



Able Marine Energy Park

Material Change 2

Revised Screening Matrix

(Tracked)

(referenced in response to questions

5.0.13 and 5.0.15)

SCREENING FOR LIKELY SIGNIFICANT EFFECTS

This document presents the draft screening matrices for the Habitats Regulations Assessment for the Able Marine Energy Park (AMEP) Quay Material Change 2. The project is not connected with or necessary to the management for nature conservation of any of the European sites considered within the assessment.

Potential Effects

Potential effects upon the European site(s)¹ which are considered within the submitted HRA report (Document TR030006/APP/7, the HRA Part 1 Report) are provided in the table below.

Effects considered within the screening matrices

The potential impacts associated with the AMEP have been grouped into broad ecological impacts on the European site features as shown in the table below.

¹ As defined in Advice Note 10.

Designation	Effects described in submission information	Presented in screening matrices as
Humber Estuary SAC/Ramsar	<ul style="list-style-type: none"> ▪ Noise generated by construction activities including piling ▪ Vibration generated by piling ▪ Noise during operation of AMEP ▪ Lighting during operation of AMEP 	<ul style="list-style-type: none"> ▪ Disturbance/displacement of species designated as European site features
	<ul style="list-style-type: none"> ▪ Construction of the berthing pocket 	<ul style="list-style-type: none"> ▪ Change to intertidal habitat
	<ul style="list-style-type: none"> ▪ Changes in suspended sediment concentrations as a result of piling, flooding of the compensation site and activities such as capital or maintenance dredging. ▪ Release of contaminated sediments as a result of dredging 	<ul style="list-style-type: none"> ▪ Changes to water quality leading to changes in aquatic ecology
	<ul style="list-style-type: none"> ▪ Changes caused by existence of quay and disposal of dredge arisings to flow patterns and morphology. ▪ Changes to the sediment budget caused by disposal of sediment outside the estuary 	<ul style="list-style-type: none"> ▪ Changes to estuary morphology, hydrodynamics and sedimentary regime
	<ul style="list-style-type: none"> ▪ Capital and maintenance dredging ▪ Construction of quay/manufacturing area ▪ Disposal of dredge arisings from capital and maintenance dredging 	<ul style="list-style-type: none"> ▪ Loss of designated habitats and associated benthos
Humber Estuary SPA/Ramsar	<ul style="list-style-type: none"> ▪ Capital and maintenance dredging ▪ Construction of quay/manufacturing area ▪ Construction of compensation site at Cherry Cobb Sands 	<ul style="list-style-type: none"> ▪ Loss of supporting habitat

Designation	Effects described in submission information	Presented in screening matrices as
	<ul style="list-style-type: none"> ▪ Construction and operation of quay/manufacturing area affecting surrounding habitat through noise, lighting and human activity. 	<ul style="list-style-type: none"> ▪ Disturbance/displacement of birds designated as European site features
	<ul style="list-style-type: none"> ▪ Alteration/loss to benthic communities as a result of changes in suspended <u>Capital and maintenance dredging</u> ▪ <u>Construction of quay/manufacturing area</u> 	<ul style="list-style-type: none"> ▪ Loss of foraging resources

Details of the changes from consented scheme are set out in Chapter 4 of the Updated Environmental Statement (UES), and differences in the habitats lost are summarised in the HRA Part 1 report Table 13.

In the original application it was agreed that a likely significant effect for impacts on bird populations which are designated features of the European sites was defined as being a reduction of 1% or more in the population. In some cases though, bird species occur on the AMEP site in very small numbers so although 1% or more of the population would be affected these, these effects were not viewed as significant because the birds could be accommodated readily elsewhere within the European sites. Similarly, where the species recorded are not reliant on the habitats lost this was not regarded as a significant effect. The same approach has been adopted for the assessment of the Material Change 2.

STAGE 1: SCREENING MATRICES

The European sites included within the screening assessment are:

- Humber Estuary Special Protection Area (SPA)
- Humber Estuary Special Area for Conservation (SAC)
- Humber Estuary Ramsar Site
- Greater Wash SPA
- Southern North Sea SAC
- Wash and North Norfolk Coast SAC
- Berwickshire and north Northumberland Coast SAC

Evidence for, or against, likely significant effects on the European site(s) and its qualifying feature(s) is detailed within the footnotes to the screening matrices below.

