FIVE ESTUARIES OFFSHORE WIND FARM

VOLUME 5, REPORT 4.1: HABITATS REGULATIONS ASSESSMENTS SITE INTEGRITY MATRICES

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DEFINITION OF ACRONYMS

Term	Definition
EMF	Electromagnetic Field
ECC	Export Cable Corridor
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
LSE	Likely Significant Effect
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Impact Report
PINS	Planning Inspectorate
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SPA	Special Protected Area
VE	Five Estuaries
VEOWFL	Five Estuaries Offshore Windfarm Limited
WTG	Wind Turbine Generator
ZoI	Zone of Influence

UNITS

Units	Definition
km	Kilometre
cm	Centimetre
m	Metre
ha	Hectare
kg	Kilogram

1 MATRIX KEY

✓ = A potential for AEoI has been identified
X = No potential for AEoI has been identified

Evidence for, or against adverse effects on European site qualifying feature and Likely Significant Effect is detailed within the footnotes to the integrity matrices

C = construction
O = operation and maintenance
D = decommissioning

 = Screened out as effect not relevant to feature (no pathway)

2 INDEX TO MATRICES

2.1.1 This appendix presents the Integrity matrices for Five Estuaries Offshore Wind Farm (OWF, hereafter 'VE') prompted by Five Estuaries Offshore Windfarm Limited (hereafter 'the Applicant') in accordance with the structure and format specified in PINS Advice Note 10 (version 8, from November 2022).

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39	Blackwater Estuary RAMSAR

HRA Integrity Matrix 1: Margate and Long Sands (SAC)

Name of European site:	**Margate and Long Sands (SAC)**																	
EU Code:	UK0030371																	
Distance to Project:	23.61 km to array																	
Likely Effects of Project																		
Effect	Physical habitat loss/ disturbance			Suspended sediment/deposition			Accidental pollution			Invasive Non-Native Species (INNS)			EMF			Changes to physical processes		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Sandbanks which are slightly covered by sea water all the time	Xa	Xb	Xc	Xa	Xa	Xa	Xd	Xd	Xd	Xe	Xe	Xe		Xe			Xb	

Evidence supporting conclusions:

Xa Given the short-term nature of the disturbance, the existing tolerance of the benthic habitats to disturbance within this area, and the predicted medium to high recoverability of the biotopes, it is considered that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

Xb Given the small area of the SAC which will undergo disturbance, the change is very small compared to total area of habitat available within the SAC and therefore the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI,

Xc Effects are considered to be similar or less than the construction phase and therefore there is no potential for an AEoI.

Xd Vessel movements and construction activities are all managed through the PEMP, ensuring that there are no adverse environmental effects from the works. Therefore, there is no potential for an AEoI.

Xe Due to the lack of evidence of any adverse effect from offshore wind farms and the project level commitments to mitigate the risk, the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

End of Matrix 1

HRA Integrity Matrix 2: Essex Estuaries SAC

Name of European site:	**Essex Estuaries SAC**																	
EU Code:	UK0013690																	
Distance to Project:	64.38 km to array																	
Likely Effects of Project																		
Effect	Physical habitat loss/ disturbance			Suspended sediment/ deposition			Accidental pollution			Invasive Non-Native Species (INNS)			EMF			Changes to physical processes		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Estuaries	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Mudflats and sandflats not covered by seawater at low tide	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Salicornia and other annuals colonizing mud and sand	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Spartina swards	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Atlantic salt meadows	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Mediterranean and thermo-Atlantic halophilous scrubs	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Sandbanks which are slightly covered by sea water all the time	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	

Evidence supporting conclusions:

Xa Given the distance of the site to potential direct interaction with construction and decommissioning activities, that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.
Xb Due to the lack of evidence of any potential adverse effects and the project level commitments to mitigate the risk, it is concluded that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.
Xc The primary source of the pollution risk from the project comes from vessel movements and construction activities, which are all managed through the PEMP, ensuring that there are no adverse environmental effects from the works. Therefore, there is no potential for an AEoI.
Xd Considering the distance of the site from potential direct EMF exposure during O&M activities and ensuring the preservation of the site's conservation objectives over the long term, there is consequently no anticipated occurrence for an AEoI.

