golden plover *(Migrant – winter)*		**×g**			**×b**			**×c**			**×zz**	
Avocet *Recurvirostra avosetta (breeding)*		**×d**			**×d**			**×d**			**×zz**	
Little tern *Sterna albifrons (Breeding)*		**×h**			**×i**			**×j**			**×zz**	
Common tern *Sterna hirundo (breeding)*		**×k**			**×l**			**×j**			**×zz**	
Arctic tern *Sterna paradisaea (Breeding)*		**×m**			**×n**			**×j**			**×zz**	
Sandwich tern *Sterna sandvicensis (breeding)*		**×o**			**×p**			**×j**			**×zz**	
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	C	C	C	O	D	C	O	D
Pintail *Anas acuta (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Shoveler *Anas clypeata (Migrant – winter)*		**×q**			**×q**			**×q**			**×zz**	
Teal *Anas crecca (Migrant – winter)*		**×r**			**×b**			**×c**			**×zz**	
Widgeon *Anas Penelope (Migrant)*		**×s**			**×t**			**×c**			**×zz**	
Mallard *Anas platyrhynchos (Migrant – winter)*		**×u**			**×b**			**×c**			**×zz**	
Gadwall *Anas strepera (Migrant – winter)*		**×v**			**×v**			**×v**			**×zz**	
Greylag Goose *Anser anser (Migrant – winter)*		**×w**			**×x**			**×c**			**×zz**	

Name of European site: Waddenzee SPA												
Distance to Hornsea Project One: 417 km												
Lesser white-fronted goose *Anser albifrons albifrons (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Turnstone *Arenaria interpres (Migrant – winter)*		**×y**			**×b**			**×c**			**×zz**	
Scaup *Aythya marila (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Brent goose *(Migrant – winter)*		**×z**			**×aa**			**×c**			**×zz**	
Goldeneye *Bucephala clangula (Migrant – winter)*		**×bb**			**× bb**			**× bb**			**×zz**	
Sanderling *Calidris alba (Migrant – winter)*		**×cc**			**×cc**			**×cc**			**×zz**	
Dunlin *Calidris alpina alpine (Migrant – winter)*		**×dd**			**×b**			**×c**			**×zz**	
Knot *Calidris canutus (Migrant – winter)*		**×ee**			**×b**			**×c**			**×zz**	
Curlew sandpiper *Calidris ferruginea (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Ringed plover *Charadrius hiaticula (Breeding)*		**×ff**			**×b**			**×c**			**×zz**	
Oystercatcher *Haematopus ostralegus (Migrant – winter)*		**×gg**			**× b**			**× c**			**×zz**	
Lesser black-backed gull *Larus fuscus (Breeding)*		**×hh**			**×ii**			**×j**			**×zz**	
Black-tailed godwit *Limosa limosa islandica (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Red-breasted merganser *(Migrant – winter)*		**×jj**			**×jj**			**×jj**			**×zz**	
Goosander *Mergus merganser (Migrant – winter)*		**×kk**			**×kk**			**×kk**			**×zz**	
Curlew *Numenius arquata (Migrant – winter)*		**×ll**			**×b**			**×c**			**×zz**	
Cormorant *Phalacrocorax carbo (Migrant – winter)*		**×mm**			**×nn**			**×oo**			**×zz**	
Lapwing *Vanellus vanellus (Migrant – winter)*		**×pp**			**×qq**			**×c**			**×zz**	
Grey Plover *Pluvialis squatarola (Migrant – winter)*		**×rr**			**×b**			**×c**			**×zz**	
Great-crested grebe *Podiceps cristatus (Migrant – winter)*		**×ss**			**×b**			**×c**			**×zz**	
Eider *Somateria mollissima (Breeding)*		**×tt**			**×uu**			**×c**			**×zz**	
Shelduck *Tadorna tadorna (Migrant – winter)*		**×vv**			**×ww**			**×ww**			**×zz**	
Spotted redshank *Tringa erythropus (Migrant – winter)*		**×d**			**×d**			**×d**			**×zz**	
Greenshank *Tringa nebularia (Migrant – winter)*		**×xx**			**× xx**			**× xx**			**×zz**	
Redshank *Tringa tetanus (Migrant – winter)*		**×yy**			**× yy**			**× yy**			**×zz**	

Evidence supporting conclusions (Ref: Table A76 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Only two short-eared owls were recorded in the Hornsea Project in September and November of Year 1. One was flying at rotor height. The very low numbers recorded indicate that there is negligible risk of an effect.

b. Migrating birds may fly around the wind farm but the incremental increase in flight distance to the SPA is likely to be negligible.

c. These species were not recorded using the development area and no displacement effects are predicted.

d. These species were not recorded during Project One surveys.

e. Only one black tern was recorded during two years of surveys.

f. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

g. A total of 15 golden plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision

h. Three little terns were recorded, all flying below 5 m.

i. Little terns were very rarely recorded within the development area and no barrier effects have been reported (e.g. Zucco *et al.* 2006).

j. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006).

k. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is out with the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

l. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is outwith the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. A total of 634 Arctic terns were recorded with peak numbers during August and September. Of those recorded in flight all% were flying below 22.5m and therefore at very low risk of a significant impact.

n. No barrier effects to Arctic terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

o. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

p. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

q. Only four shoveler were recorded during two years of surveys.

r. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

s. A total of 19 wigeon were recorded during two years of surveys. The low numbers recorded and predicted high avoidance rates indicate low risk of collision. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

t. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

u. A total of ten mallard were recorded during two years of surveys. The low numbers recorded and reported relatively high levels of avoidance behaviour by wildfowl indicate very low risk of collision.

v. Only one gadwall was recorded during two years of surveys.

w. A total of 16 greylag geese were recorded out with Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

x. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

y. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

z. A total of 7 dark-bellied brent geese were recorded, all but one were outwith Hornsea Project One during two years of surveys. Small numbers recorded and predicted relatively high avoidance rates reported by geese, low risk of collision. Collision risk modelling predicts one collision per year (APEM 2012).

aa. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

bb. Only one goldeneye was recorded during two years of surveys.

cc. No sanderling were recorded.

dd. A total of 23 dunlin were recorded in the Hornsea Project One area. All were flying below 22.5 m and therefore not at risk of collision.

ee. A total of 21 knot were recorded all flying below 22.5 m and therefore not at risk of collision.

ff. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

gg. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

hh. A total of 1,299 lesser black-backed gulls were recorded in Year 1 and 1,342 during Year 2, with peak numbers occurring during the breeding season. Of those in flight, 81.4% were below 22.5 m and therefore at low risk of collision. The SPA is beyond the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore birds at this site are at low risk of being impacted. Following breeding lesser black-backed gulls disperse away from their colonies and an estimated four collisions per year are predicted to be on birds from this SPA. The breeding population is 19,000 pairs and therefore four collisions will be negligible.

ii. The SPA is out with the mean maximum foraging range for lesser black-backed gull during the breeding season and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in distance flown.

jj. Only two red-breasted merganser were recorded during two years of surveys.

kk. Three goosander were recorded outwith the Hornsea Project One in Year 2.

ll. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

mm. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

nn. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

oo. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

pp. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

qq. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

rr. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

ss. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

tt. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

uu. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

vv. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

ww. Only one shelduck was recorded during two years of surveys.

xx. Only one greenshank was recorded during two years of surveys.

yy. Only seven redshank were recorded during two years of surveys.

zz. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A76 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 111: Voordelta SPA

Name of European site: Voordelta SPA												
Distance to Hornsea Project One: 235 km												
European site features	**Likely Effects of Project One**											
Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Red-throated diver *Gavia stellate (breeding)*		**×a**			**×b**			**×c**			**×qq**	
Little gull *Hydrocoloeus minutus (Migrant – winter)*		**×d**			**×e**			**×f**			**×qq**	
Bar-tailed godwit *Limosa lapponica (Migrant – winter)*		**×g**			**×b**			**×h**			**×qq**	
Spoonbill *Platalea leucorodia*		**×i**			**×i**			**×i**			**×qq**	
Slavonian Grebe *Podiceps auritus (Migrant – winter)*		**×i**			**×i**			**×i**			**×qq**	
Golden plover *(Migrant – winter)*		**×j**			**×b**			**×h**			**×qq**	
Avocet *Recurvirostra avosetta (breeding)*		**×i**			**×i**			**×i**			**×qq**	
Common tern *Sterna hirundo (breeding)*		**×k**			**×l**			**×m**			**×qq**	
Sandwich tern *Sterna sandvicensis (breeding)*		**×n**			**×o**			**×m**			**×qq**	
Non-Annex I Species	Collision			Barrier			Displacement			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Pintail *Anas acuta (Migrant – winter)*		**×i**			**×i**			**×i**			**×qq**	
Shoveler *Anas clypeata (Migrant – winter)*		**×p**			**×p**			**×p**			**×qq**	
Teal *Anas crecca (Migrant – winter)*		**×q**			**×b**			**×h**			**×qq**	
Widgeon *Anas Penelope (Migrant)*		**×r**			**×s**			**×h**			**×qq**	
Gadwall *Anas strepera (Migrant – winter)*		**×t**			**×t**			**×t**			**×qq**	
Greylag Goose *Anser anser (Migrant – winter)*		**×u**			**×v**			**×h**			**×qq**	
Turnstone *Arenaria interpres (Migrant – winter)*		**×w**			**×b**			**×h**			**×qq**	
Scaup *Aythya marila (Migrant – winter)*		**×i**			**×i**			**×i**			**×qq**	
Goldeneye *Bucephala clangula (Migrant – winter)*		**×x**			**×x**			**×x**			**×qq**	
Sanderling *Calidris alba (Migrant – winter)*		**×i**			**×i**			**×i**			**×qq**	
Dunlin *Calidris alpina alpine (Migrant – winter)*		**×y**			**×b**			**×h**			**×qq**	
Ringed plover *Charadrius hiaticula (Breeding)*		**×z**			**×b**			**×h**			**×qq**	
Oystercatcher *Haematopus ostralegus (Migrant – winter)*		**×aa**			**×b**			**×h**			**×qq**	
Common Scoter *Melanitta nigra (Breeding)*		**×bb**			**×cc**			**×h**			**×qq**	

Red-breasted Merganser *Mergus serrator (Migrant – winter)*		**×dd**			**×dd**			**×dd**			**×qq**	
Curlew *Numenius arquata (Migrant – winter)*		**×ee**			**×b**			**×h**			**×qq**	
Cormorant *Phalacrocorax carbo (Migrant – winter)*		**×ff**			**×gg**			**×hh**			**×qq**	
Lapwing *Podiceps cristatus (Migrant – winter)*		**×ii**			**×jj**			**×h**			**×qq**	
Grey Plover *Pluvialis squatarola (Migrant – winter)*		**×kk**			**×b**			**×h**			**×qq**	
Great-crested grebe *Podiceps cristatus (Migrant – winter)*		**×ll**			**×b**			**×h**			**×qq**	
Eider *Somateria mollissima (Breeding)*		**×mm**			**×nn**			**×h**			**×qq**	
Shelduck *Tadorna tadorna (Migrant – winter)*		**×oo**			**×oo**			**×oo**			**×qq**	
Redshank *Tringa tetanus (Migrant – winter)*		**×pp**			**×pp**			**×pp**			**×qq**	

Evidence supporting conclusions (Ref: Table A77 of Annex A of the HRA Report (Doc ref No 12.6)):

a. Within the whole of the Hornsea Survey Area a total of 21 red-throated divers were recorded in Year 1 and 42 in Year 2. All were flying below turbine height. Evidence from other wind farms indicates that risk of collision is low with approximately 98% of flights below turbine height (e.g. LAL 2006).

b. Migrating birds may fly around the wind farm but the incremental increase in flight of up to 36 km to or from the SPA is negligible.

c. Red-throated divers may be displaced from offshore wind farms. However, only two red-throated divers were recorded using the development area and the water depths and location suggest that Divers will not regularly use the Hornsea Project One. Consequently any potential impacts will be negligible.

d. A total of 3,522 little gulls were recorded, with nearly all records during October and the large majority flying below 22.5 m. The SPA is [hold] km from the proposed development and therefore the risk of a significant effect is negligible.

e. Evidence from existing offshore wind farms indicates that there is no barrier effect on little gulls (e.g. Barton *et al.* 2010). However, if migrating little gulls do fly around the wind farm the incremental increase in flight of up to 36 km to or from the SPA is negligible.

f. No displacement effects have been reported for little gull with little gulls occurring within offshore wind farms (e.g. Zucco *et al.* 2006, Barton *et al.* 2010).

g. A total of 29 bar-tailed godwit were recorded in the Hornsea Zone and 10 km Buffer, of which one was in the Hornsea Project One. 82.8% of birds were recorded flying at rotor height and therefore at risk of collision. However, the number of bar-tailed godwit recorded was low and therefore at low risk of an effect.

h. These species were not recorded using the development area and no displacement effects are predicted.

i. These species were not recorded during Project One surveys.

j. A total of 15 golden plover plover were recorded in the Hornsea Project One and a further 133 in the whole study area. No golden plover were recorded flying above 22.5 m and therefore not at risk of collision. However, studies undertaken elsewhere indicate waders have a high avoidance rate (e.g. Petersen *et al.* 2006) and therefore at low risk of collision.

k. A total of 3,410 common terns were recorded; with peak numbers during August and September. Of those in flight 98.6% were below 22.5 m. Collision risk modelling predicts no collisions per year (at a 98% avoidance rate). The SPA is out with the maximum foraging range for common tern during the breeding season and therefore birds at this site are at low risk of being impacted.