Matrix Key:

✓ = Likely significant effect **cannot** be excluded

✗ = Likely significant effect **can** be excluded

C = construction

O = operation

D = decommissioning

The decommissioning column in the matrices has been greyed out because the quay and infrastructure comprising imported fill material and services will not be decommissioned (UES Chapter 4). Other sections have been greyed out because the potential impacts were not relevant to individual features.

HRA Screening Matrix 1: Humber Estuary Special Protection Area

Name of European site and designation: Humber Estuary SPA									
EU Code: UK9006111									
Distance to project: 0 km									
European site features	Likely Effects of NSIP								
	Loss of foraging resources			Direct loss of supporting habitat			Displacement or disturbance though increased noise or lighting		
Effect	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
Stage of Development	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
Avocet (wintering)*	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Bittern (wintering)*	✗ ^a	✗ ^a		✗ ^a	✗ ^a		✗ ^a	✗ ^a	
Hen harrier (wintering)*	✗ ^a	✗ ^a		✗ ^a	✗ ^a		✗ ^a	✗ ^a	
Bar-tailed godwit (wintering)*	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Ruff (passage)*	✗ ^e	✗ ^e		✗ ^e	✗ ^e		✗ ^e	✗ ^e	
Bittern (breeding)*	✗ ^a	✗ ^a		✗ ^a	✗ ^a		✗ ^a	✗ ^a	
Marsh harrier (breeding)*	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Avocet (breeding)*	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Little tern (breeding)*	✗ ^a	✗ ^a		✗ ^a	✗ ^a		✗ ^a	✗ ^a	
Shelduck (wintering) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Knot (wintering) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Dunlin (wintering) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Black-tailed godwit (wintering) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Redshank (wintering) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Knot (passage) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Dunlin (passage) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Black-tailed godwit (passage) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	

Name of European site and designation: Humber Estuary SPA									
EU Code: UK9006111									
Distance to project: 0 km									
European site features	Likely Effects of NSIP								
<i>Effect</i>	<i>Loss of foraging resources</i>			<i>Direct loss of supporting habitat</i>			<i>Displacement or disturbance though increased noise or lighting</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
Redshank (passage) [§]	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Assemblage qualification – the site qualifies under article 4.2 of the Birds Directive because it regularly supports 153,394 individuals waterbirds in the non-breeding season ⁺	✓ ^{b-g}	✓ ^{b-g}		✓ ^{b-g}	✓ ^{b-g}		✓ ^{b-g}	✓ ^{b-g}	

* The SPA qualifies under article 4.1 of the Birds Directive as it is regularly used by 1% or more of the Great Britain populations of these Annex 1 species.

[§] The SPA qualifies under article 4.2 of the Birds Directive as it is regularly used by 1% or more of the biogeographical populations of these regularly occurring migratory species.

⁺ Species recorded include dark-bellied brent goose, shelduck, wigeon, teal, mallard, pochard, scaup, goldeneye, bittern, oystercatcher, avocet, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, ruff, black-tailed godwit, bar-tailed godwit, whimbrel, curlew, redshank, greenshank and turnstone.

With regard to cumulative effects, the following projects were screened in as potentially having an effect in combination with AMEP: Able Logistics Park, North Killingholme Generating Station, Hornsea Offshore Wind Farm (Zone 4) Project 2, Yorkshire Energy Park, Outstrays to Skeffling Managed Realignment Site and the South Humber Gateway Mitigation Areas (including Cress Marsh, Novartis and the former Huntsman Tioxide site). The SPA qualifying bird species for which LSE was not identified for AMEP alone were largely species that were not recorded as part of site-specific surveys or only records infrequently/in trivial numbers, and hence will not be affected at all by AMEP. In-combination ornithological effects were also concluded for the consented DCO not to occur because either (a) they were not reliant on the habitats lost (e.g. gull species recorded and others such as coot, heron and gadwall); or (b) there were only records of one or two birds; or they occurred in a such a small percentage of the Humber Estuary population as to be insignificant. That

remains the case for the proposed material change.