End of Matrix 2

HRA Integrity Matrix 3: Berwickshire and North Northumberland Coast SAC

Name of European site:	**Berwickshire and North Northumberland Coast SAC**														
EU Code:	UK0017072														
Distance to Project:	445.9 km to array														
Likely Effects of Project															
Effect	Underwater noise			Vessel collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions:

Xa Any disturbance caused by piling will be short term, temporary and recoverable across a period of up to 12 months with assessments. There is, therefore, no AEoI.
Xb The increased vessel traffic associated with activities is insufficient to result in an increase in the risk of disturbance to marine mammals, or to result in an increase in the risk of mortality or injury in marine mammals through vessel collisions as well as disruption to the haul out sites. There is, therefore, no AEoI.
Xc Due to the lack of significant effect on prey species and given the generalist/ opportunist nature of the features in question, it is not predicted that there will be any impacts on grey seal. There is, therefore, no AEoI.
Xd Given the low numbers of seals in the vicinity of VE, it is not predicted that there will be any impacts on seal features as a result of supporting habitat loss. There is, therefore, no AEoI.

End of Matrix 3

HRA Integrity Matrix 4: Humber Estuary SAC

Name of European site:	**Humber Estuary SAC**														
EU Code:	UK0030170														
Distance to Project:	203.32 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions:

Xa Any disturbance caused will be short term, temporary and recoverable across a period of up to 12 months with assessments of grey seal disturbance. It is expected that will be maintained in the long-term. There is, therefore, no AEoI.
Xb The increased vessel traffic associated with activities is insufficient to result in an increase in the risk of disturbance to marine mammals, or to result in an increase in the risk of mortality or injury in marine mammals through vessel collisions. There is, therefore, no AEoI.
Xc Due to the lack of significant effect on prey species and given the generalist/ opportunist nature of the features in question it is not predicted that there will be any impacts on grey seal. There is, therefore, no AEoI.
Xd Given the low numbers of seals in the vicinity of VE, it is not predicted that there will be any impacts on seal features as a result of supporting habitat loss. There is, therefore, no AEoI.

End of Matrix 4

HRA Integrity Matrix 5: Humber Estuary RAMSAR

Name of European site:	**Humber Estuary RAMSAR**														
EU Code:	663														
Distance to Project:	197.29 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions:

Xa Any disturbance caused will be short term, temporary and recoverable across a period of up to 12 months with assessments of grey seal disturbance. It is expected that will be maintained in the long-term. There is, therefore, no AEoI.
Xb The increased vessel traffic associated with activities is insufficient to result in an increase in the risk of disturbance to marine mammals, or to result in an increase in the risk of mortality or injury in marine mammals through vessel collisions as well as disruption to the haul out sites. There is, therefore, no AEoI.
Xc Due to the lack of significant effect on prey species and given the generalist/ opportunist nature of the receptor it is not predicted that there will be any impacts on grey seal. There is, therefore, no AEoI.
Xd Given the low numbers of seals in the vicinity of VE, it is not predicted that there will be any impacts on seal features as a result of supporting habitat loss. There is, therefore, no AEoI.

End of Matrix 5

HRA Integrity Matrix 6: Southern North Sea SAC

Name of European site:	**Southern North Sea SAC**														
EU Code:	UK0030395														
Distance to Project:	0 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Accidental pollution and changes in water quality			Physical habitat loss/ disturbance		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xe	Xe	Xe

Evidence supporting conclusions:

Xa The impact of underwater noise will be negligible due to the implementation of the SIP and MMMP bring disturbance levels to below seasonal thresholds and reduce the risk of injury to negligible levels. As a result, there will be no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for adverse effects on integrity (AEoI) arising from underwater noise pollution.
Xb The increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions.. There is, therefore, no AEoI.
Xc Due to the lack of significant effect on prey species and given the generalist/ opportunist nature of the features in question it is not predicted that there will be any impacts on grey seal. There is, therefore, no AEoI.
Xd The implementation of PEMP as provided for in the DCO application enables the conclusion that there is, therefore, no AEoI.
Xe Given the highly mobile nature of the species, the widely available comparable habitat, the area of habitat loss/disturbed, and the generalist/opportunist nature of harbour porpoise (ES Volume 6, Part 2, Chapter 7: Marine Mammal Ecology, Pierce et al., 2007) it is considered that there is no adverse effect from a loss of available supporting habitat on harbour porpoise.