l. No barrier effects on common terns have been recorded from constructed offshore wind farms (e.g. Zucco *et al.* 2006). The SPA is out with the mean maximum or maximum foraging range for common tern and therefore no regularly barrier effects will occur during this period. During migration birds will be able to fly around the proposed development estimated as being up to 36 km without causing a significant increase in overall distance flown.

m. Evidence from constructed offshore wind farms indicates that these species are not displaced by wind farms (e.g. Zucco *et al.* 2006, Pettersson 2005).

n. One sandwich tern was recorded in Year 1 and six in Year 2. The SPA is outwith the maximum foraging range for Sandwich tern during the breeding season and therefore there is a very low risk of a significant impact.

o. Sandwich terns are rarely recorded within the development area and no barrier effects have been reported for Sandwich terns (e.g. Petersen *et al.* 2006).

p. Only four shoveler were recorded during two years of surveys.

q. Teal were regularly recorded in small numbers throughout the development area with a total of 37 records in Year 1 and one in year 2. All birds were recorded flying below rotor height and therefore not at risk of collision.

r. A total of 19 wigeon were recorded during two years of surveys. The low numbers recorded and predicted high avoidance rates indicate low risk of collision. Collision risk modelling predicts up to 20 collisions per year (APEM 2012).

s. Wigeon migrate to the UK from Scandinavia and Russia and therefore the incremental increase in flight distance from flying around the Hornsea Project One will be very small.

t. Only one gadwall was recorded during two years of surveys.

u. A total of 16 greylag geese were recorded outwith Hornsea Project One during two years of surveys. Small numbers of greylag geese from Iceland and the north-western Scotland population occur in Yorkshire in winter (Thomas 2011). It is likely that birds recorded in the Study Area are from these populations so regular passage offshore is unlikely. All records were of birds flying below rotor height and therefore not at risk of collision.

v. Geese are known to fly around or over offshore wind farms and therefore at risk of a barrier effect. The incremental increase in distance flown of approximately 36 km is negligible compared to the overall distance flown during migration to and from their breeding and wintering grounds.

w. Four turnstone were recorded in the Hornsea Zone and 10 km buffer, flying below 2.5 m in height and therefore at low risk of collision.

x. Only one goldeneye was recorded during two years of surveys.

y. A total of 23 dunlin were recorded in the Hornsea Project One area. All were flying below 22.5 m and therefore not at risk of collision.

z. Four ringed plover were recorded in the study area in Year 1 and six in Year 2. All were flying below 22.5 m and therefore not at risk of collision.

aa. A total of 23 oystercatchers were recorded in the study area. All were flying below 12.5 m and therefore not at risk of collision.

bb. A total of 419 common scoter were recorded throughout the study area during two years of surveys. All but six birds were recorded in flight, of which 1.2% were flying above 20 m. Data from other offshore wind farms also suggests a relatively low flight height with 93% flying below turbine height (e.g. npower 2006). Therefore, there is a low risk of collision.

cc. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with common scoter flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by common scoter and the distance from the SPA indicate that impacts from any additional distance flown will be negligible compared to the overall distance flown during migration.

dd. Only two red-breasted merganser were recorded during two years of surveys.

ee. Only four curlew were recorded in the Hornsea development zone during Year 1 and 14 in Year 2. The low numbers recorded and predicted avoidance rates mean that the risk of a significant impact is very low.

ff. Only 11 cormorants were recorded, of which three were within the Hornsea Project One. One bird was flying at rotor height. Evidence from other offshore wind farms indicates that approximately 10% of cormorants fly at rotor height (e.g. npower 2006). Consequently, the risk of an impact is low.

gg. There is evidence of a barrier effect to cormorants from existing offshore wind farms (e.g. Zucco *et al.* 2006). However, the incremental increase in flight distance to or from the SPA is small compared to the overall distance flown during migration.

hh. Cormorants are not known to be displaced by offshore wind farms (e.g. Petersen *et al.* 2006).

ii. A total of 141 lapwing were recorded, of which 95.3% were flying above 22.5 m and therefore at risk of collision. However, the total number of lapwing recorded was relatively low and it is known that waders are able to avoid wind turbines (e.g. Petersen *et al.* 2006). Therefore the risk of an impact is low and will not be significant.

jj. A total of 148 lapwing were recorded. Any additional distance required to fly around the Hornsea Project One will be negligible relative to the overall distance migrated.

kk. One grey plover was recorded in the study area in Year 1 and three in Year 2. The low numbers recorded and predicted level of avoidance based on existing studies indicate little or no risk of collision.

ll. Two great-crested grebes were recorded within the Hornsea Survey Area flying below 22.5 m and therefore at low risk of collision.

mm. A total of nine eiders were recorded during two years of surveys. All but one were flying below 22.5 m and therefore not at risk of collision. Consequently, there is a low risk of collision.

nn. Evidence from constructed offshore wind farms indicates that there is the potential for a barrier effect with eider flying around wind farms (e.g. Petersen *et al.* 2006). If a barrier effect occurs the low usage of the site by eider and the distance from the SPA indicate that impacts from any additional distance flown will be negligible.

oo. Only one shelduck was recorded during two years of surveys. Collision risk modelling predicts up to four collisions per year (APEM 2012).

pp. Only seven redshank were recorded during two years of surveys.

qq. In-combination LSE informed by the footnotes above for the individual receptors as presented in **Annex A, Table A77 of the HRA Report (Doc ref No 12.6)**. Additional information to support the conclusions made with regard to the in-combination LSE screening is presented in **paragraphs 4.3.213 *et seq.* of the HRA Report (Doc ref No 12.6)** for Collision Effects, **paragraphs 4.3.224 *et seq.*** for Displacement Effects and **paragraphs 4.3.229 *et seq.*** for Barrier Effects.

Stage 1 Matrix 112 A: Humber Estuary SAC

Name of European site: Humber Estuary SAC													
Distance to Hornsea Project One: 0 km as the cable route crosses the site (102 km from Subzone 1)													
European site features	**Likely Effects of Project One**												
Annex I qualifying features (habitats); see also footnote **h**.	Habitat extent			Water quality						In-combination			
	C	O	D	C	O	D				C	O	D	
Estuaries	✓**a**	×**b**	×**c**	✓**a**		×**c**				✓**e**			
Mudflats and sandflats not covered by seawater at low tide	✓**a**	×**b**	×**c**	✓**a**		×**c**				✓**e**			
Sandbanks which are slightly covered by sea water all the time; see footnote **f**.													
Coastal lagoons; see footnote **f**.													
Salicornia and other annuals colonizing mud and sand	✓**a**	×**b**	×**c**	✓**a**		×**c**				✓**e**			
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	✓**d**	×**b**	×**c**	✓**a**		×**c**				✓**e**			
Embryonic shifting dunes	✓**d**	×**b**	×**c**	✓**a**		×**c**				✓**e**			
Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)	✓**d**	×**b**	×**c**	✓**a**		×**c**				✓**e**			
Fixed dunes with herbaceous vegetation (‘grey dunes’); see footnote **f**.													
Dunes with *Hippophae rhamnoides*; see footnote **f**.													

Evidence supporting conclusions

a. LSE as these habitats occur at the Horseshoe Point landfall site and are likely to be directly affected by the proposed works (see **Table 4.10 of the HRA Report (Doc ref No 12.6)**).

b. No cable maintenance (e.g. cable re-burial) is predicted within designated estuarine habitats of the Humber Estuary SAC (see **Section 2.4 of the HRA Report (Doc ref No 12.6)**). Although access to the intertidal will be required during the operational phase (e.g. for cable inspection), no LSE from access during the operational phase is predicted as access to the intertidal will be gained along a permitted access route and will result in minimal disturbance to qualifying features (see **Table 4.10 and Section 2.4 of the HRA Report (Doc ref No 12.6)**).

c. No LSE during the decommissioning phase as cables are likely to remain in situ **(see Section 2.5 of the HRA Report (Doc ref No 12.6)).**

d. Potential for LSE as these habitats occur at the Horseshoe Point landfall site, though may not be directly affected by the proposed works **(see Table 4.10 of the HRA Report (Doc ref No 12.6)).**

e. Plans/projects with potential for LSE on qualifying features in-combination with Project One construction and components within the Humber Estuary include: Hornsea Project Two, Tetney to Saltfleet Tidal Flood Defence Scheme, Phillips 66 Tetney Sea Line Replacement Project and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraph 4.4.15 to 4.4.61 of the HRA Report (Doc ref No 12.6)**).

f. These habitats were not recorded in the vicinity of Project One and therefore no likely significant effects are predicted on these features (see **Annex E**, **paragraphs E.12 et seq**. and **E.126 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 112 B: Humber Estuary SAC

Name of European site: Humber Estuary SAC												
Distance to Hornsea Project One: 0 km as the cable route crosses the site (102 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II qualifying features (fish): see also footnote **i**.	Disruption to migration						In-combination					
	C	O	D				C	O	D			
Sea lamprey *Petromyzon marinus*	**✓a**	**✓b**	**✕c**				**✓d**	**✓d**				
River lamprey *Lampetra fluviatilis*	**✓a**	**✓b**	**✕c**				**✓d**	**✓d**				
Annex II qualifying features (marine mammals)	Injury/Disturbance			Collision risk			Change in prey species distribution / abundance			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal *Halichoerus grypus*	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓f, g**	**✓ f, g**	**✓ f, g**

Evidence supporting conclusions

a. Potential for LSE as these species may occur in the vicinity of the cable laying operations (see **Table 4.10 of the HRA Report (Doc ref No 12.6)**).

b. Potential for LSE as these species may occur in the vicinity of the operational cable, with potential for EMF related effects on migratory behaviour (see **Table 4.10 of the HRA Report (Doc ref No 12.6)**).

c. No LSE during the decommissioning phase as cables are likely to remain in situ (see **Section 2.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on qualifying features in-combination with Project One construction and components within the Humber Estuary include: Hornsea Project Two, Tetney to Saltfleet Tidal Flood Defence Scheme, Phillips 66 Tetney Sea Line Replacement Project and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraph 4.4.15 to 4.4.61 of the HRA Report (Doc ref No 12.6)**).

e. Grey seal: Construction and operation of Project One may cause physical and/or behavioural disturbance of grey seal from increased potential of vessel traffic and strikes (both within the Humber Estuary and Offshore), suspended sediments, habitat/prey species loss, accidental pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g., piling noise for a 2,300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see **Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Tagging studies from the Donna Nook haul out site in the Humber Estuary SAC show trips between this site and Project One (in particular the export cable route and the southern boundary of Subzone 1) (see **Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4**). Densities of grey seal averaged 0.043 animals per km^2 in the Hornsea Zone plus 10 km buffer, with a slightly lower density recorded in Subzone 1 plus 4 km buffer (0.038 animals per km2) (see **Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Given that grey seal from the SAC may occur in close proximity to Project One (both offshore and within the Humber Estuary), there is considered to be potential for a likely significant effect on the conservation objectives of grey seal from this site, either alone and/or in combination with other projects/plans (**Section 4.3 and 4.4 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on qualifying features in-combination with Project One construction and components within the Humber Estuary include: Hornsea Project Two, Tetney to Saltfleet Tidal Flood Defence Scheme, Phillips 66 Tetney Sea Line Replacement Project and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraph 4.4.15 to 4.4.61 of the HRA Report (Doc ref No 12.6)**).

g. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.5 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 113 A: Moray Firth SAC

Name of European site: Moray Firth SAC									
Distance to Hornsea Project One: 491 km (521 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
All Annex I habitats, see footnote **a.**									

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site because it is 491 km away from Project One. The numerical plume dispersion modelling for the fate of fine sediments (see the **Environmental Statement, Volume 2 Chapter 1: Marine Processes (Doc ref No 7.2.1)**) has shown that the majority of sediment to be disturbed comprises coarse material, which will be deposited near to the site. Annex I habitats present within this SAC are therefore located outside the potential zone of influence for impacts associated with elevated suspended sediments, sediment deposition, release of potential contaminants and nutrients above background levels. The habitats are also located outside the zone of influence for impacts associated with scour effects and EMF. The production of a Code of Construction Practice (CoCP) and Environmental Management Plan (EMP) will further reduce the risk of releasing pollutants, including accidental release. Therefore, no likely significant effect is anticipated on the conservation objectives for Annex I habitats and consequently this site (**Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 113 B: Moray Firth SAC

Name of European site: Moray Firth SAC									
Distance to Hornsea Project One: 491 km (521 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex II Species	Injury/disturbance			Collision risk			Changes in prey species		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Bottlenose dolphin (*Tursiops truncatus*)	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Potential impact pathways have been identified for bottlenose dolphin for physical injury/disturbance (from underwater noise), increased risk of collision with vessels and changes in prey species distribution/abundance during construction, operation and decommissioning. Bottlenose dolphin from the Moray Firth SAC are known to occur along the east coast of Scotland but no confirmed identifications of bottlenose dolphin elsewhere in the North Sea have been linked with the Moray Firth population (SMRU, 2012). There is no evidence from surveys (see Environmental Statement Volume 2, Chapter 4: Marine Mammals) to indicate that bottlenose dolphin occur in significant numbers or with any regularity within Project One. Only one sighting of three individuals was recorded during the two year survey, which indicates that Project One is not frequently used by this species. Therefore, there is no potential for LSEs for bottlenose dolphin and for this reason this species is screened out of further assessment.

Stage 1 Matrix 114 A: River Derwent SAC

Name of European site: River Derwent SAC									
Distance to Hornsea Project One: 45 km (160 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I qualifying features (habitats)									
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; see footnote **a**.									