Evidence supporting conclusions:

- a.** Species not recorded in either the WeBS data for the site over the last five years or any other of the recent baseline surveys (Killingholme Marshes Foreshore [KMFS] and/or North Killingholme Haven Pits [NKHP]; see HRA Part 1 Report Tables 11 and 12) – arctic tern, bittern, barnacle goose, Bewick’s swan, black-throated diver, brent goose, common scoter, common tern, curlew sandpiper, eider, great white egret, garganey, goosander, green sandpiper, greenshank, greylag goose, goldeneye, great crested grebe, hen harrier, jack snipe, kittiwake, little stint, long-tailed duck, little tern, pink-footed goose, pintail, red-throated diver, roseate tern, sanderling, shag, scaup, spotted redshank, whooper swan, wood sandpiper, woodcock.
- b.** More than 1% of the population of the Humber Estuary uses the Killingholme Marshes Foreshore and is likely to be displaced (HRA tables 11 and 12).
- c.** Species not reliant on habitats at KMFS /NKHP – black-headed gull, common gull, coot, grey heron, herring gull, gadwall, great black-backed gull, lesser black-backed gull and Mediterranean gull.
- d.** Species that although they occurred in numbers $\geq 1\%$, their ecology makes them resilient to impacts (e.g. through their use of cover at NKHP) - moorhen, snipe.
- e.** Species for which only very low numbers (1-2 individuals) recorded during baseline surveys, or percentage of Humber Estuary population recorded is so low as to be insignificant – Canada goose, cormorant, golden plover, grey plover, little grebe, little egret, mute swan, oystercatcher, pochard, ruff, smew, tufted duck, turnstone, water rail, whimbrel, wigeon and yellow-legged gull.
- f.** Species only uses the North Haven Killingholme Pits – no habitat will be lost and there will be no disturbance from construction activities. No visual disturbance will occur during construction as North Killingholme Haven Pits are largely shielded by the existing bund which extends around the south of the Haven Pits, combined with the screen planting on top. In addition, large scale construction works will be more than 200m away from the NKHP (ES Chapter 11). Noise levels from piling are predicted to be no higher than predicted for the consented DCO (UES, Chapter 16: Noise). There will be no residual light impacts after mitigation (UES Chapter 11, section 11.6).
- g.** Assemblage species for which LSE could not be ruled out comprise curlew, lapwing, mallard, ringed plover, shoveler and teal, and for the following supporting habitats: coastal lagoons, freshwater and coastal grazing marsh, inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture), intertidal sand and mudflats, Salicornia and other annuals colonising mud and sand, saltmarsh (Atlantic salt meadows) and water column

HRA Screening Matrix 2: Humber Estuary Special Area of Conservation

Name of European site and designation: Humber Estuary SAC															
EU code: UK0030170															
Distance to project: 0 km															
European site features	Likely effects of NSIP														
	Disturbance/ displacement			Water quality changes leading to changes in aquatic ecology			Changes to intertidal habitat			Habitat loss			Estuary morphology, hydrodynamics & sedimentary regime		
Effect	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Atlantic saltmeadows				X ^c	X ^c		X ^c	X ^c		✓ ^b	✓ ^b		X ^c	X ^c	
Coastal lagoons (priority habitat)				X ^e	X ^e					X ^e	X ^e				
Dunes with <i>Hippophae rhamnoides</i>							X ^e	X ^e		X ^e	X ^e				
Embryonic shifting dunes							X ^e	X ^e		X ^e	X ^e				
Estuaries				X ^c	X ^c		X ^c	X ^c		✓ ^a	✓ ^a		X ^c	X ^c	
Mudflats & sandflats not covered by seawater at low tide				X ^c	X ^c		X ^c	X ^c		✓ ^{a,b}	✓ ^{a,b}		X ^c	X ^c	
Fixed dunes with herbaceous vegetation ('grey dunes'- priority habitat)							X ^e	X ^e		X ^e	X ^e				
Salicornia & other annuals colonizing mud & sand				X ^c	X ^c		X ^c	X ^c		✓ ^{a,b}	✓ ^{a,b}		X ^c	X ^c	
Sandbanks which are slightly covered by sea water all the time				X ^c	X ^c					X ^d	X ^d		X ^c	X ^c	
Shifting dunes along the				X ^e	X ^e		X ^e	X ^e		X ^e	X ^e				