End of Matrix 6

HRA Integrity Matrix 7: Wash and North Norfolk Coast SAC

Name of European site:	**Wash and North Norfolk Coast SAC**														
EU Code:	UK0017075														
Distance to Project:	126.45 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions

Xa Given only 2 harbour seals (0.18%) of designated sites population have potential impacted, the short-term duration of the overall impact, and the implementation of a MMMP further reducing potential effects, the effect significance of disturbance and/ or injury from underwater noise to harbour seal is negligible. There is, therefore, no AEoI.
Xb The increased vessel traffic associated with activities is insufficient to result in an increase in the risk of disturbance to seals, or to result in an increase in the risk of mortality or injury in seals through vessel collisions, and the supporting habitat for harbour seal prey will be maintained in the long-term. There is, therefore, no AEoI.
Xc Due to the lack of significant effect on prey species and given the generalist/ opportunist nature of the receptor it is not predicted that there will be any impacts on harbour seal. There is, therefore, no AEoI.
Xd Given the low numbers of seals in the vicinity of VE, it is not predicted that there will be any impacts on seal features as a result of supporting habitat loss from placement of structures, scour protection, cable protection or cable crossings within the vicinity of VE. There is, therefore, no AEoI.

End of Matrix 7

HRA Integrity Matrix 8: Transboundary Sites for Seals

Name of European site:	**Transboundary sites for seals (Harbour seal; and Grey seal)**														
EU Code:	Various														
Distance to Project:	Various														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Bancs des Flandres SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Vlaamse Banken SAC	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Doggersbank (Netherlands) SAC	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Klaverbank SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Noordzeekustone SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
SBZ 1 SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
SBZ 2 SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
SBZ 3 SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Vlakte van de Raan SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Voordelta SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Waddenzee SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Westerschelde & Saeftinghe	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
*Note that some sites may be considered separately for other feature(s), notably seals															

Evidence supporting conclusions:

Xa Given the low number of seals predicted to be impacted and the proportion of the population this represents, along with the short-term duration of the overall impact, the effect significance of disturbance from piling to seals is considered to be negligible. There is, therefore, no AEoI

Xb The increased vessel traffic associated with activities is insufficient to result in an increase in the risk of disturbance to seals, or to result in an increase in the risk of mortality or injury to seals through vessel collisions, and the supporting habitat for seal prey will be maintained in the long-term. There is, therefore, no AEoI.

Xc Given that seals are considered to be generalist feeders and are thus not reliant on a single prey species, It is not predicted that there will be any impacts on seal at these sites as a result of changes to the populations or general distributions of prey species within the vicinity of VE. There is, therefore, no AEoI.
Xd Given the low numbers of seals in vicinity of VE, it is not predicted that there will be any impacts on seal features as a result of supporting habitat loss from placement of structures. There is, therefore, no AEoI.

End of Matrix 8

HRA Integrity Matrix 9: Outer Thames Estuary SPA

Name of European site:	**Outer Thames Estuary SPA**		
EU Code:	UK9020309A		
Distance to Project:	17.24 km to array		
Likely Effects of Project			
Effect	Disturbance and displacement due to work activity and vessel movements within the ECC only		
Stage of Development	C	O	D
Red-throated diver	Xa		Xa

Evidence supporting conclusions:

Xa Given the low number of birds predicted to be impacted and the proportion of the population this represents, it is considered that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

End of Matrix 9

HRA Integrity Matrix 10: Alde-Ore Estuary SPA

Name of European site:	**Alde-Ore Estuary SPA**		
EU Code:	UK9009112		
Distance to Project:	37.44 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Lesser black-backed gull		✓a	
Avocet		Xb	
Redshank		Xb	
Ruff		Xb	