Evidence supporting conclusions:

a. Annex I habitats have been screened out for Project One offshore activities, as this site as it is 45 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 114 B: River Derwent SAC

Name of European site: River Derwent SAC									
Distance to Hornsea Project One: 45 km (160 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex II qualifying features	Disruption to migration			In-combination					
	C	O	D	C	O				
Sea lamprey *Petromyzon marinus*; see footnote **d**.	**✓a**	**✓b**	**×c**	**✓f**	**✓f**				
River lamprey *Lampetra fluviatilis*; see footnote **e**.	**✓a**	**✓b**	**×c**	**✓f**	**✓f**				
Bullhead *Cottus gobio***.**	**×g**	**×g**		**×h**	**×h**				
Otter *Lutra lutra***.**	**×h**			**×h**					

Evidence supporting conclusions:

a. Potential for LSE as these species may occur in the vicinity of the cable laying operations (see **Table 4.10 of the HRA Report (Doc ref No 12.6)**).

b. Potential for LSE as these species may occur in the vicinity of the operational cable, with potential for EMF related effects on migratory behaviour (**Table 4.10 of the HRA Report (Doc ref No 12.6)**).

c. No LSE during the decommissioning phase as cables are likely to remain in situ (**Section 2.5 of the HRA Report (Doc ref No 12.6)**).

d. Sea lamprey could potentially be indirectly affected by physical injury and/or behavioural disturbance from noise and increased suspended sediments in the water column from the installation of foundations/cables. However, given the migratory distribution of sea lamprey appears to preclude a significant presence within Project One area (see Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology), and that habitat seems only to be important in relation to their ability to reach silt and gravel beds spawning beds (Maitland, 2003), it is unlikely that there will be any adverse effects on this species or its conservation objectives for the Humber Estuary SAC from Project One offshore activities, alone or in-combination (**Section 4.3 of the HRA Report (Doc ref No 12.6)**).

e. River lamprey are remain within rivers and estuaries throughout their lives; (Maitland, 2003), and migration behaviour is not expected to be affected by construction, operation or decommissioning of offshore infrastructure due to the low abundances predicted in these areas and the large distance between the coastline and the offshore Project One area. As such, injury or

behavioural impacts related to, for example, piling noise, plume effects or EMF in offshore areas have been screened out for further assessment (**Section 4.3 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on qualifying features in-combination with Project One construction and components within the Humber Estuary include: Hornsea Project Two, Tetney to Saltfleet Tidal Flood Defence Scheme, Phillips 66 Tetney Sea Line Replacement Project and Able Marine Energy Park (AMEP) (**Table 4.13 and paragraph 4.4.15 TO 4.4.61 of the HRA Report (Doc ref No 12.6)**).

g. Physical and/or behavioural disturbance: Bullhead fish do not occur in salt water. The site is inland and approximately 45 km away from the offshore Project One components and therefore no potential for LSEs (**Section 4.3 of the HRA Report (Doc ref No 12.6)**).

h. Physical and/or behavioural disturbance: Otter may utilise coastal habitats, and this species is generally a primary qualifying feature of several river SACs that flow into the North Sea (e.g., River Derwent) as well as additionally being a qualifying feature of some coastal SACs (e.g., The Wash and North Norfolk Coast). Coastal / landfall works within the export cable corridor could have the potential to cause disturbance to otter populations. However, Project One, including the export cable corridor, is at considerable distance (45 km away). Therefore, no direct or indirect disturbance effects leading to a likely significant effect would be anticipated on the conservation objectives for this species, and consequently the SAC (**Section 4.3 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 115 A: Firth of Tay and Eden Estuary SAC

Name of European site: Firth of Tay and Eden Estuary SAC									
Distance to Hornsea Project One: 340 km (390 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
All Annex I habitats, see footnote **a**.									

Evidence supporting conclusions (Ref:Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 340 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 115 B: Firth of Tay and Eden Estuary SAC

Name of European site: Firth of Tay and Eden Estuary SAC									
Distance to Hornsea Project One: 340 km (390 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex II Species	Injury/disturbance			In-combination effects					
	C	O	D	C	O	D			
Harbour seal (*Phoca vitulina*)	**×a**	**×a**		**×a**	**×a**				

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Harbour seal: The construction and operation of Project One may cause physical and/or behavioural disturbance of harbour seal from increased potential of vessel traffic and strikes, suspended sediments, habitat/prey species loss, accidential pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g. piling noise for a 2,300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see the **Environmental Statement Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Tagging studies of harbour seal from the Forth Tay and Eden Estuary SAC indicate that harbour seal from this SAC show a very high degree of site fidelity, with all harbour seal tagged travelling relatively locally to forage and returning to the SAC to haul out. On a few occasions individual harbour seal travelled up the Forth and along the south Fife coastline, hauling out at various places along the coast (Sparling *et al.,* 2011). Tagging of harbour seal in the UK suggests that harbour seal generally tend to forage within 40 or 50 km of their haul-out sites (SCOS, 2011). Harbour seal hauled out in The Greater Wash region, were found to travel between 75 and 120 km offshore to assumed foraging locations (SMRU, 2011) as reported in the **Environmental Statement Volume 2, Chapter 4: Marine Mammals**. As this site is located 340 km away from Project One, it is located beyond any potential for direct and indirect effects on harbour seal on foraging trips from this site, and therefore no LSEs are anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 116 A: Berwickshire and North Northumberland Coast SAC

Name of European site: Berwickshire and North Northumberland Coast SAC												
Distance to Hornsea Project One: 208 km (258 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 208 km away from Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 116 B: Berwickshire and North Northumberland Coast SAC

Name of European site: Berwickshire and North Northumberland Coast SAC												
Distance to Hornsea Project One: 208 km (258 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal (*Halichoerus grypus*)	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a,b**	**✓a,b**	**✓a,b**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: Construction and operation of Project One may cause physical and/or behavioural disturbance of grey seal from increased potential of piling noise during turbine and associated infrastructure installation, vessel traffic and strikes, suspended sediments, habitat/prey species loss, accidential pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g. piling noise for a 2,300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see the **Environmental Statement Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Tagging studies of grey seal from the Berwickshire and North Northumberland Coast SAC indicate that they occur widely across the North Sea and could occur in the potential area of impact from the Project One development (Sparling *et al*., 2011). Similarly, tagging studies from the Donna Nook haul out site in the Humber Estuary SAC, also show trips between the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC, and the Humber Estuary SAC and Project One, (in particular the export cable route and the southern boundary of Subzone 1), (see the Environmental Statement Volume 2, Chapter 4: Marine Mammals). Densities of grey seal averaged 0.043 animals per km^2 in the Hornsea Zone plus 10 km buffer, with a slightly lower density recorded in Subzone 1 plus 4 km buffer (0.038 animals per km^2). SMRU estimates of at sea density were 0.4 to 2 animals per km^2 (see the **Environmental Statement Volume 2, Chapter 4: Marine Mammals**). Given that grey seal from this SAC may travel in close proximity to Project One, there is considered to be potential LSEs on the conservation objectives of grey seal from this site, either alone and/or in combination with other projects/plans (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.5 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 117: Flamborough Head SAC

Name of European site: Flamborough Head SAC									
Distance to Hornsea Project One: 47 km (111 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
All Annex I habitats, see footnote **a**.									

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 47 km away from the closest point of Project One (i.e., the export cable route and Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 118: Dogger Bank cSAC

Name of European site: Dogger Bank cSAC									
Distance to Hornsea Project One: 35 km									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
All Annex I habitats are screened out of further assessment see footnote **a**.									

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 35 km away from the closest point of Project One (i.e., the export cable route and Subzone 1) (see Matrix 113: Moray Firth SAC; and**Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 119 A: The Wash and North Norfolk Coast SAC

Name of European site: The Wash and North Norfolk Coast SAC												
Distance to Hornsea Project One: 40 km (94 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats are screened out of further assessment, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 40 km away from the closest point of Project One (i.e., the export cable route) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 119 B: The Wash and North Norfolk Coast SAC

Name of European site: The Wash and North Norfolk Coast SAC												
Distance to Hornsea Project One: 40 km (94 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**
Otter, see footnote **b**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Harbour seal: the construction and operation of Project One may cause physical and/or behavioural disturbance of harbour seal from piling noise during turbine and associated infrastructure installation, increased potential of vessel traffic and strikes, suspended sediments, habitat/prey species loss, accidential pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g. piling noise for a 2300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see the **Environmental Statement Volume 2, Chapter 4: Marine Mammals (Doc ref No 7.2.4)**). Tagging of harbour seal in the UK suggests that harbour seal generally tend to forage within 40 or 50 km of their haul-out sites (SCOS, 2011). Harbour seal hauled out in The Greater Wash region (which encompasses the North Norfolk and Lincolnshire coastlines), were found to travel between 75 and 120 km offshore to assumed foraging locations (SMRU, 2011) as reported in the **Environmental Statement Volume 2, Chapter 4: Marine Mammals**. The Wash and North Norfolk Coast SAC holds 7% of the UK population of harbour seal with 2,829 counted there in 2009. The tagging studies of harbour seal from the SAC (as described above) indicate that individuals from this site do occur within Project One, in particular, across the export cable route corridor and southern boundary of Subzone 1. Densities within the study area were found to be low, with 0.028 animals per km^2 estimated for the Hornsea Zone plus buffer and 0.12 animals per km^2 estimated for Subzone 1 plus buffer, based on the site specific data. The SMRU data showed higher densities with 0.4 to 2 animals per km^2 estimated within the study area. Therefore, there is considered to be potential LSEs from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Otter may utilise coastal habitats, and this species is generally a primary qualifying feature of several river SACs that flow into the North Sea (e.g., River Derwent) as well as additionally being a qualifying feature of some coastal SACs (e.g., The Wash and North Norfolk Coast). Coastal / landfall works within the export cable corridor could have the potential to cause disturbance to otter

populations. However, Project One, including the export cable corridor, is at considerable distance (40 km away). Therefore, no direct or indirect disturbance effects leading to a likely significant effect would be anticipated on the conservation objectives for this species, and consequently the SAC.

c.

Stage 1 Matrix 120 A: North Norfolk Coast SAC

Name of European site: North Norfolk Coast SAC												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats	Habitat extent			Water quality						In-combination		
All Annex I habitats are screened out of further assessment, see footnote **a**.												

Evidence supporting conclusions (Ref: Marine Processes Clarification Note [insert doc ref.]):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 57.9 km away from the closest point of Project One (i.e., the export cable route) (see **Marine Processes Clarification Note [insert doc ref.]**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 120 B: North Norfolk Coast SAC

Name of European site: North Norfolk Coast SAC												
Distance to Hornsea Project One: 57.9 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Otter, see footnote **a**.												
Petalwort, see footnote **b**.												

Evidence supporting conclusions (Ref: Marine Processes Clarification Note [insert doc ref.]):

a. Otter may utilise coastal habitats, and this species is generally a primary qualifying feature of several river SACs that flow into the North Sea (e.g., River Derwent) as well as additionally being a qualifying feature of some coastal SACs (e.g., The Wash and North Norfolk Coast). Coastal / landfall works within the export cable corridor could have the potential to cause disturbance to otter populations. However, Project One, including the export cable corridor, is at considerable distance (40 km away). Therefore, no direct or indirect disturbance effects leading to a likely significant effect would be anticipated on the conservation objectives for this species, and consequently the SAC.

b. Annex II species within Annex I habitats have been screened out for this Natura 2000 site as it is 57.9 km away from the closest point of Project One (i.e., the export cable route) (see **Marine Processes Clarification Note [insert doc ref.]**). Therefore, no LSEs are anticipated on the conservation objectives for species associated with this species and consequently this site.

Stage 1 Matrix 121: Haisborough, Hammond and Winterton cSAC

Name of European site: Haisborough, Hammond and Winterton cSAC									
Distance to Hornsea Project One: 80 km (88 from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
All Annex I habitats, see footnote **a**.									

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats (for this site, 'Sandbanks not covered by seawater at all times' and 'Reefs') could potentially be affected by habitat loss, increase in suspended sediments, sediment bound contaminants and smothering. However, only the Annex I sandbanks are within one tidal excursion of Project One, with the Annex I *Sabellaria* reef within this cSAC located over 40 km to the south of Project One (Environmental Statement **Volume 2, Chapter 2: Benthic Subtidal and Intertidal Ecology (Doc ref No. 7.2.2)**). Therefore, no likely significant effect is anticipated on the conservation objectives for Annex I reefs. For Annex I sandbanks, direct habitat loss/disturbance, smothering from suspended sediments, release of contaminants, accidental pollution release and EMF, which are effects localised to Project One, are anticipated on this Annex I habitat as a result of the construction and operation of Project One (see **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**, and the **Environmental Statement Volume 2, Chapter 1: Marine Processes (Doc ref No 7.2.1) and Chapter 2: Benthic Subtidal and Intertidal Ecology**). Changes in sediment transport and wave regime have the potential to alter the structure and function of Annex I sandbanks, and this potential effect has also been assessed (**Volume 2, Chapter 1: Marine Processes**). This potential effect is associated with the presence of the wind turbines and not with the export or inter-array cabling. The Annex I sandbanks within this cSAC are located 10 km to the south of Subzone 1. The wave modelling results suggest that a small reduction in wave climate will occur under high frequency low intensity wave events, and under such conditions a slow growth of bank crest level may be observed for some of the shallow banks within the Norfolk offshore sandbank system due to the operational presence of Project One. However, under more severe storm conditions the wave modelling indicates that the wave climate remains largely unaffected by structure-induced wave scattering, and it will be these events that most influence offshore sandbank behaviour and stability, therefore any changes in bank crest levels under high frequency low intensity wave events will be masked by storm events (**Volume 2: Chapter 1 Marine Processes**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 122: North Norfolk Sandbanks and Saturn Reef cSAC

Name of European site: North Norfolk Sandbanks and Saturn Reef cSAC									
Distance to Hornsea Project One: 1.8 km (10 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
Annex I habitats, see footnote **a**.									