Name of European site and designation: Humber Estuary SAC															
EU code: UK0030170															
Distance to project: 0 km															
European site features				Likely effects of NSIP											
<i>Effect</i>	Disturbance/ displacement			Water quality changes leading to changes in aquatic ecology			Changes to intertidal habitat			Habitat loss			Estuary morphology, hydrodynamics & sedimentary regime		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
shoreline with <i>Ammophila arenaria</i> ('white dunes')															
Grey seal	✓ ^f			✗ ^c	✗ ^c					✓-✗ ^f	✓-✗ ^f				
River lamprey	✓ ^g	✓ ^g		✗ ^c	✗ ^c					✓ ^g	✓ ^g				
Sea lamprey	✓ ^g	✓ ^g		✗ ^c	✗ ^c					✓ ^g	✓ ^g				

The qualifying interest habitats listed on the Humber Estuary SAC citation for which LSE was not identified for AMEP alone (e.g. sandbanks which are slightly covered by the sea at all times and various dune communities) will not be affected at all by AMEP, and hence an in-combination assessment for them is not necessary (this remains the same position as agreed for the consented DCO statement of common ground (ERM 2012)).

Evidence supporting conclusions:

- a.** Direct loss of 31.3 ha of mudflat, 10.4 ha of sub-tidal habitat and 1.9ha of *Salicornia* and other mud and sand colonizing annuals/saltmarsh (HRA report Part 1 Table 13 and UES Appendix 11.2).
- b.** Additional functional loss of 5.5 ha of mudflat, 2.2 ha of *Salicornia* and other mud and sand colonizing annuals/saltmarsh and 4.7 ha. of saltmarsh (through disturbance) (HRA report Part 1 Table 13 and UES Appendix 11.2).
- c.** Permanent loss or change to benthic communities will occur as a result of dredging but no loss of benthic diversity is expected and subtidal mudflats are widespread within the estuary (HRA report Part 1, paragraph 7.11).
- d.** Sandbanks are not immediately affected by project and indirect morphodynamic change as a result of the project is not likely to affect the extent of the sandbanks (HRA report Section 7).

- e.** No impacts on these species/communities as they do not occur within the development impact zone (HRA report Section 7).
- f.** No effect on pup production because Donna Nook is beyond airborne and waterborne noise disturbance limit. Underwater noise will create temporary disturbance, but this should not permanently prevent pups from entering estuary, or affect its food supply. Most seals will prefer to hunt for food at sea and so will not approach the AMEP site closely enough to risk auditory damage (HRA report Part 2 paragraphs 6.15-6.17). Mitigation for noise and vibration from piling is proposed (UES Chapter 11 paragraph 11.5.2).
- g.** There will be some loss of sub-tidal habitat which could affect lamprey. Adult migratory movement of lampreys could be affected by underwater noise (HRA report Part 2 paragraphs 6.18-6.19).

HRA Screening Matrix 3: Humber Estuary Ramsar site

Name of European site and designation: Humber Estuary Ramsar site									
Ramsar Code: UK11031									
Distance to project: 0 km									
European site features	Likely Effects of NSIP								
	Loss of foraging resources			Direct loss of supporting habitat			Displacement or disturbance though increased noise or lighting		
Effect	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
Stage of Development	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
Bar-tailed godwit (wintering)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Shelduck (wintering)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Knot (wintering)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Dunlin (wintering)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Black-tailed godwit (wintering)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Redshank (wintering)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Knot (passage)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Dunlin (passage)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Black-tailed godwit (passage)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Redshank (passage)	✓ ^b	✓ ^b		✓ ^b	✓ ^b		✓ ^b	✓ ^b	
Assemblage qualification – the site qualifies because it regularly supports >20,000 individuals waterbirds in the non-breedingseason ⁺	✓ ^{b-g}	✓ ^{b-g}		✓ ^{b-g}	✓ ^{b-g}		✓ ^{b-g}	✓ ^{b-g}	
Grey seal	✓ ^h	✓ ^h		✓ ^h	✓ ^h		✓ ^h	✓ ^h	

Name of European site and designation: Humber Estuary Ramsar site									
Ramsar Code: UK11031									
Distance to project: 0 km									
European site features	Likely Effects of NSIP								
<i>Effect</i>	<i>Loss of foraging resources</i>			<i>Direct loss of supporting habitat</i>			<i>Displacement or disturbance though increased noise or lighting</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
River lamprey	✓ ⁱ	✓ ⁱ		✓ ⁱ	✓ ⁱ		✓ ⁱ	✓ ⁱ	
Sea lamprey	✓ ⁱ	✓ ⁱ		✓ ⁱ	✓ ⁱ		✓ ⁱ	✓ ⁱ	
Natterjack toad	✗ ^a	✗ ^a		✗ ^a	✗ ^a		✗ ^a	✗ ^a	

+ Species recorded include dark-bellied brent goose, shelduck, wigeon, teal, mallard, pochard, scaup, goldeneye, bittern, oystercatcher, avocet, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, ruff, black-tailed godwit, bar-tailed godwit, whimbrel, curlew, redshank, greenshank and turnstone.