Evidence supporting conclusions:

✓a Potential for AEoI on lesser black-backed gull, in-combination for collision risk.
Xb Given the low number of birds predicted to be impacted and the proportion of the population this represents, it is considered that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

End of Matrix 10

HRA Integrity Matrix 11: Alde-Ore Estuary RAMSAR

Name of European site:	**Alde-Ore Estuary RAMSAR**		
EU Code:	UK9009112		
Distance to Project:	37.44 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Lesser black-backed gull		✓a	
Avocet		Xb	
Redshank		Xb	

Evidence supporting conclusions:

✓a Potential for AEoI on lesser black-backed gull, in-combination for collision risk.
Xb Given the low number of birds predicted to be impacted and the proportion of the population this represents, it is considered that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

End of Matrix 11

HRA Integrity Matrix 12: Minsmere-Walberswick SPA

Name of European site:	**Minsmere-Walberswick SPA**		
EU Code:	UK9009101		
Distance to Project:	41.88 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Avocet		Xa	
Bittern		Xa	
Gadwall		Xa	
Greater white-fronted goose		Xa	
Hen harrier		Xa	
Shoveler		Xa	
Teal		Xa	

Evidence supporting conclusions:

Xa Given the low number of birds predicted to be impacted and the proportion of the population this represents, it is considered that the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

End of Matrix 12

HRA Integrity Matrix 13: Minsmere-Walberswick RAMSAR

Name of European site:	**Minsmere-Walberswick RAMSAR**		
EU Code:	UK1044		
Distance to Project:	41.88 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Avocet		Xa	
Bittern		Xa	
Gadwall		Xa	
Marsh harrier		Xa	
Shoveler		Xa	
Teal		Xa	
Bearded tit		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPA's can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no AEoI.

End of Matrix 13

HRA Integrity Matrix 14: Deben Estuary SPA

Name of European site:	Deben Estuary SPA		
EU Code:	UK9009261		
Distance to Project:	48.45 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Avocet		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 14

HRA Integrity Matrix 15: Deben Estuary RAMSAR

Name of European site:	**Deben Estuary RAMSAR**		
EU Code:	UK9009261		
Distance to Project:	48.45 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 15

HRA Integrity Matrix 16: Hamford Water SPA

Name of European site:	**Hamford Water SPA**		
EU Code:	UK0030377		
Distance to Project:	51.17 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Avocet		Xa	
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Grey plover		Xa	
Redshank		Xa	
Ringed plover		Xa	
Shelduck		Xa	
Teal		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 16

HRA Integrity Matrix 17: Hamford Water RAMSAR

Name of European site:	**Hamford Water RAMSAR**		
EU Code:	UK11028		
Distance to Project:	52.89 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Redshank		Xa	
Ringed plover		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 17

HRA Integrity Matrix 18: Stour and Orwell Estuaries SPA

Name of European site:	**Stour and Orwell Estuaries SPA**		
EU Code:	UK9009121		
Distance to Project:	54.81 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	
Knot		Xa	
Pintail		Xa	
Redshank		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 18

HRA Integrity Matrix 19: Stour and Orwell Estuaries RAMSAR

Name of European site:	**Stour and Orwell Estuaries RAMSAR**		
EU Code:	UK9009121		
Distance to Project:	54.81 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	
Knot		Xa	
Pintail		Xa	
Redshank		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 19

HRA Integrity Matrix 20: Colne Estuary (Mid-Essex Coast Phase 2) SPA

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) SPA**		
EU Code:	UK9009243		
Distance to Project:	66.51 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Pochard		Xa	
Redshank		Xa	
Ringed Plover		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 20

HRA Integrity Matrix 21: Colne Estuary (Mid-Essex Coast Phase 2) RAMSAR

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) RAMSAR**		
EU Code:	UK9015022		
Distance to Project:	66.63 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Redshank		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 21