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats (for this site, 'Sandbanks not covered by seawater at all times' and 'Reefs') could potentially be affected by habitat loss, increase in suspended sediments, sediment bound contaminants and smothering. However, only the Annex I sandbanks are within one tidal excursion of Project One, with the Annex I Sabellaria reef within the cSAC located over 40 km to the south of Project One (see Environmental Statement **Volume 2, Chapter 2: Benthic Subtidal and Intertidal Ecology (Doc ref No 7.2.2)**). For Annex I sandbanks, potential effects include suspended sediments, changes in sediment transport and wave regime, release of contaminants from disturbed sediments and accidential pollution release. No direct habitat loss/disturbance is anticipated, nor is EMF, which is localised to Project One, anticipated to have an effect on this Annex I habitat (**see Environmental Statement Volume 2, Chapter 1: Marine Processes (Doc ref No 7.2.1) and Chapter 2: Benthic Subtidal and Intertidal Ecology**). Wave modelling results indicate that the wave climate remains largely unaffected by structure-induced wave scattering, and it will be these events that most influence offshore sandbank behaviour and stability, therefore any changes in bank crest levels under high frequency low intensity wave events will be masked by storm events (**Environmental Statement Volume 2, Chapter 1: Marine Processes).** Therefore, no LSE is anticipated on the conservation objectives for Annex I reefs or sandbanks (**Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 123: Inner Dowsing, Race Bank and North Ridge cSAC

Name of European site: Inner Dowsing, Race Bank and North Ridge cSAC									
Distance to Hornsea Project One: 12 km (71 km from Subzone 1)									
European site features	**Likely Effects of Project One**								
Annex I Habitats									
All Annex I habitats, see footnote **a**.									

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 12 km away from the closest point of Project One (i.e., the export cable), (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 124 A: SBZ 1 / ZPS 1 (Belgium) SCI

Name of European site: SBZ 1 / ZPS 1 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a.**												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 276 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 124 B: SBZ 1 / ZPS 1 (Belgium) SCI

Name of European site: SBZ 1 / ZPS 1 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad and sea lamprey, see footnote **b**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**
Harbour porpoise (*Phocoena phocoena*)	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: HRA Report, Section 4.3):

a. Collision, barrier, displacement: As the site is located approximately 276 km away from Project One and due to the reasons highlighted in **Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology (Doc ref No 7.2.5)** and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 276 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 276 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (HRA Report, **Section 4.3** and **Section 4.5**).

d. Harbour seal: As this site is located 276 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 276 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 125 A: SBZ 2 / ZPS 2 (Belgium) SCI

Name of European site: SBZ 2 / ZPS 2 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: HRA Report, Section 4.3):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 276 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 125 B: SBZ 2 / ZPS 2 (Belgium) SCI

Name of European site: SBZ 2 / ZPS 2 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad and sea lamprey, see footnote **b**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**
Harbour porpoise	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 276 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (**APEM 2012 and 2013**), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 276 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 276 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour seal: As this site is located 276 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 276 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (see **Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 126 A: SBZ 3 / ZPS 3 (Belgium) SCI

Name of European site: SBZ 3 / ZPS 3 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 276 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 126 B: SBZ 3 / ZPS 3 (Belgium) SCI

Name of European site: SBZ 3 / ZPS 3 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad and sea lamprey, see footnote **b**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**
Harbour porpoise	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 276 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (**APEM 2012 and 2013**), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 276 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 276 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (HRA Report, **Section 4.3** and **Section 4.5**).

d. Harbour seal: As this site is located 276 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (HRA Report, **Table 4.7**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 276 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 127 A: Vlakte van de Raan (Belgium) pSCI

Name of European site: Vlakte van de Raan pSCI												
Distance to Hornsea Project One: 271 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 271 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 127 B: Vlakte van de Raan (Belgium) pSCI

Name of European site: Vlakte van de Raan pSCI												
Distance to Hornsea Project One: 271 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad and sea lamprey, see footnote **b**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**
Harbour porpoise	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 271 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 271 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 271 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour seal: As this site is located 271 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (HRA Report, **Table 4.7**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 271 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 128 A: NTP S-H Wattenmeer und angrenzende Küstengebiete SCI (Germany)

Name of European site: NTP S-H Wattenmeer und angrenzende Küstengebiete SCI												
Distance to Hornsea Project One: 386 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 386 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 128 B: NTP S-H Wattenmeer und angrenzende Küstengebiete SCI (Germany)

Name of European site: NTP S-H Wattenmeer und angrenzende Küstengebiete SCI												
Distance to Hornsea Project One: 386 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Sea and river lamprey, see footnote **a**.												
Grey seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour porpoise	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d,e**	**✓d,e**	**✓d,e**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 386 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

b. Grey seal: As this site is located approximately 386 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: As this site is located 386 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour porpoise: Although this site is located approximately 386 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 129 A: Doggerbank (German Dogger Bank) SCI (Germany)

Name of European site: Doggerbank (German Dogger Bank) SCI												
Distance to Hornsea Project One: 210 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 210 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 129 B: Doggerbank (German Dogger Bank) SCI (Germany)

Name of European site: Doggerbank (German Dogger Bank) SCI												
Distance to Hornsea Project One: 210 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour porpoise	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d,e**	**✓d,e**	**✓d,e**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 210 km away from Project One and due to the reasons highlighted in **Section 4.3 of the Environmental Statement Volume 2, Chapter 5: Ornithology (Doc ref No 7.2.5)** and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Grey seal: As this site is located approximately 210 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: As this site is located 210 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour porpoise: Although this site is located approximately 210 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (see **Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 130 A: Östliche Deutsche Bucht SCI (Germany)

Name of European site: Östliche Deutsche Bucht SCI												
Distance to Hornsea Project One: 347 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 347 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 130 B: Östliche Deutsche Bucht SCI (Germany)

Name of European site: Östliche Deutsche Bucht SCI												
Distance to Hornsea Project One: 347 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory bird species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
River lamprey, see footnote **b**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**
Harbour porpoise	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 347 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 347 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 347 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour seal: As this site is located 347 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 386 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 131 A: Sylter Außenriff SCI (Germany)

Name of European site: Sylter Außenriff SCI												
Distance to Hornsea Project One: 293 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 293 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 131 B: Sylter Außenriff SCI (Germany)

Name of European site: Sylter Außenriff SCI												
Distance to Hornsea Project One: 293 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
River lamprey, see footnote **b.**												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**
Harbour porpoise	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 293 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 293 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 293 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour seal: As this site is located 293 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 293 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 132 A: Steingrund SCI (Germany)

Name of European site: Steingrund SCI												
Distance to Hornsea Project One: 378 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 378 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 132 B: Steingrund SCI (Germany)

Name of European site: Steingrund SCI												
Distance to Hornsea Project One: 378 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour porpoise	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d,e**	**✓d,e**	**✓d,e**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 378 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Grey seal: As this site is located approximately 378 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: As this site is located 378 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour porpoise: Although this site is located approximately 378 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 133 A: Helgoland mit Helgoländer Felssockel SCI (Germany)

Name of European site: Helgoland mit Helgoländer Felssockel SCI												
Distance to Hornsea Project One: 367 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats are screened out of further assessment, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 367 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 133 B: Helgoland mit Helgoländer Felssockel SCI (Germany)

Name of European site: Helgoland mit Helgoländer Felssockel SCI												
Distance to Hornsea Project One: 367 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 367 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: As this site is located 367 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 367 km from Subzone 1, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 134 A: Hamburgisches Wattenmeer SCI (Germany)

Name of European site: Hamburgisches Wattenmeer SCI												
Distance to Hornsea Project One: 393 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 393 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 134 B: Hamburgisches Wattenmeer SCI (Germany)

Name of European site: Hamburgisches Wattenmeer SCI												
Distance to Hornsea Project One: 393 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twaite shad, sea and river lamprey, see footnote **a**.												
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c,d**	**✓c,d**	**✓c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 393 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

b. Grey seal: As this site is located approximately 393 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: As this site is located 393 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour porpoise: Although this site is located approximately 393 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**),

which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 135 A: Unterelbe SCI (Germany)

Name of European site: Unterelbe SCI												
Distance to Hornsea Project One: 424 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 424 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 135 B: Unterelbe SCI (Germany)

Name of European site: Unterelbe SCI												
Distance to Hornsea Project One: 424 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twaite shad, sea river lamprey, Atlantic salmon, see footnote **a**.												
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c**	**✓c,d**	**✓c,d**	**✓c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 424 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

b. Harbour seal: As this site is located 424 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 424 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)).**

Stage 1 Matrix 136 A: Borkum-Riffgrund SAC (Germany)

Name of European site: Borkum-Riffgrund SAC (Germany)												
Distance to Hornsea Project One: 254 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 254 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 136 B: Borkum-Riffgrund SAC (Germany)

Name of European site: Borkum-Riffgrund SAC (Germany)												
Distance to Hornsea Project One: 254 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twaite shad, see footnote **b**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**	**✓d**
Harbour porpoise	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e**	**✓e,f**	**✓e,f**	**✓e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 254 km away from Project One and due to the reasons highlighted in S**ection 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology (Doc ref No 7.2.5)** and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 254 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3))**, no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 254 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (HRA Report, **Table 4.7**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour seal: As this site is located 254 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 254 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 137 A: Nationalpark Niedersächsisches Wattenmeer SCI (Germany)

Name of European site: Nationalpark Niedersächsisches Wattenmeer SCI												
Distance to Hornsea Project One: 287 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 287 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 137 B: Nationalpark Niedersächsisches Wattenmeer SCI (Germany)

Name of European site: Nationalpark Niedersächsisches Wattenmeer SCI												
Distance to Hornsea Project One: 287 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 287 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: As this site is located 287 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (HRA Report, **Table 4.7**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 287 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and

the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 138 A: Venø, Venø Sund SAC (Denmark)

Name of European site: Venø, Venø Sund SAC												
Distance to Hornsea Project One: 501 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 501 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 138 B: Venø, Venø Sund SAC (Denmark)

Name of European site: Venø, Venø Sund SAC												
Distance to Hornsea Project One: 501 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 501 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Harbour seal: Tagging of harbour seal in the UK suggests that harbour seal generally tend to forage within 40 or 50 km of their haul-out sites (SCOS, 2011). Harbour seal hauled out in The Greater Wash region (which encompassed the North Norfolk and Lincolnshire coastlines), were found to travel between 75 and 120 km offshore to assumed foraging locations, athough some were recorded travelling as far as 220 km (SMRU, 2011) as reported in the Volume 2: Chapter 4 Marine Mammals. As this SAC is located 501 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, and therefore no likely significant effects is anticipated on the conservation objectives for this species and consequently this site.

Stage 1 Matrix 139 A: Dråby Vig SAC (Denmark)

Name of European site: Dråby Vig SAC												
Distance to Hornsea Project One: 534 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 534 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 139 B: Dråby Vig SAC (Denmark)

Name of European site: Dråby Vig SAC												
Distance to Hornsea Project One: 534 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species												
Twaite shad, see footnote **b**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	C	O	D	C	C	O	D	C
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Otter	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**

Evidence supporting conclusions (**Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)**):

a. Collision, barrier, displacement: As the site is located approximately 534 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 534 km away from Project One, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Harbour seal: As this site is located 534 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3 and Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Otter may utilise coastal habitats, however Project One, including the the export cable corridor, is at considerable distance (534 km away). Therefore, no direct or indirect disturbance effects leading to a likely significant effect would be anticipated on the conservation objectives for this species, and consequently the SAC.

Stage 1 Matrix 140 A: Løgstør Bredning, Vejlerne og Bulbjerg SAC (Denmark)

Name of European site: Løgstør Bredning, Vejlerne og Bulbjerg SAC												
Distance to Hornsea Project One: 539 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 539 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 140 B: Løgstør Bredning, Vejlerne og Bulbjerg SAC (Denmark)

Name of European site: Løgstør Bredning, Vejlerne og Bulbjerg SAC												
Distance to Hornsea Project One: 539 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species												
Sea lamprey, see footnote **b**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Otter	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 539 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 539 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement (**Volume 2, Chapter 3: Fish and Shellfish Ecology (Doc Ref No 7.2.3)**), no LSEs are anticipated on these features or the conservation objectives for this site.

c. Harbour seal: As this site is located 539 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Otter may utilise coastal habitats, however Project One, including the the export cable corridor, is at considerable distance (539 km away). Therefore, no direct or indirect disturbance effects leading to a likely significant effect would be anticipated on the conservation objectives for this species, and consequently the SAC.