The Ramsar qualifying bird species for which LSE was not identified for AMEP alone were largely species that were not recorded as part of site-specific surveys or only records infrequently/in trivial numbers, and hence will not be affected at all by AMEP. In-combination ornithological effects were also concluded for the consented DCO not to occur because either (a) they were not reliant on the habitats lost (e.g. gull species recorded and others such as coot, heron and gadwall); or (b) there were only records of one or two birds; or they occurred in a such a small percentage of the Humber Estuary population as to be insignificant. That remains the case for the proposed material change.

Evidence supporting conclusions:

- a.** Species not recorded in either the WeBS data for the site over the last five years or any other of the recent baseline surveys (Killingholme Marshes Foreshore [KMFS] and/or North Killingholme Haven Pits [NKHP]; see HRA Part 1 Report Tables 11 and 12) – arctic tern, bittern, barnacle goose, Bewick’s swan, black-throated diver, brent goose, common scoter, common tern, curlew sandpiper, eider, great white egret, garganey, goosander, green sandpiper, greenshank, greylag goose, goldeneye, great crested grebe, hen harrier, jack snipe, kittiwake, little stint, long-tailed duck, little tern, pink-footed goose, pintail, red-throated diver, roseate tern, sanderling, shag, scaup, spotted redshank, whooper swan, wood sandpiper, woodcock.
- b.** More than 1% of the population of the Humber Estuary uses the Killingholme Marshes Foreshore and is likely to be displaced (HRA tables 11 and 12).

- c.** Species not reliant on habitats at KMFS /NKHP – black-headed gull, common gull, coot, grey heron, herring gull, gadwall, great black-backed gull, lesser black-backed gull and Mediterranean gull.
- d.** Species that although they occurred in numbers $\geq 1\%$ their ecology makes them resilient to impacts (e.g. through their use of cover at NKHP) - moorhen, snipe.
- e.** Species for which only very low numbers (1-2 individuals) recorded during baseline surveys, or percentage of Humber Estuary population recorded is so low as to be insignificant – Canada goose, cormorant, golden plover, grey plover, little grebe, little egret, mute swan, oystercatcher, pochard, ruff, smew, tufted duck, turnstone, water rail, whimbrel, wigeon and yellow-legged gull.
- f.** Species only uses the North Haven Killingholme Pits – no habitat will be lost and there will be no disturbance from construction activities. No visual disturbance will occur during construction as North Killingholme Haven Pits are largely shielded by the existing bund which extends around the south of the Haven Pits, combined with the screen planting on top. In addition, large scale construction works will be more than 200m away from the NKHP (ES Chapter 11). Noise levels from piling are predicted to be no higher than predicted for the consented DCO (UES, Chapter 16: Noise). There will be no residual light impacts after mitigation (UES Chapter 11, section 11.6).
- g.** Assemblage species for which LSE could not be ruled out comprise curlew, lapwing, mallard, ringed plover, shoveler and teal.
- h.** No effect on pup production because Donna Nook is beyond airborne and waterborne noise disturbance limit. Underwater noise will create temporary disturbance, but this should not permanently prevent pups from entering estuary, or affect its food supply. Most seals will prefer to hunt for food at sea and so will not approach the AMEP site closely enough to risk auditory damage (HRA report Part 2 paragraphs 6.15-6.17). Mitigation for noise and vibration from piling is proposed (UES Chapter 11 paragraph 11.5.2).
- i.** There will be some loss of sub-tidal habitat which could affect lamprey. Adult migratory movement of lampreys could be affected by underwater noise (HRA report Part 2 paragraphs 6.18-6.19).