HRA Integrity Matrix 22: Dengie (Mid-Essex Coast Phase 1) SPA

Name of European site:	**Dengie (Mid-Essex Coast Phase 1) SPA**		
EU Code:	UK9009242		
Distance to Project:	73.63 km to array area		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Grey plover		Xa	
Knot		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 22

HRA Integrity Matrix 23: Dengie (Mid-Essex Coast Phase 1) RAMSAR

Name of European site:	**Dengie (Mid-Essex Coast Phase 1) RAMSAR**		
EU Code:	UK9009242		
Distance to Project:	73.63 km to array area		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Grey plover		Xa	
Knot		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 23

HRA Integrity Matrix 24: Blackwater Estuary (Mid-Essex Coast Phase 4) SPA

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) SPA**		
EU Code:	UK9009245		
Distance to Project:	77.69 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied Brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 24

HRA Integrity Matrix 25: Blackwater Estuary (Mid-Essex Coast Phase 4) RAMSAR

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) RAMSAR**		
EU Code:	UK9009245		
Distance to Project:	77.81 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied Brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	

Evidence supporting conclusions:

Xa Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

End of Matrix 25

HRA Integrity Matrix 26: Flamborough and Filey Coast SPA

Name of European site:	**Flamborough and Filey Coast SPA**					
EU Code:	UK9006101					
Distance to Project:	275.50 km to array					
Likely Effects of Project						
Effect	Collision risk			Direct disturbance and displacement		
Stage of Development	C	O	D	C	O	D
Kittiwake		Xa				
Gannet		Xa		Xb		Xb
Guillemot				Xb	Xb	Xb
Razorbill				Xb	Xb	Xb

Evidence supporting conclusions:

Xa The addition of less than one possible additional breeding adult mortalities per annum equates to less than a 1% increase in baseline mortality, when considering either the citation or the latest colony count. This level of impact would be indistinguishable from natural fluctuations in the baseline mortality rate of breeding adults from this population per annum. Therefore there is no potential for an AEoI

Xb This level of impact would be indistinguishable from natural fluctuations in the population. Therefore, there is no potential for an AEoI.

End of Matrix 26

HRA Integrity Matrix 27: Farne Islands SPA

Name of European site:	Farne Islands SPA		
EU Code:	UK9006021		
Distance to Project:	472.54 km to array		
Likely Effects of Project			
Effect	Direct disturbance and displacement		
Stage of Development	C	O	D
Guillemot	Xa	Xa	Xa
Razorbill	Xa	Xa	Xa

Evidence supporting conclusions:

Xa This level of impact would be indistinguishable from natural fluctuations in the population. Therefore, the potential for an AEoI.

End of Matrix 27

HRA Integrity Matrix 28: Vlaamse Banken (Special Area of Conservation (SAC)

Name of European site:	**Vlaamse Banken SAC**		
EU Code:	BEMNZ000		
Distance to Project:	34.75 km to array		
Likely Effects of Project			
Effect	Underwater noise		
Stage of Development	C	O	D
Twaite shad	Xa		Xa

Evidence supporting conclusions:

Xa Effects from these impacts are not expected to manifest at levels that could compromise the maintenance of the twaite shad population. There is, therefore, no potential for an AEoI.

End of Matrix 28

HRA Integrity Matrix 29: Hamford Water SAC

Name of European site:	**Hamford Water SAC**																	
EU Code:	UK0030377																	
Distance to Project:	0 km to onshore ECC																	
Likely Effects of Project																		
Effect	Impacts on supporting populations, food plant and potential habitat outside the SAC			Water quality: pollution from site run-off affecting habitat quality			Decreases in water quantity			Decrease in air quality			Increase in lighting			In-combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Fisher's estuarine moth	Xa		Xa	Xb		Xb	Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa The effects of construction and decommissioning activities on the site are expected to be minor as Fisher's estuarine moths are limited to the areas outside of the project site and therefore their habitat is expected to remain intact and undisturbed. There is, therefore, no potential for AEoI.

Xb There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xc Air quality impacts during operation will not have an adverse effect on the relevant designated sites. There is, therefore, no potential for AEoI.