Stage 1 Matrix 141 A: Gule Rev SAC (Denmark)

Name of European site: Gule Rev SAC												
Distance to Hornsea Project One: 517 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 517 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 141 B: Gule Rev SAC (Denmark)

Name of European site: Gule Rev SAC												
Distance to Hornsea Project One: 517 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			Injury/Disturbance		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a,b**	**×a,b**	**×a,b**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Harbour porpoise: Although this site is located approximately 517 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 142 A: Sydlige Nordsø SAC (Denmark)

Name of European site: Sydlige Nordsø SAC												
Distance to Hornsea Project One: 347 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 347 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 142 B: Sydlige Nordsø SAC (Denmark)

Name of European site: Sydlige Nordsø SAC												
Distance to Hornsea Project One: 347 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 347 km away from the closest point of Project One (i.e. Project One), it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: As this site is located 347 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 347 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 143 A: Estuaires Et Littoral Picards (baies de Somme et d'Authie) pSCI (France)

Name of European site: Estuaires Et Littoral Picards (baies de Somme et d'Authie) pSCI												
Distance to Hornsea Project One: 353 km (384 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 353 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 143 B: Estuaires Et Littoral Picards (baies de Somme et d'Authie) pSCI (France)

Name of European site: Estuaires Et Littoral Picards (baies de Somme et d'Authie) pSCI												
Distance to Hornsea Project One: 353 km (384 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
River lamprey, see footnote **a**.												
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 353 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology, no LSEs are anticipated on these features or the conservation objectives for this site.

b. Harbour seal: As this site is located 353 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 144 A: Estuaire de la Seine pSCI (France)

Name of European site: Estuaire de la Seine pSCI												
Distance to Hornsea Project One: 442 km (490 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 442 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 144 B: Estuaire de la Seine pSCI (France)

Name of European site: Estuaire de la Seine pSCI												
Distance to Hornsea Project One: 442 km (490 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Atlantic salmon and river lamprey, see footnote **a**.												
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 442 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology, no LSEs are anticipated on these features or the conservation objectives for this site.

b. Harbour seal: As this site is located 442 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 145 A: Rècifs et landes de la Hague pSCI (France)

Name of European site: Rècifs et landes de la Hague pSCI												
Distance to Hornsea Project One: 440 km (513 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 440 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 145 B: Rècifs et landes de la Hague pSCI (France)

Name of European site: Rècifs et landes de la Hague pSCI												
Distance to Hornsea Project One: 440 km (513 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Bottlenose dolphin	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Bottlenose dolphin: As this site is located approximately 440 km away from Project One and due to the low numbers recorded in the vicinity of Project One, no LSEs are anticipated on this species or the conservation objectives of this site.

Stage 1 Matrix 146 A: Rècifs et marais arrière-littoraux du Cap Lèvi à la Pointe de Saire pSCI (France)

Name of European site: Rècifs et marais arrière-littoraux du Cap Lèvi à la Pointe de Saire pSCI												
Distance to Hornsea Project One: 428 km (495 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 428 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 146 B: Rècifs et marais arrière-littoraux du Cap Lèvi à la Pointe de Saire pSCI (France)

Name of European site: Rècifs et marais arrière-littoraux du Cap Lèvi à la Pointe de Saire pSCI												
Distance to Hornsea Project One: 428 km (495 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Harbour seal: As this site is located 428 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 147 A: Banc et rècifs de Surtainville pSCI (France)

Name of European site: Banc et rècifs de Surtainville pSCI												
Distance to Hornsea Project One: 469 km (541 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 469 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 147 B: Banc et rècifs de Surtainville pSCI (France)

Name of European site: Banc et rècifs de Surtainville pSCI												
Distance to Hornsea Project One: 469 km (541 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Bottlenose dolphin	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Bottlenose dolphin: As this site is located approximately 469 km away from Project One and due to the low numbers recorded in the vicinity of Project One, no LSEs are anticipated on this species or the conservation objectives of this site.

Stage 1 Matrix 148 A: Anse de Vauville pSCI (France)

Name of European site: Anse de Vauville pSCI												
Distance to Hornsea Project One: 452 km (524 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 452 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 148 B: Anse de Vauville pSCI (France)

Name of European site: Anse de Vauville pSCI												
Distance to Hornsea Project One: 452 km (524 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Bottlenose dolphin	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Bottlenose dolphin: As this site is located approximately 452 km away from Project One and due to the low numbers recorded in the vicinity of Project One, no LSEs are anticipated on this species or the conservation objectives of this site.

Stage 1 Matrix 149 A: Baie de Seine occidentale SCI (France)

Name of European site: Baie de Seine occidentale SCI (France)												
Distance to Hornsea Project One: 443 km (509 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 443 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 149 B: Baie de Seine occidentale SCI (France)

Name of European site: Baie de Seine occidentale SCI (France)												
Distance to Hornsea Project One: 443 km (509 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Bottlenose dolphin	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Harbour seal: As this site is located 443 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Bottlenose dolphin: As this site is located approximately 443 km away from Project One and due to the low numbers recorded in the vicinity of Project One, no LSEs are anticipated on this species or the conservation objectives of this site.

Stage 1 Matrix 150 A: Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI (France)

Name of European site: Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI												
Distance to Hornsea Project One: 299 km (325 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 299 km away from the closest point of Project One (i.e. Subzone 1) (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 150 B: Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI (France)

Name of European site: Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI												
Distance to Hornsea Project One: 299 km (325 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 299 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: As this site is located 299 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 299 km from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and

the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 151 A: Bancs des Flandres pSCI (France)

Name of European site: Bancs des Flandres pSCI												
Distance to Hornsea Project One: 263 km (279 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 263 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 151 B: Bancs des Flandres pSCI (France)

Name of European site: Bancs des Flandres pSCI												
Distance to Hornsea Project One: 263 km (279 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 263 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (HRA Report, **Section 4.3** and **Section 4.5**).

b. Harbour seal: As this site is located 263 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 263 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and

the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 152 A: Recifs Gris-nez Blanc-nez pSCI (France)

Name of European site: Recifs Gris-nez Blanc-nez pSCI												
Distance to Hornsea Project One: 288 km (315 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 288 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 152 B: Recifs Gris-nez Blanc-nez pSCI (France)

Name of European site: Recifs Gris-nez Blanc-nez pSCI												
Distance to Hornsea Project One: 288 km (315 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 288 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: As this site is located 288 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 288 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and

the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 153 A: Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI (France)

Name of European site: Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI												
Distance to Hornsea Project One: 288 km (320 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 288 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 153 B: Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI (France)

Name of European site: Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI												
Distance to Hornsea Project One: 288 km (320 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions ((Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 288 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: As this site is located 288 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 288 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and

the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 154 A: Baie de canche et couloir des trois estuaires pSCI (France)

Name of European site: Baie de canche et couloir des trois estuaires pSCI												
Distance to Hornsea Project One: 331 km (361 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 331 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 154 B: Baie de canche et couloir des trois estuaires pSCI (France)

Name of European site: Baie de canche et couloir des trois estuaires pSCI												
Distance to Hornsea Project One: 331 km (361 km from Subzone 1)												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: As this site is located approximately 331 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (HRA Report, **Section 4.3** and **Section 4.5**).

b. Harbour seal: As this site is located 331 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: Although this site is located approximately 331 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and

the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 155 A: Doggersbank (Dutch Dogger Bank) pSCI (Netherlands)

Name of European site: Doggersbank (Dutch Dogger Bank) pSCI												
Distance to Hornsea Project One: 64 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 64 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 155 B: Doggersbank (Dutch Dogger Bank) pSCI (Netherlands)

Name of European site: Doggersbank (Dutch Dogger Bank) pSCI												
Distance to Hornsea Project One: 64 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: The construction and operation of Project One may cause physical and/or behavioural disturbance of harbour seal from piling noise during turbine and associated infrastructure installation, increased potential of vessel traffic and strikes, suspended sediments, habitat/prey species loss, accidential pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g. piling noise for a 2,300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see Volume 2: Chapter 4 Marine Mammals). Given that most foraging ranges for grey seal have generally been recorded as up to 145 km from their haul-out sites (Thompson *et al.*, 1996), grey seal from Dutch Dogger Bank may travel in close proximity to Project One. Therefore, there is potential for LSEs on this species from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seals occur predominantly in nearshore waters but do occur on the Dutch Dogger Bank. Tagging of harbour seal in the UK suggests that harbour seal generally tend to forage within 40 or 50 km of their haul-out sites (SCOS, 2011). As this site is located only 64 km away from Project One, there is potential for harbour seals originating from this SAC to occur in the proposed development area. Therefore, there is potential for LSEs on this species from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoises occur on the Klaverbank and were frequently recorded during Year 1 surveys. The species is recognised as being highly mobile, occurring widely across the North Sea. Noise modelling indicates potential displacement or behavioural impacts up to 38 km from the sound source. It is highly likely that harbour porpoise within this site form part of the overall mobile

southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**). Based on the values of electromagnetic fields likely to occur from cables and the likely sensitivity of porpoises, there may be a very localised effect on harbour porpoise within the vicinity of the inter-array and export cables, with potential responses such as temporary changes in swimming direction or slight deviation from a transit route. EMF, however, is not anticipated to lead to a likely significant effect on this species or adversely affect the conservation objectives for this site.

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 156 A: Klaverbank pSCI (Netherlands)

Name of European site: Klaverbank pSCI												
Distance to Hornsea Project One: 44 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 44 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 156 B: Klaverbank pSCI (Netherlands)

Name of European site: Klaverbank pSCI												
Distance to Hornsea Project One: 44 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c,d**	**×c,d**	**×c,d**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Grey seal: The construction and operation of Project One may cause physical and/or behavioural disturbance of harbour seal from piling noise during turbine and associated infrastructure installation, increased potential of vessel traffic and strikes, suspended sediments, habitat/prey species loss, accidential pollution and EMF. All of these impacts are localised to Project One or within close proximity to this area e.g. piling noise for a 2,300 kJ hammer energy results in a temporal threshold shift (TTS) and subsequent behavioural response of fleeing/likely avoidance out to a range of 1.7 km (see Volume 2: Chapter 4 Marine Mammals). Given that most foraging ranges for grey seal have generally been recorded as up to 145 km from their haul-out sites (Thompson *et al.*, 1996), grey seal from Klaverbank may travel in close proximity to Project One. Therefore, there is potential for LSEs on this species from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seals occur predominantly in nearshore waters but do occur on the Klaverbank. Tagging of harbour seal in the UK suggests that harbour seal generally tend to forage within 40 or 50 km of their haul-out sites (SCOS, 2011). As this site is located only 44 km away from Project One, there is potential for harbour seals originating from this SAC to occur in the proposed development area. Therefore, there is potential for LSEs on this species from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoises occur on the Klaverbank and were frequently recorded during Year 1 surveys. The species is recognised as being highly mobile, occurring widely across the North Sea. Noise modelling indicates potential displacement or behavioural impacts up to 38 km from the sound source. It is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury,

behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**). Based on the values of electromagnetic fields likely to occur from cables and the likely sensitivity of porpoises, there may be a very localised effect on harbour porpoise within the vicinity of the inter-array and export cables, with potential responses such as temporary changes in swimming direction or slight deviation from a transit route. EMF, however, is not anticipated to lead to a likely significant effect on this species or adversely affect the conservation objectives for this site.

d. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 157 A: Vlakte van de Raan SAC (Netherlands)

Name of European site: Vlakte van de Raan SAC												
Distance to Hornsea Project One: 259 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 259 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 157 B: Vlakte van de Raan SAC (Netherlands)

Name of European site: Vlakte van de Raan SAC												
Distance to Hornsea Project One: 259 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey species distribution/abundance			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad, sea and river lamprey, see footnote **a**.												
Grey seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour porpoise	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d,e**	**×d,e**	**×d,e**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 259 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology, no LSEs are anticipated on these features or the conservation objectives for this site.

b. Grey seal: As this site is located approximately 259 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: As this site is located 259 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour porpoise: Although this site is located approximately 259 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural

disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 158 A: Noordzeekustzone SAC (Netherlands)

Name of European site: Noordzeekustzone SAC												
Distance to Hornsea Project One: 179 km												
European site features	**Likely Effects of Project One**											
Annex I Habitats												
All Annex I habitats, see footnote **a**.												

Evidence supporting conclusions ((Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 179 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 158 B: Noordzeekustzone SAC (Netherlands)

Name of European site: Noordzeekustzone SAC												
Distance to Hornsea Project One: 179 km												
European site features	**Likely Effects of Project One**											
Annex I Migratory Species												
All Annex I migratory species, see footnote **a**.												
Annex II Species	Injury/Disturbance			Collision risk			Change in prey speciesdistribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad, sea and river lamprey, see footnote **a**.												
Grey seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour seal	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**
Harbour porpoise	**×e**	**×e**	**×e**	**×e**	**×e**	**×e**	**×e**	**×e**	**×e**	**×e,f**	**×e,f**	**×e,f**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Collision, barrier, displacement: As the site is located approximately 179 km away from Project One and due to the reasons highlighted in Section 4.3, Environmental Statement Volume 2, Chapter 5: Ornithology and the findings of the collision risk modelling (APEM 2012 and 2013), no LSEs are predicted on Annex I migratory bird species and the conservation objectives for this site.

b. Annex II migratory fish species: As the site is located approximately 179 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3**) and the Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology, no LSEs are anticipated on these features or the conservation objectives for this site.

c. Grey seal: As this site is located approximately 179 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour seal: As this site is located 179 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Harbour porpoise: Although this site is located approximately 179 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

f. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 159 A: Noordzeekustzone II pSCI (Netherlands)

Name of European site: Noordzeekustzone II pSCI										
Distance to Hornsea Project One: 180 km										
European site features	**Likely Effects of Project One**									
Annex I Habitats										
All Annex I habitats, see footnote **a**.										