Four other European Sites were identified in the screening process and were considered in the assessment, but no possible routes to any Likely Significant Effect were identified:

- **Greater Wash SPA** - this marine SPA lies 18km from the project at its nearest point. Its qualifying features comprise three breeding bird species (Sandwich tern, common tern and little tern) and three non-breeding species (red-throated diver, little gull and common scoter). Given its qualifying features, its distance from the Project and the nature of the proposed project, together with the clear lack of any ecological link, it can be safely concluded that there would be no LSE on this SPA, so it is not considered further in this report.
- **Southern North Sea SAC** - lies 35km from the project at its nearest point and has been designated for the Annex II species harbour porpoise only. The distance between the SAC and the project exceeds the maximum screening range of 26km (JNCC 2020). Given the available information, it can be safely concluded that there would be no potential for LSE on the harbour porpoise feature of the SAC and the site is not considered further in this report.
- **Wash and North Norfolk Coast SAC** - lies approximately 68km from the project at its nearest point and has been designated for a number of Annex I habitats, together with the Annex II species harbour seal as a primary reason for site selection. The distance between the SAC and the project is within the likely foraging range of harbour seal (120km, Thomson et al 2016, MMO 2018), though at sea usage data does not indicate any site connectivity between the SAC and the Humber (MMO 2018). Given the available information, it can be safely concluded that there would be no potential for LSE on the harbour seal feature of the SAC and the site is not considered further in this report.
- **Berwickshire and North Northumberland Coast SAC** - located about 210km from the project, includes the Annex II species grey seal as a primary reason for selection of the site. The distance between the SAC and the project lies well beyond the likely maximum foraging range of grey seal (145km, Thompson et al, 1996, MMO 2018). Further, at sea usage data does not indicate any site connectivity between the SAC and the Humber (MMO 2018). Given the available information, it can be safely concluded that there would be no potential for LSE on the grey seal feature of the SAC and the site is not considered further in this report.

STAGE 2: EFFECTS ON INTEGRITY

Likely significant effects have been identified for the following sites:

- Humber Estuary Special Area of Conservation
- Humber Estuary Special Protection Area
- Humber Estuary Ramsar site

These sites have been subject to further assessment in order to establish if the NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Matrix Key

✓ = Adverse effect on integrity **cannot** be excluded

✗ = Adverse effect on integrity **can** be excluded

C = construction

O = operation

D = decommissioning

HRA Integrity Matrix 4: Humber Estuary SPA summary of effects on site integrity

Name of European site and designation: Humber Estuary SPA						
EU Code: UK9006111						
Distance to project: 0 km						
European site features	Adverse Effect on Integrity					
Effect	Direct intertidal habitat loss		Indirect intertidal habitat loss through disturbance		Displacement from high tide roost site (NKHP)	
Stage of Development	C	O	C	O	C	O
Avocet (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Bar-tailed godwit (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d %
Marsh harrier (breeding)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Avocet (breeding)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Shelduck (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Knot (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Dunlin (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Black-tailed godwit (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Redshank (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Knot (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Dunlin (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Black-tailed godwit (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Redshank (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c

Name of European site and designation: Humber Estuary SPA						
EU Code: UK9006111						
Distance to project: 0 km						
European site features	Adverse Effect on Integrity					
<i>Effect</i>	<i>Direct intertidal habitat loss</i>		<i>Indirect intertidal habitat loss through disturbance</i>		<i>Displacement from high tide roost site (NKHP)</i>	
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>C</i>	<i>O</i>	<i>C</i>	<i>O</i>
Assemblage qualification – the site qualifies under article 4.2 of the Birds Directive because it regularly supports 153,394 individual waterbirds in the non-breeding season +	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^e	✓ ^e

+ Assemblage species for which LSE could not be ruled out comprised: curlew, lapwing, mallard, ringed plover, shoveler and teal

No decommissioning stage as project will not be decommissioned.

Evidence supporting conclusions:

- a.** Permanent direct loss amended to 43.6 ha (31.3 ha of intertidal mudflat and 10.4 ha of sub-tidal habitat, plus an additional loss of 1.9ha of colonising saltmarsh) - adverse effect on integrity (HRA Part 2 Table 12, UES Appendix 11.2).
- b.** Indirect functional habitat loss through disturbance to internationally important populations of regularly occurring Annex I species, migratory species and the waterfowl assemblage, due to the effective reduction in extent and distribution of the habitat supporting birds - adverse effect on integrity.
- c.** NKHP as a roost site by waders from KMFS, particularly black-tailed godwit, may be lost as roost after once mudflats at KMFS lost - adverse effect on integrity.
- d.** Species not using NKHP for roosting in more than non-trivial numbers.
- e.** Use by additional assemblage for roost on NKHP for three species: shoveler, mallard, teal and lapwing