Xd Whilst the period of illuminated construction partially overlaps with the flight period during a maximum of two years, there is little possibility for it to interact with the individuals that form part of the population for which the SAC is designated.

Xe With the low likelihood of hog's fennel/ Fisher's estuarine moth being present in the vicinity of the VE onshore ECC, due to its rarity, despite the lack of information appertaining to North Falls, the situation is likely to be similar to that of VE.

End of Matrix 29

HRA Integrity Matrix 30: Hamford Water SPA

Name of European site:	**HAMFORD WATER SPA**														
EU Code:	UK9009131														
Distance to Project:	51.04 km to array														
Likely Effects of Project															
Effect	Habitat loss			Disturbance of birds outside the SPA			Pollution (air quality)			Decreases in water quantity			Water quality: pollution from site run-off affecting habitat quality		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Avocet	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Black-tailed godwit	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Grey plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Redshank	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Ringed plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Shelduck	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Teal	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe
Little tern	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xe		Xe

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity

Xc The conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe Following the implementation of relevant mitigation (including seasonal piling, alternative installation methods, fencing for visual and acoustic impacts), it is concluded that there is no AEoI.

End of Matrix 30

HRA Integrity Matrix 31: Hamford Water RAMSAR

Name of European site:	**Hamford Water RAMSAR**																	
EU Code:	UK11028																	
Distance to Project:	0.72 km to array																	
Likely Effects of Project																		
Effect	Disturbance of birds outside the Ramsar			Decrease in air quality			Habitat loss			Water quality: pollution from site run-off affecting prey availability			Decreases in water quantity			Loss of foraging and roosting habitat outside the Ramsar		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe
Dark-bellied brent goose	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe
Redshank	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe
Ringed plover	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity

Xb The conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xc Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

Xd There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

End of Matrix 31

HRA Integrity Matrix 32: Stour and Orwell Estuaries SPA

Name of European site:	**Stour and Orwell Estuaries SPA**																	
EU Code:	UK9009121																	
Distance to Project:	54.81 km to array																	
Likely Effects of Project																		
Effect	Disturbance of birds outside the SPA			Decreases in water quantity			Decrease in air quality			Habitat loss			Pollution from site run-off affecting prey availability			Loss of foraging and roosting habitat outside the SPA		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Dark-bellied brent goose	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Dunlin	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Grey plover	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Knot										Xc		Xc	Xe		Xe	Xf		Xf
Pintail	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Redshank	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Avocet	Xa	Xa	Xa	Xd	Xd	Xd	Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf
Waterbird assemblage	Xa	Xa	Xa	Xd	Xd	Xd	Xb		Xb	Xc		Xc	Xe		Xe	Xf		Xf

Evidence supporting conclusions:

Xa Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.

Xb The modelled air quality impacts are all below specified thresholds. Therefore, the conservation objectives will not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity.

Xc Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

Xd The conservation objectives of any qualifying interest features will not be undermined by any hydrological changes and there will be no adverse effect on integrity on the relevant SPA. There is, therefore, no AEoI.

Xe There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xf Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

End of Matrix 32

HRA Integrity Matrix 33: Stour and Orwell Estuaries RAMSAR

Name of European site:	**Stour and Orwell Estuaries RAMSAR**																	
EU Code:	UK9009121																	
Distance to Project:	54.80 km to array																	
Likely Effects of Project																		
Effect	Disturbance / displacement of birds outside of Ramsar			Decrease in air quality			Loss of foraging and roosting habitat outside the SPA			Decreases in water quantity.			Pollution from site run-off affective prey availability			Collision Risk		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Dark-bellied brent goose	Xg	Xg	Xg	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Dunlin	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Grey plover	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Knot	Xa	Xa	Xa				Xc			Xd		Xd	Xe		Xe		Xf	
Pintail	Xh	Xh	Xh	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Redshank	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Waterbird assemblage	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Wetland invertebrate assemblage				Xb		Xb				Xd		Xd						
Wetland plant assemblage				Xb		Xb				Xd		Xd						

Evidence supporting conclusions:

Xa Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.
Xb The modelled air quality impacts are all below specified thresholds. Therefore, the conservation objectives will not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity.
Xc Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.
Xd There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.
Xe The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.
Xf Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs and RAMSARs can be considered minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

Xg With consideration of the mitigation being implemented (timing of works/maintenance, vibro-piling technology, fencing for visual and acoustic screening, suspending works during very cold periods, construction lighting at HDD locations would be at the lowest, safest permissible level and with light spill minimised and on-site measures overseen by an ECoW), the predicted potential disturbance to the species is reduced to negligible levels, and therefore there is no potential for AEoI.