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 180 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; and **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 159 B: Noordzeekustzone II pSCI (Netherlands)

Name of European site: Noordzeekustzone II pSCI												
Distance to Hornsea Project One: 180 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey speciesdistribution/abundance			Injury/Disturbance		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad, allis shad, sea and river lamprey, see footnote **a**.												
Grey seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**
Harbour porpoise	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d**	**×d,e**	**×d,e**	**×d,e**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 180 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology, no LSEs are anticipated on these features or the conservation objectives for this site.

b. Grey seal: As this site is located approximately 180 km away from Project One, it is located beyond the foraging distance (i.e., 145 km) for grey seal and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: As this site is located 180 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, (based on a maximum foraging distance of 120 km), and therefore, there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

d. Harbour porpoise: Although this site is located approximately 180 km away from Project One, it is highly likely that harbour porpoise within this site form part of the overall mobile southern North Sea population. Therefore, as a precautionary measure, the potential for LSEs cannot be ruled out and this species is screened in for further assessment due to physical injury, behavioural

disturbance and changes to prey species availability from Project One offshore activities, alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**), which could have implications for the conservation objectives of this species within this site for which it is a designated feature (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

e. Plans/projects with potential for LSE on marine mammals in-combination with Project One offshore activities include: Triton Knoll, Race Bank, Dudgeon, Dogger Bank Creyke Beck A and B, East Anglia One, Galloper, London Array Phase II, Kentish Flats Extension and the Blyth Demonstration Site which are within 250 km, and Moray Firth Project One, Neart na Gaoithe, Beatrice and the Aberdeen European Offshore Wind Deployment Centre, Hornsea Project Two (all due to overlap in the construction phases) (**Table 4.7 and Section 5.3, paragraph 5.3.1 *et seq.* of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 160 A: Waddenzee (Wadden Sea) SCI (Netherlands)

Name of European site: Waddenzee (Wadden Sea) SCI											
Distance to Hornsea Project One: 189 km											
European site features	**Likely Effects of Project One**										
Annex I Habitats											
All Annex I habitats, see footnote **a**.											

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex I habitats have been screened out for this Natura 2000 site as it is 189 km away from the closest point of Project One (see Matrix 113: Moray Firth SAC; **Section 4.3, paragraph 4.3.44 of the HRA Report (Doc ref No 12.6)**). Therefore, no LSEs are anticipated on the conservation objectives for Annex I habitats and consequently this site.

Stage 1 Matrix 160 B: Waddenzee (Wadden Sea) SCI (Netherlands)

Name of European site: Waddenzee (Wadden Sea) SCI												
Distance to Hornsea Project One: 189 km												
European site features	**Likely Effects of Project One**											
Annex II Species	Injury/Disturbance			Collision risk			Change in prey speciesdistribution/abundance			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Twait shad, sea and river lamprey, see footnote **a**.												
Grey seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour seal	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**

Evidence supporting conclusions (Ref: Section 4.3 of the HRA Report (Doc ref No 12.6)):

a. Annex II migratory fish species: As the site is located approximately 189 km away from Subzone 1, it is beyond potential range of effects from Project One offshore activities. Due to the reasons highlighted in HRA Report (**Section 4.3 of the HRA Report (Doc ref No 12.6)**) and the Environmental Statement Volume 2, Chapter 3: Fish and Shellfish Ecology, no LSEs are anticipated on these features or the conservation objectives for this site.

b. Grey seal: This site has been considered for grey seal based on advice received by the Dutch Rijkswaterstaat during Phase 4 Consultation. Counts of grey seal, in particular, are undergoing exponential rates of increase in Dutch colonies, including those in the Wadden Sea SAC. Tracking studies have revealed that this is, in part, attributable to immigration from, and movement between, UK colonies, particularly those on the west coast of Scotland (Brasseur *et al.,* 2010). Telemetry data collected between 2005 and 2004 showed that of eleven seals tagged, three crossed the North Sea to UK waters and haul-out sites in the Moray Firth, Farne Islands and Orkney (Brasseur *et al.,* 2010). None of these tracks, however, passed through Project One, and as such it is not considered likely that the areas in the vicinity of Project One are important for individuals originating from these colonies. Similar tracking studies of harbour seal in the Wadden Sea in 2002/2003 showed that, although some individuals make foraging trips to UK waters, on the whole, the at-sea distribution of this species is concentrated on the waters of Wadden Sea. Therefore, as no connectivity to Project One has been demonstrated and this site is located approximately 189 km away from Subzone 1 (beyond the foraging distance (i.e., 145 km) for grey seal), there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

c. Harbour seal: This site has been considered for harbour seal, based on advice received by the Dutch Rijkswaterstaat during Phase 4 Consultation. Tagging of harbour seal in the UK suggests that harbour seal generally tend to forage within 40 or 50 km of their haul-out sites (SCOS, 2011). Harbour seal hauled out in The Greater Wash region (which encompassed the North Norfolk and Lincolnshire coastlines), were found to travel between 75 and 120 km offshore to assumed foraging locations (SMRU, 2011) as reported in the Environmental Statement Volume 2, Chapter 4: Marine Mammals. As this site is located 189 km away from Project One, it is located beyond any potential for direct, and indirect effects on harbour seal on foraging trips from this site, and therefore there are no LSEs anticipated from Project One alone or in-combination with other plans/projects (**Table 4.7 of the HRA Report (Doc ref No 12.6)**) on the conservation objectives for this species and consequently this site (**Section 4.3** and **Section 4.5 of the HRA Report (Doc ref No 12.6)**).

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Applicants Integrity Matrices

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Stage 2 Matrix 2: Coquet Island SPA

Name of European site: Coquet Island SPA												
Distance to Hornsea Project One: 260 km												
European site features	**Adverse effect on integrity**											
Article 4.1 – Breeding/ Article 4.2 - Assemblage	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination***		
	C	O	D	C	O	D	C	O	D	C	O	D
Common tern *Sterna hirundo*	**×a**			**×b**			**×c**			**×d, e, f**		

Evidence supporting conclusions:

a. In relation to the relevant conservation objectives, the extent and distribution of habitats within the Humber Estuary which support this qualifying feature of the Coquet Island SPA will not be significantly affected, with habitat loss/disturbance being minimal with the vast majority of habitat loss will be reversible within a short period. As a result, the numbers or distribution of qualifying species will not be affected by habitat loss. It can therefore be concluded that unmitigated, no conservation objectives are expected to be compromised by habitat loss, and consequently there will be no adverse effects on the integrity of the Coquet Island SPA as a result of temporary habitat loss during cable installation at the landfall site (**paragraphs 6.3.5 to 6.3.26 of the HRA Report (Doc ref No 12.6)**). To provide further confidence, mitigation measures have been proposed to reduce habitat loss and increase recovery rates within the *Salicornia* and other annuals colonising mud and sand Annex I habitat and other Annex I habitats following cable installation (**Section 6.4: Mitigation Measures and Monitoring, and Tables 6.5 and 6.6 of the HRA Report (Doc ref No 12.6)**).

b. Very low peak counts of common tern were recorded at Horseshoe Point (within the Humber Estuary) in 2011-12, however it is acknowledged that the use of the intertidal area by terns between July and September may be sporadic, and often most frequent in congregations from dusk onwards, which may be missed by surveys. Although the local area may still on occasion act as a roost site in late summer, it appears that the species' presence would be brief and intermittent between April and September. Most impacts may therefore take place during the post-breeding season, after juveniles have fledged, and so impacts on productivity are unlikely. With evidence suggesting that low tide roosts occur at dusk and into the night, disturbance will be negligible as this is outside the hours of planned intertidal works in Phase 2. No adverse effects on common tern are therefore predicted as a result of Project One cable laying within the Humber Estuary and along the onshore export cable route (**paragraphs 6.3.100 to 6.3.103 of the HRA Report (Doc ref No 12.6))**.

c. In relation to the relevant conservation objectives, the extent, distribution and function of habitats within the Humber Estuary which support this qualifying species of the Coquet Island SPA will only be briefly affected in the local area, and will not result in the significant redistribution or reduction of the population. As such no conservation objectives are predicted to be compromised as a result of indirect disturbance (i.e. via impacts on prey species), and so the integrity of the Coquet Island SPA will be unaffected. Effects related to reductions in water quality are also not expected to lead to adverse effects on qualifying features with effects predicted to be short-term and areas affected are likely to be very small compared to available alternative habitat and prey items within these habitats. The potential for any discharges associated with construction activities will also be minimised through the implementation of good working and management practices as detailed in the CoCP (**paragraphs 6.3.104 to 6.3.105 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc ref No 12.6)**).

d. Habitat loss is predicted to occur as a result of the AMEP development plans, the Tetney to Saltfleet Tidal Flood Defence Scheme, the Phillips 66 Tetney Sea Line Replacement project and Hornsea Project Two, though the proportion of estuarine habitats affected is small in the context of the available habitats within the SAC/SPA (i.e. 0.74% of the total estuarine habitat). The majority of this is temporary habitat loss/disturbance, with the affected habitats expected to recovery quickly following disturbance. Any long term habitat loss (as a result of the AMEP development) will be mitigated through a habitat creation scheme. In-combination effects on the extent of habitats within the Humber Estuary supporting this feature of the Coquet Island SPA are therefore not predicted to result in an adverse effect on ornithological features of the SPA (**paragraphs 6.3.128 to 6.3.132 of the HRA Report (Doc ref No 12.6)**).

e. Due to the limited area of effect associated with Hornsea Project One and Project Two and accounting for the anticipated completion dates for the Tetney flood defence project (i.e. at least 2 years before the start of Project One and Two cable installation) and the Phillips 66 Tetney sea line replacement project (due to be completed by 2015) in advance of the start of Project One and Project Two cable installation, adverse effects are not expected for Project One in combination with other projects. A commitment for Project One to restrict cable installation activities to avoid the most sensitive period, will also help to ensure that disturbance related adverse effects on populations of the Coquet Island SPA will not occur (**paragraphs 6.3.133 to 6.3.142 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc ref No 12.6)**).

f. In-combination disturbance to prey items is likely to be highly localised with the area affected predicted to be small, with other prey items available during the construction phase in similar habitats both at Horseshoe Point and in the wider area. In addition, effects are expected to be reversible with recovery time for prey species expected to be fast. As such, no in-combination effects on prey availability are likely to occur. In-combination effects of disturbance or water quality changes for prey species are most likely to occur when construction phases of projects are coincidental. Although the nature and extent of any discharges associated with construction activities are difficult to predict with any accuracy, it is unlikely that individuals from most species will be adversely affected to a level that will significantly affect the populations within the relevant SPAs, with overall areas affected likely to be very small compared to available alternative habitat, even in-combination with other projects. This is particularly likely to be the case when best practice and mitigation measures are considered for other projects (which are likely to be conditions of consent) which will minimise the risk of any in-combination discharge events and it can be reasonably concluded that no in-combination adverse effects are likely to occur (**paragraphs 6.3.143 to 6.3.144 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 3: Farne Islands SPA

Name of European site: Farne Islands SPA												
Distance to Hornsea Project One: 285 km												
European site features	**Adverse effect on integrity**											
Article 4.1 – Breeding / Article 4.2 - Assemblage	***Habitat extent***			***Disturbance and displacement***			***Indirect effects***			***In-combination***		
	C	O	D	C	O	D	C	O	D	C	O	D
Common tern *Sterna hirundo*	**×a**			**×b**			**×c**			**×d, e, f**		

Evidence supporting conclusions:

a. In relation to the relevant conservation objectives, the extent and distribution of habitats within the Humber Estuary which support this qualifying feature of the Farne Islands SPA will not be significantly affected, with habitat loss/disturbance being minimal with the vast majority of habitat loss will be reversible within a short period. As a result, the numbers or distribution of qualifying species will not be affected by habitat loss. It can therefore be concluded that unmitigated, no conservation objectives are expected to be compromised by habitat loss, and consequently there will be no adverse effects on the integrity of the Farne Islands SPA as a result of temporary habitat loss during cable installation at the landfall site (**paragraphs 6.3.5 to 3.6.26 of the HRA Report (Doc ref No 12.6)**). To provide further confidence, mitigation measures have been proposed to reduce habitat loss and increase recovery rates within the Salicornia and other annuals colonising mud and sand Annex I habitat and other Annex I habitats following cable installation (**Section 6.4: Mitigation Measures and Monitoring, and Tables 6.5 and 6.6 of the HRA Report (Doc ref No 12.6)**).

b. Very low peak counts of common tern were recorded at Horseshoe Point (within the Humber Estuary) in 2011-12, however it is acknowledged that the use of the intertidal area by terns between July and September may be sporadic, and often most frequent in congregations from dusk onwards, which may be missed by surveys. Although the local area may still on occasion act as a roost site in late summer, it appears that the species' presence would be brief and intermittent between April and September. Most impacts may therefore take place during the post-breeding season, after juveniles have fledged, and so impacts on productivity are unlikely. With evidence suggesting that low tide roosts occur at dusk and into the night, disturbance will be negligible as this is outside the hours of planned intertidal works in Phase 2. No adverse effects on common tern are therefore predicted as a result of Project One cable laying within the Humber Estuary and along the onshore export cable route (**paragraphs 6.3.100 to 6.3.103 of the HRA Report (Doc ref No 12.6))**.

c. In relation to the relevant conservation objectives, the extent, distribution and function of habitats within the Humber Estuary which support this qualifying species of the Farne Islands SPA will only be briefly affected in the local area, and will not result in the significant redistribution or reduction of the population. As such no conservation objectives are predicted to be compromised as a result of indirect disturbance (i.e. via impacts on prey species), and so the integrity of the Farne Islands SPA will be unaffected. Effects related to reductions in water quality are also not expected to lead to adverse effects on qualifying features with effects predicted to be short-term and areas affected are likely to be very small compared to available alternative habitat and prey items within these habitats. The potential for any discharges associated with construction activities will also be minimised through the implementation of good working and management practices as detailed in the CoCP (**paragraphs 6.3.104 to 6.3.108 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc ref No 12.6)**).