HRA Integrity Matrix 5: Humber Estuary SAC summary of effects on site integrity

Name of European site and designation: Humber Estuary SAC				
EU Code: UK0030170				
Distance to NSIP: 0 km				
European sitefeatures	Adverse effect on integrity			
<i>Effect</i>	Disturbance/displacement		Habitat loss	
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>C</i>	<i>O</i>
Atlantic salt meadows (saltmarsh)			✓ a,b	✓ a,b
Estuaries			✓ a,b	✓ a,b
Mudflats and sandflatsnot covered by seawater at low tide			✓ a,b	✓ a,b
<i>Salicornia</i> and other annuals colonising mud and sand			✓ a,b	✓ a,b
Grey seal	✗ ^c		✗ ^c	✗ ^c
River lamprey	✗ ^c		✗ ^c	✗ ^c
Sea lamprey	✗ ^c		✗ ^c	✗ ^c

Evidence supporting conclusions:

- a.** Direct loss of 31.3 ha of mudflat, 10.4 ha of sub-tidal habitat and 1.9ha of *Salicornia* and other mud and sand colonizing annuals/saltmarsh (HRA report Part 1 Table 13 and UES Appendix 11.2).
- b.** Additional functional loss of 5.5 ha of mudflat, 2.2 ha of *Salicornia* and other mud and sand colonizing annuals/saltmarsh and 4.7 ha. of saltmarsh (through disturbance) (HRA report Table 13 and UES Appendix 11.2).
- c.** No evidence that the impact zone is of particular importance for grey seal, sea lamprey or river lamprey. No adverse effect concluded with the

implementation of the mitigation measures listed in UES Chapter 11 paragraph 11.5.2.

HRA Integrity Matrix 6: Humber Estuary Ramsar summary of effects on site integrity

Name of European site and designation: Humber Estuary SPA						
Ramsar Code: UK11031						
Distance to project: 0 km						
European sitefeatures	Adverse Effect on Integrity					
Effect	Direct intertidal habitat loss		Indirect intertidal habitat loss through disturbance		Displacement from high tide roost site (NKHP)	
Stage of Development	C	O	C	O	C	O
Bar-tailed godwit (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Shelduck (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Knot (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Dunlin (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Black-tailed godwit (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Redshank (wintering)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Knot (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✗ ^d	✗ ^d
Dunlin (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Black-tailed godwit (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Redshank (passage)	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^c	✓ ^c
Assemblage qualification – the site qualifies because it regularly supports >20,000 individuals waterbirds in the non-breedingseason ⁺	✓ ^a	✓ ^a	✓ ^b	✓ ^b	✓ ^e	✓ ^e
Grey seal	✗ ^k	✗ ^k	✗ ^k	✗ ^k		
Sea lamprey	✗ ^k	✗ ^k	✗ ^k	✗ ^k		
River lamprey	✗ ^k	✗ ^k	✗ ^k	✗ ^k		

⁺ Assemblage species for which LSE could not be ruled out comprised: curlew, lapwing, mallard, ringed plover, shoveler and teal

No decommissioning stage as project will not be decommissioned.

Evidence supporting conclusions:

- f.** Permanent direct loss amended to 43.6 ha (31.3 ha of intertidal mudflat and 10.4 ha of sub-tidal habitat, plus an additional loss of 1.9ha of colonising saltmarsh) - adverse effect on integrity (HRA Part 2 Table 12, and UES Appendix 11.2).
- g.** Indirect functional habitat loss through disturbance to internationally important populations of regularly occurring Annex I species, migratory species and the waterfowl assemblage, due to the effective reduction in extent and distribution of the habitat supporting birds - adverse effect on integrity.
- h.** NKHP as a roost site by waders from KMFS, particularly black-tailed godwit, may be lost as roost after once mudflats at KMFS lost - adverse effect on integrity.
- i.** Species not using NKHP for roosting in more than non-trivial numbers.
- j.** Use by additional assemblage for roost on NKHP for three species: shoveler, mallard, teal and lapwing
- k.** No evidence that the impact zone is of particular importance for grey seal, sea lamprey or river lamprey. No adverse effect concluded with the implementation of the mitigation measures listed in UES Chapter 11 paragraph 11.5.2.