Xh With consideration of the distance from any construction this species was recorded and the infrequency of observations we conclude that the conservation objectives will not be undermined by this effect and there is no potential for AEoI.

End of Matrix 33

HRA Integrity Matrix 34: Colne Estuary (Mid-Essex Coast Phase 2) SPA

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) SPA**														
EU Code:	UK9009243														
Distance to Project:	66.51 km to array														
Likely Effects of Project															
Effect	Habitat loss			Direct disturbance and displacement			Pollution (air quality)			Decreases in water quantity			Pollution from site run-off affecting prey availability		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Hen harrier	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Pochard	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Redshank	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Ringed plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Little tern	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity

Xc The conservation objectives would not be undermined by any changes in associated with the Project alone or in combination and air quality. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 34

HRA Integrity Matrix 35: Colne Estuary (Mid-Essex Coast Phase 2) RAMSAR

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) RAMSAR**														
EU Code:	UK9015022														
Distance to Project:	66.63 km to array														
Likely Effects of Project															
Effect	Loss of foraging and roosting habitat outside the SPA			Disturbance/displacement of birds outside of Ramsar			Pollution (air quality)			Invasive Non-Native Species (INNS)			Pollution from site run-off affecting prey availability		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Redshank	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xf	Xf	Xf
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xf	Xf	Xf
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xf	Xf	Xf
Wetland invertebrate assemblage										Xd	Xd	Xd			
Wetland plant assemblage										Xd	Xd	Xd			
Saltmarsh										Xd	Xd	Xd			

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.
Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity
Xc The implementation of PEMP and provided for in the marine licence application, enables the conclusion that there is, therefore, no AEoI.
Xd Due to the evidence there is no adverse effect from offshore wind farms and the project level commitments to mitigate the risk, the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI
Xe Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs and RAMSARs can be considered minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.
Xf The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 35

HRA Integrity Matrix 36: Abberton Reservoir SPA

Name of European site:	**Abberton Reservoir SPA**											
EU Code:	UK9009141											
Distance to Project:	11.4 km to onshore EEC											
Likely Effects of Project												
Effect	Habitat loss			Disturbance of birds outside the SPA			Decrease in air quality			Water quality: pollution from site run-off affecting habitat quality		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D
Cormorant	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Coot	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Gadwall	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Great crested grebe	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Mute swan	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Pochard	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Shoveler	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Widgeon	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Teal	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Tufted Duck	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.
Xb The conservation objectives would not be undermined for the identified sites in relation to important wintering populations of the designated species during construction, operation and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.
Xc The conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.
Xd The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 36

HRA Integrity Matrix 37: Abberton Reservoir RAMSAR

Name of European site:	**Abberton Reservoir RAMSAR**											
EU Code:	UK9009141											
Distance to Project:	11.4 km to ECC											
Likely Effects of Project												
Effect	Habitat loss			Disturbance of birds outside the Ramsar			Decrease in air quality			Water quality: pollution from site run-off affecting habitat quality		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Shoveler	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Widgeon	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.
Xb The conservation objectives would not be undermined for the identified sites in relation to important wintering populations of the designated species during construction, operation and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.
Xc The conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.
Xd The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 37