d. Habitat loss is predicted to occur as a result of the AMEP development plans, the Tetney to Saltfleet Tidal Flood Defence Scheme, the Phillips 66 Tetney Sea Line Replacement project and Hornsea Project Two, though the proportion of estuarine habitats affected is small in the context of the available habitats within the SAC/SPA (i.e. 0.74% of the total estuarine habitat). The majority of this is temporary habitat loss/disturbance, with the affected habitats expected to recovery quickly following disturbance. Any long term habitat loss (as a result of the AMEP development) will be mitigated through a habitat creation scheme. In-combination effects on the extent of habitats within the Humber Estuary supporting this feature of the Farne Islands SPA are therefore not predicted to result in an adverse effect on ornithological features of the SPA (**paragraphs 6.3.128 to 6.3.132 of the HRA Report (Doc ref No 12.6)**).

e. Due to the limited area of effect associated with Hornsea Project One and Project Two and accounting for the anticipated completion dates for the Tetney flood defence project (i.e. at least 2 years before the start of Project One and Two cable installation) and the Phillips 66 Tetney sea line replacement project (due to be completed by 2015) in advance of the start of Project One and Project Two cable installation, adverse effects are not expected for Project One in combination with other projects. A commitment for Project One to restrict cable installation activities to avoid the most sensitive period, will help to ensure that disturbance related adverse effects on populations of the Farne Islands SPA will not occur (**paragraphs 6.3.133 to 6.3.142 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc ref No 12.6)**).

f. In-combination disturbance to prey items is likely to be highly localised with the area affected predicted to be small, with other prey items available during the construction phase in similar habitats both at Horseshoe Point and in the wider area. In addition, effects are expected to be reversible with recovery time for prey species expected to be fast. As such, no in-combination

effects on prey availability are likely to occur. In-combination effects of disturbance or water quality changes for prey species are most likely to occur when construction phases of projects are coincidental. Although the nature and extent of any discharges associated with construction activities are difficult to predict with any accuracy, it is unlikely that individuals from most species will be adversely affected to a level that will significantly affect the populations within the relevant SPAs, with overall areas affected likely to be very small compared to available alternative habitat, even in-combination with other projects. This is particularly likely to be the case when best practice and mitigation measures are considered for other projects (which are likely to be conditions of consent) which will minimise the risk of any in-combination discharge events and it can be reasonably concluded that no in-combination adverse effects are likely to occur (**paragraphs 6.3.143 to 6.3.144 and Section 6.4: Mitigation Measures and Monitoring of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 5: Forth Islands SPA

Name of European site: Forth Islands SPA												
Distance to Hornsea Project One: **363 km**												
European site features	**Adverse effect on integrity**											
Article 4.2 – Migratory Species	***Collision***						***Displacement***			***In-combination***		
	C	O	D				C	O	D	C	O	D
Gannet *Morus bassanus*		**×a**						**×b**			**×a,b**	
Article 4.2 – Assemblage	***Collision***						***Displacement***			***In-combination***		
	C	O	D				C	O	D	C	O	D
Gannet *Morus bassanus*		**×a**						**×b**			**×a,b**	

Evidence supporting conclusions:

a. Collision – The potential loss of 10 gannets per year from a breeding population of 110,974 individuals is 0.009% of the population, and an increase in baseline mortality by 0.1%. Population Viability Analysis undertaken on gannets indicates that the breeding population within the Forth Islands SPA may be able to sustain an increase in annual mortality of up to 2,000 birds per year without a high risk of a population decline (WWT, 2011). The population is in favourable conservation status (SNH, 2012) and therefore the predicted small increase in adult mortality is not expected to cause an adverse effect on the integrity of the site population or affect the conservation objectives of the site due to Project One alone or in combination with other plans and projects (**paragraphs 5.4.166 to 5.4.173, and 5.5.141 to 5.5.149 of the HRA Report (Doc ref No 12.6)**).

b. Displacement – The estimated loss of one adult gannet per year from displacement effects is less than 0.001% of the SPA breeding population. The level of impact estimated will not affect the conservation status of the species and/or the conservation objectives of the site and therefore there will be no effect on the integrity of the SPA due to Project One alone or in combination with other plans and projects (**paragraphs 5.4.174 to 5.4.178 and 5.5.150 to 5.5.158 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 6: Humber Estuary SAC

Name of European site: Humber Estuary SAC												
Distance to Hornsea Project One: 0 km (102 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex I Habitats	***Habitat Extent***			***Water quality***						***In-combination effects***		
	C	O	D	C	O	D				C	O	D
Estuaries	**×a**			**×a**						**×a**		
Mudflats and sandflats not covered by seawater at low tide	**×b**			**×b**						**×b**		
Salicornia and other annuals colonizing mud and sand	**×c**			**×c**						**×c**		
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	**×d**			**×d**						**×d**		
Embryonic shifting dunes	**×e**			**×e**						**×e**		
Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)	**×e**			**×e**						**×e**		
Annex II species (fish)	***Disruption to migration***									***In-combination effects***		
	C	O	D							C	O	D
Sea lamprey	**×f**	**×f**								**×f**	**×f**	
River lamprey	**×f**	**×f**								**×f**	**×f**	
Annex II species (marine mammals)	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**	**×g**

Evidence supporting conclusions:

a. No adverse effect on the integrity of the Humber Estuary SAC as a result of cable installation, either alone or in-combination with other plans and projects. A small proportion of the extent of this habitat within the Humber Estuary SAC (0.47%) is predicted to be temporarily affected (i.e., temporary habitat loss/disturbance) by cable installation. All habitats affected are predicted to recover quickly following disturbance, with no long term effects anticipated. Effects on water quality and the hydrodynamic regime of the estuary are also not expected to be adversely affected, with any potential effects (e.g. increased suspended sediment concentrations) likely to be limited both spatially and temporally, with no long term effects on this feature. Similarly, potential water quality effects as a result of fuel spillages would be minimised through the use of good working practices (i.e. the implementation of a Code of Construction Practices, or CoCP). In-combination effects are also not predicted to result in an adverse effect on this habitat feature, with the majority of the in-combination habitat loss being short lived (i.e., temporary habitat loss) and any long term habitat loss (i.e. as a result of the AMEP development) mitigated by the creation of intertidal habitats. No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.1 to 6.2.11 and 6.2.28 to 6.3.38 of the HRA Report (Doc ref No 12.6)**).

b. No adverse effect on the integrity of the Humber Estuary SAC as a result of cable installation, either alone or in-combination with other plans and projects. A small proportion of the extent of this habitat within the Humber Estuary SAC (1.68%) is predicted to be temporarily affected by installation of Project One export cables. Recovery of this habitat and its associated communities is expected to occur quickly following cable burial, with no long term effects anticipated. Potential water quality effects as a result of fuel spillages would be minimised through the use of good

working practices (i.e. the implementation of a Code of Construction Practices). In-combination effects are not predicted to result in an adverse effect on this habitat feature, with the majority of the in-combination habitat loss being short lived (i.e. temporary habitat loss) and any long term habitat loss (i.e. as a result of the AMEP development) mitigated by the creation of intertidal habitats. No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.1 to 6.2.11, 6.2.12 to 6.2.14 and 6.2.28 to 6.2.38 of the HRA Report (Doc ref No 12.6)**).

c. No adverse effect on the integrity of the Humber Estuary SAC as a result of cable installation, either alone or in-combination with other plans and projects. Although a relatively large proportion of the extent of this habitat within the Humber Estuary SAC is predicted to be affected by cable installation from Project One (i.e., approximately 7.8%), recovery of this habitat and its component species is expected to be fast, with full recovery expected within 1 year. It is also likely that the baseline used to estimate the area of this habitat within the SAC is an underestimate. Measures will be employed to reduce the area of this habitat affected (i.e. working within the convergence corridor only within this habitat) and also increase the recovery rate of this habitat (i.e. by smoothing of disturbed sediment to encourage seed capture). Pre and post construction monitoring will also be undertaken to assess the success of the mitigation measures employed. Potential for water quality effects as a result of fuel spillages would be minimised through the use of good working practices (i.e. CoCP). In-combination effects on this habitat are expected as a result of cable installation for Hornsea Project Two. This will result in further loss of this habitat, though the area affected by repeat disturbance from Project One and Project Two is likely to be limited to access routes, and recovery rates following cable installation would be expected to be rapid. Although an area of this habitat may be affected in the short term, due to the expected high recovery rates and the measures employed to encourage recolonisation, no adverse effects on this feature are predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.1 to 6.2.11, 6.2.15 to 6.2.17 and 6.2.28 to 6.2.38 of the HRA Report (Doc ref No 12.6)**).

d. No adverse effect on the integrity of the Humber Estuary SAC as a result of cable installation, either alone or in-combination with other plans and projects. Based on the area of saltmarsh habitat mapped at Horseshoe Point in 2011 and assuming all cable laying operations will occur within the convergence route corridor, cable laying during Project One will not result in any loss of this Annex I habitat feature. Indirect effects (e.g. sediment deposition or fuel spillages) on saltmarsh habitats are also not expected to occur as a result of cable installation activities as plume modelling showed that sedimentation would not be expected in these habitats and the potential for fuel spillages would be minimised through the use of good working practices (i.e. CoCP). Adverse effects in combination with other project are also not predicted as only a small proportion of this habitat would be affected (i.e. loss of <0.001 of this habitat within the SAC), with none of this loss coming from Project One or Project Two (**paragraphs 6.2.1 to 6.2.11, 6.2.18 to 6.2.22 and 6.2.28 to 6.2.38 of the HRA Report (Doc ref No 12.6)**).

e. No adverse effect on the integrity of the Humber Estuary SAC as a result of cable installation, either alone or in-combination with other plans and projects. A small proportion of the extent of these habitats within the Humber Estuary SAC (0.03%) is predicted to be affected by access arrangements to the intertidal. In-combination effects are predicted to increase this proportion slightly, though the area affected is likely to be small and all habitats will be reinstated following completion of development works (i.e. for Project One and other projects considered in-combination, including future access arrangements at Horseshoe Point). Measures to reduce ground pressures in the vicinity of these habitats are to be considered prior to cable installation in order to aid natural recovery of these habitats. Fencing off of these habitats to prevent further disturbance will also aid recovery and the speed and success of natural regeneration will be also be monitored post cable burial operations. Potential for fuel spillages would be minimised through the use of good working practices (i.e. CoCP). No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.23 to 6.2.56 and 6.2.28 to 6.2.38 of the HRA Report (Doc ref No 12.6)**).

f. No adverse effect on the integrity of the Humber Estuary SAC as a result of cable installation, either alone or in-combination with other plans and projects. Installation of export cables for Project One is not predicted to create artificial barriers to lamprey species (i.e. through sediment plume effects during construction or EMF during operation) on migration to spawning grounds in the rivers flowing to the Humber Estuary, including the River Derwent SAC. In-combination effects on migration are also not expected from other projects in the Humber Estuary (e.g. through habitat loss, plume effects or underwater noise disturbance). No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.42 to 6.2.51 and 6.2.57 to 6.2.59 of the HRA Report (Doc ref No 12.6)**).

g. Grey seal: No adverse effect on the integrity of the Humber Estuary SAC and Ramsar site as a result of cable installation or risk of collision between cable laying vessels and grey seal, either alone or in-combination with other plans and projects (**paragraphs 6.2.52 to 6.2.55 and 6.2.60 of the HRA Report (Doc ref No 12.6)**). Installation of export cables for Project One is not predicted to affect accessibility of the Donna Nook breeding site to adult seals in the Humber Estuary SAC and Ramsar site. The offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance) are also not predicted to affect grey seal conservation objectives for the Humber Estuary SAC and Ramsar site. The zone of noise disturbance for grey seal does not extend as far as the Donna Nook breeding site, which lies over 100 km from Subzone 1, and accessibility for adult seals to this breeding site is not predicted to be affected. Furthermore, due to grey seal exploiting a range of prey resources and ranging widely to forage, effects will be localised and unlikely to result in a significant effect on prey species. There may also be a potential for the operational offshore wind farm to provide benefits to fish and shellfish may also indirectly benefit grey seal populations. Given the large extent of available alternative foraging habitat outside of areas of disturbance, the highly localised nature of the predicted impacts and intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered, and the small numbers of the Humber Estuary SAC grey seal population affected; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for grey seal at a population level or as a feature of the Humber Estuary SAC. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.4; and paragraphs 7.2.21 to 7.2.24 and 7.4.1 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 7: River Derwent SAC

Name of European site: River Derwent SAC									
Distance to Project One: 45 km (160 km from Subzone 1)									
European site features	**Adverse effect on integrity**								
Annex II species (fish)	***Disruption to migration***						***In-combination effects***		
	C	O	D			D	C	O	D
Sea lamprey *Petromyzon marinus*	**×a**	**×a**					**×a**	**×a**	
River lamprey *Lampetra fluviatilis*	**×a**	**×a**					**×a**	**×a**	