HRA Integrity Matrix 38: Blackwater Estuary SPA

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) SPA**														
EU Code:	UK9009245														
Distance to Project:	77.69 km to array														
Likely Effects of Project															
Effect	Habitat loss			Disturbance / displacement of birds outside SPA			Pollution (air quality)			Water quality: pollution from site run-off affecting habitat quality			Decreases in water quantity		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Dark-bellied Brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Dunlin	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Grey plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Hen harrier	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Little tern	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Pochard	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Ringed plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.
Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity
Xc The conservation objectives would not be undermined by any changes in associated with the Project alone or in combination and air quality. Therefore, there would be no adverse effect on integrity and no potential for AEoI.
Xd The conservation objectives of any qualifying interest features will not be undermined by any hydrological changes and there will be no adverse effect on integrity on the relevant SPA. There is, therefore, no AEoI.
Xe There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.
End of Matrix 38

HRA Integrity Matrix 39: Blackwater Estuary RAMSAR

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) RAMSAR**																	
EU Code:	UK11007																	
Distance to Project:	77.81 km to array																	
Likely Effects of Project																		
Effect	Habitat loss			Disturbance / displacement of birds outside SPA			Decreases in air quality			Water quality: pollution from site run-off affecting habitat quality			Decreases in water quantity			Impacts on supporting populations of plants and invertebrates outside the Ramsar		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Dunlin	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Grey plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf

Evidence supporting conclusions:

Xa Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.
Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity
Xc The conservation objectives would not be undermined by any changes in associated with the Project alone or in combination and air quality. Therefore, there would be no adverse effect on integrity and no potential for AEoI.
Xd Following the implementation of relevant mitigation (including seasonal piling, alternative installation methods, fencing for visual and acoustic impacts), it is concluded that there is no AEoI.
Xe There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.
Xf The effects of construction and decommissioning activities on the site are expected to be minor as Fisher's estuarine moths are limited to the areas outside of the project site and therefore their habitat is expected to remain intact and undisturbed. There is, therefore, no potential for AEoI.

End of Matrix 39

3 REFERENCES

Bradbury, G., Trinder, M., Furness, B., Banks, A.N., Caldow, R.W. and Hume, D., 2014. Mapping seabird sensitivity to offshore wind farms. PloS one, 9(9).

Cleasby, I.R., Owen, E., Wilson, L., Wakefield, E.D., O'Connell, P. and Bolton, M., 2020. Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping. Biological Conservation, 241, p.108375.

Dierschke, V., Furness, R.W. and Garthe, S., 2016. Seabirds and offshore wind farms in European waters: Avoidance and attraction. Biological Conservation, 202, pp.59-68.

Ellis, J.R., Milligan, S.P. Readdy, L. Taylor, N. and Brown, M.J. (2012), 'Spawning and nursery grounds of selected fish species in UK waters'. Cefas Scientific Series Technical Report 147.

Fliessbach, K.L., Borkenhagen, K., Guse, N., Markones, N., Schwemmer, P. and Garthe, S., 2019. A ship traffic disturbance vulnerability index for Northwest European seabirds as a tool for marine spatial planning. Frontiers in Marine Science.

Masden. E.A., Haydon, D.T., Fox A.D., Furmess, R.W. 2010. Barriers to movement: Modelling energetic costs of avoiding marine wind farms amongst breeding seabirds. Marine Pollution Bulletin, 60(7) pp.1085-1091.

Wildfowl and Wetland Trust (WWT). 2009. Distributions of Cetaceans, Seals, Turtles, Sharks and Ocean Sunfish recorded from Aerial Surveys 2001-2008. WWT Consulting. Report to Department of Energy and Climate Change

Wright, L. J., Ross-Smith, V. H., Austin, G. E., Massimino, D., Dadam, D., Cook, A. S. C. P., Calbrade, N. A. and Burton, N. H. K. (2012), 'Assessing the risk of offshore wind farm development to migratory birds designated as features of UK Special Protection Areas (and other Annex 1 species)', Strategic Ornithological Support Services, Project SOSS-05, BTO Research Report No. 592.

Woodward, I., Thaxter, C. B., Owen, E., Cook, A. S. C. P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening. BTO Research Report No. 724. ISBN 978-1-912642-12-0Zeale, M., 2009. Barbastelles in the landscape: ecological research and conservation in Dartmoor National Park. SITA Trust.

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