Evidence supporting conclusions:

a. No adverse effect on the integrity of the River Derwent SAC as a result of cable installation, either alone or in-combination with other plans and projects. Installation of export cables for Project One is not predicted to create artificial barriers to lamprey species (i.e. through sediment plume effects during construction or EMF during operation) on migration to spawning grounds in the rivers flowing to the Humber Estuary, including the River Derwent SAC. In-combination effects on migration are also not expected from other projects in the Humber Estuary (e.g. through habitat loss, plume effects or underwater noise disturbance). No adverse effects on this feature are therefore predicted as a result of Hornsea Project One either alone or in-combination with other projects (**paragraphs 6.2.42 to 6.2.51, 6.2.57 to 6.2.59 and 7.4.2 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 8: Berwickshire and North Northumberland Coast SAC

Name of European site: Berwickshire and North Northumberland Coast SAC												
Distance to Hornsea Project One: 208 km (258 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Grey seal: No adverse effect on the integrity of the Berwickshire and North Northumberland Coast SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. The Berwickshire and North Northumberland Coast SAC is situated 208 km from Project One and significantly beyond the zone of potential direct impact. The distance of Project One from the SAC and results of grey seal tagging studies indicate a very low risk of any grey seal from this SAC occurring within the Subzone 1 or the zone of potential impact as identified by the underwater noise modelling. Furthermore, due to grey seal exploiting a range of prey resources and ranging widely to forage, effects will be localised and unlikely to result in a significant effect on prey species. Potential beneficial effects of the operational offshore wind farm to fish and shellfish may also indirectly benefit grey seal populations. Given the distance of the SAC to Project One, the highly localised nature of the predicted impacts and intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered, the large extent of available alternative foraging habitat outside of areas of disturbance and the small numbers of grey seal affected; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for grey seal at a population level or as a feature of the Berwickshire and North Northumberland Coast SAC. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.21 to 7.2.24 and 7.4.3 to 7.4.4 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 9: The Wash and North Norfolk Coast SAC

Name of European site: The Wash and North Norfolk Coast SAC												
Distance to Hornsea Project One: 40 km (94 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour seal: No adverse effect on the integrity of The Wash and North Norfolk Coast SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. The SAC lies 94 km from Subzone 1 and 40 km from Project One and significantly beyond the zone of potential direct impact identified by the underwater noise modelling. Due to harbour seal exploiting a range of prey resources able to range up to 120 km from haul-outs, effects will be localised and unlikely to result in a significant effect on prey species. Potential beneficial effects of the operational offshore wind farm to fish and shellfish may also indirectly benefit harbour seal populations. Given the distance of the SAC to Project One, the highly localised nature of the predicted impacts and intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered, the large extent of available alternative foraging habitat and the small numbers of harbour seal affected; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for harbour seal at a population level or as a feature of The Wash and North Norfolk Coast SAC. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.26 to 7.2.29 and 7.4.5 to 7.4.6 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 10: SBZ 1 / ZPS 1 (Belgium) SCI

Name of European site: SBZ 1 / ZPS 1 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the SBZ 1 / ZPS 1 SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.193 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the SBZ 1 / ZPS 1 SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 11: SBZ 2 / ZPS 2 (Belgium) SCI

Name of European site: SBZ 2 / ZPS 2 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the SBZ 2 / ZPS 2 SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the SBZ 2 / ZPS 2 SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 12: SBZ 3 / ZPS 3 (Belgium) SCI

Name of European site: SBZ 3 / ZPS 3 SCI												
Distance to Hornsea Project One: 276 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the SBZ 3 / ZPS 3 SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the SBZ 3 / ZPS 3 SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 13: Vlakte van de Raan (Belgium) pSCI

Name of European site: Vlakte van de Raan pSCI												
Distance to Hornsea Project One: 271 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Vlakte van de Raan pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Vlakte van de Raan pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 14: NTP S-H Wattenmeer und angrenzende Küstengebiete SCI (Germany)

Name of European site: NTP S-H Wattenmeer und angrenzende Küstengebiete SCI												
Distance to Hornsea Project One: 386 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the NTP S-H Wattenmeer und angrenzende Küstengebiete SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the NTP S-H Wattenmeer und angrenzende Küstengebiete SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 15: Doggerbank SCI (Germany)

Name of European site: German Dogger Bank (Doggerbank) SCI												
Distance to Hornsea Project One: 209 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the German Dogger bank (Doggerbank) SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the German Dogger bank (Doggerbank) SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 16: Östliche Deutsche Bucht SCI (Germany)

Name of European site: Östliche Deutsche Bucht SCI												
Distance to Hornsea Project One: 347 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Östliche Deutsche Bucht SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Östliche Deutsche Bucht SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 17: Sylter Außenriff SCI (Germany)

Name of European site: Sylter Außenriff SCI												
Distance to Hornsea Project One: 293 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Sylter Außenriff SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 *et seq.* of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Sylter Außenriff SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 18: Steingrund SCI (Germany)

Name of European site: Steingrund SCI												
Distance to Hornsea Project One: 378 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Steingrund SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Steingrund SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 19: Helgoland mit Helgoländer Felssockel SCI (Germany)

Name of European site: Helgoland mit Helgoländer Felssockel SCI												
Distance to Hornsea Project One: 367 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Helgoland mit Helgoländer Felssockel SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Helgoland mit Helgoländer Felssockel SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 20: Hamburgisches Wattenmeer SCI (Germany)

Name of European site: Hamburgisches Wattenmeer SCI												
Distance to Hornsea Project One: 393 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Hamburgisches Wattenmeer SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Hamburgisches Wattenmeer SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 21: Unterelbe SCI (Germany)

Name of European site: Unterelbe SCI												
Distance to Hornsea Project One: 424 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Unterelbe SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Unterelbe SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 22: Borkum-Riffgrund SAC (Germany)

Name of European site: Borkum-Riffgrund SAC												
Distance to Hornsea Project One: 254 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Borkum-Riffgrund SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Borkum-Riffgrund SAC. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 23: Nationalpark Niedersächsisches Wattenmeer SCI (Germany)

Name of European site: Nationalpark Niedersächsisches Wattenmeer SCI												
Distance to Hornsea Project One: 287 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Nationalpark Niedersächsisches Wattenmeer SCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Nationalpark Niedersächsisches Wattenmeer SCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 24: Gule Rev SAC (Denmark)

Name of European site: Gule Rev SAC												
Distance to Hornsea Project One: 517 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Gule Rev SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.490 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Gule Rev SAC. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 25: Sydlige Nordsø SAC (Denmark)

Name of European site: Sydlige Nordsø SAC												
Distance to Hornsea Project One: 347 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Sydlige Nordsø SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Sydlige Nordsø SAC. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 1 Matrix 26: Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI (France)

Name of European site: Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI												
Distance to Hornsea Project One: 299 km (325 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.490 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Falaises du Cran aux oeufs et du cap gris-nez, dunes du chatelet, marais de tardinghen et dunes de wissant pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 27: Bancs des Flandres pSCI (France)

Name of European site: Bancs des Flandres pSCI												
Distance to Hornsea Project One: 263 km (279 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Bancs des Flandres pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.490 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Bancs des Flandres pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 28: Recifs Gris-nez Blanc-nez pSCI (France)

Name of European site: Recifs Gris-nez Blanc-nez pSCI												
Distance to Hornsea Project One: 288 km (315 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Recifs Gris-nez Blanc-nez pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.490 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Recifs Gris-nez Blanc-nez pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 29: Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI (France)

Name of European site: Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI												
Distance to Hornsea Project One: 288 km (320 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.490 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Ridens et dunes hydrauliques du detroit du pas-de-calais pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 30: Baie de canche et couloir des trois estuaires pSCI (France)

Name of European site: Baie de canche et couloir des trois estuaires pSCI												
Distance to Hornsea Project One: 331 km (361 km from Subzone 1)												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Baie de canche et couloir des trois estuaires pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.490 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Baie de canche et couloir des trois estuaires pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 31: Doggersbank (Dutch Dogger Bank) pSCI (Netherlands)

Name of European site: Doggersbank (Dutch Dogger Bank) pSCI												
Distance to Hornsea Project One: 64 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**

Evidence supporting conclusions:

a. Grey seal: No adverse effect on the integrity of the Dutch Dogger Bank pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Grey seal is a feature of the Dutch Dogger Bank pSCI and animals from these sites may occur within the Project One offshore wind farm areas, either en-route or actively using the sites for foraging and other activities. However, tagging studies of grey seals in the Netherlands indicate that there is relatively low usage of the area compared to nearshore Dutch waters (Jak *et al.,* 2009). Given the highly localised nature of the predicted impacts and intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered and the large extent of available alternative foraging habitat outside areas of disturbance; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for grey seal at a population level or consequently as a feature of the Dutch Dogger Bank pSCI. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.21 to 7.2.24 and 7.4.7 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: No adverse effect on the integrity of the Dutch Dogger Bank pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Harbour seal is a qualifying feature of the Dutch Dogger Bank pSCI and the results from tagging studies undertaken on harbour seals in the Netherlands indicate that harbour seals generally forage within coastal waters up to some tens of kilometres away from the haulout sites (Brasseur, Reijnders and Meesters, 2006). Therefore, whilst it is possible that harbour seal from this site may occur within Project One, either on-route or actively using the site for foraging and other activities, due to the highly localised nature of the predicted impacts, the intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered and the large extent of available alternative foraging habitat outside areas of disturbance; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for harbour seal at a population level or consequently as a feature of the Dutch Dogger Bank pSCI. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.25 to 7.2.28 and 7.4.7 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: No adverse effect on the integrity of the Doggersbank (Dutch Dogger Bank) pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Doggersbank (Dutch Dogger Bank) pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 32: Klaverbank pSCI (Netherlands)

Name of European site: Klaverbank pSCI												
Distance to Hornsea Project One: 44 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Harbour seal	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Harbour porpoise	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**	**×c**

Evidence supporting conclusions:

a. Grey seal: No adverse effect on the integrity of the Dutch Dogger Bank pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Grey seal is a feature of the Dutch Dogger Bank pSCI and animals from these sites may occur within the Project One offshore wind farm areas, either en-route or actively using the sites for foraging and other activities. However, tagging studies of grey seals in the Netherlands indicate that there is relatively low usage of the area compared to nearshore Dutch waters (Jak *et al.,* 2009). Given the highly localised nature of the predicted impacts and intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered and the large extent of available alternative foraging habitat outside areas of disturbance; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for grey seal at a population level or consequently as a feature of the Dutch Dogger Bank pSCI. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.21 to 7.2.24 and 7.4.7 of the HRA Report (Doc ref No 12.6)**).

b. Harbour seal: No adverse effect on the integrity of the Dutch Dogger Bank pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Harbour seal is a qualifying feature of the Dutch Dogger Bank pSCI and the results from tagging studies undertaken on harbour seals in the Netherlands indicate that harbour seals generally forage within coastal waters up to some tens of kilometres away from the haulout sites (Brasseur, Reijnders and Meesters, 2006). Therefore, whilst it is possible that harbour seal from this site may occur within Project One, either on-route or actively using the site for foraging and other activities, due to the highly localised nature of the predicted impacts, the intermittent vessel activity over the construction/operation/decommissioning phases for all projects considered and the large extent of available alternative foraging habitat outside areas of disturbance; it is therefore concluded that there will be no adverse effects from Project One, alone or in-combination with other plans and projects, for harbour seal at a population level or consequently as a feature of the Dutch Dogger Bank pSCI. Although no adverse effect on conservation objectives have been concluded, due to the uncertainties highlighted regarding ducted propellers, the Developer commits to following best practice in line with latest JNCC guidance (JNCC, 2012), the detail of which will be established through consultation on the MMMP with statutory advisors (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.25 to 7.2.28 and 7.4.7 of the HRA Report (Doc ref No 12.6)**).

c. Harbour porpoise: No adverse effect on the integrity of the Klaverbank pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Klaverbank pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 33: Vlakte van de Raan SAC (Netherlands)

Name of European site: Vlakte van de Raan SAC												
Distance to Hornsea Project One: 259 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Vlakte van de Raan SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Vlakte van de Raan SAC. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 34: Noordzeekustzone SAC (Netherlands)

Name of European site: Noordzeekustzone SAC												
Distance to Hornsea Project One: 179 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Noordzeekustzone SAC as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Noordzeekustzone SAC. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

Stage 2 Matrix 35: Noordzeekustzone II pSCI (Netherlands)

Name of European site: Noordzeekustzone II pSCI												
Distance to Hornsea Project One: 180 km												
European site features	**Adverse effect on integrity**											
Annex II Species	***Injury/Disturbance***			***Collision risk***			***Change in prey species distribution / abundance***			***In-combination effects***		
	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**

Evidence supporting conclusions:

a. Harbour porpoise: No adverse effect on the integrity of the Noordzeekustzone II pSCI as a result of the offshore components of Project One, (i.e., piling activities, vessel noise, increased risk of vessel collision and indirect effects causing changes in prey species distribution and/or abundance), either alone or in-combination with other plans and projects. Due to the distance to Subzone 1 from this site, the local spatial extent and intermittent nature of the impacts, the highly mobile and wide ranging nature of harbour porpoise coupled with their ability to exploit a wide range of prey species, and empirical evidence indicating movement of animals back to the area of impact following cessation of the activity (**paragraphs 5.2.190 to 5.2.192 of the HRA Report (Doc ref No 12.6)**), therefore no adverse effects are predicted on harbour porpoise at a southern North Sea population level or consequently as a feature of the Noordzeekustzone II pSCI. Potential impacts associated with Project One construction piling will be further managed through the use of soft start procedures and an approved MMMP (**Section 5.2, 5.3 and 5.6; and paragraphs 7.2.29 to 7.2.32, 7.4.7 of the HRA Report (Doc ref No 12.6)**).

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