Planning Act 2008
Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011
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Able Marine Energy Park

Material Change 2

Habitats Regulations Assessment Part 2

June 2021
Revision 1
BDB Pitmans

Executive Summary

The requirement for this Assessment is set out under Article 6 of Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna, (the 'Habitats Directive'). Article 6 requires that any plan or project which is not directly connected to, or necessary to the management of a Natura 2000 site and which is likely to have a significant effect on the conservation objectives of the site, either individually or in combination with other plans and projects, should be subject to an appropriate assessment.

Part 1 of the HRA report concluded that the Able Marine Energy Park (AMEP) project would have Likely Significant Effects (LSE) on eight qualifying species of the Humber Estuary Special Protected Area (SPA) and Ramsar site (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, knot, redshank and shelduck) and on six of the wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal).

LSE was also recorded for seven features of the Humber Estuary SAC/Ramsar site (estuarine habitats, intertidal mudflats, *Salicornia* and other annuals colonising mud and sand, Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*), grey seal, sea lamprey and river lamprey).

This report, forming Part 2 of the HRA, provides the competent authority with the information required to assess and review the information and make its determination of effect for an Appropriate Assessment.

It is concluded that the Project would continue to adversely affect the ecological integrity of the Humber Estuary SPA and Ramsar site, and the Humber Estuary SAC. Since the original HRA was carried out, the amount of mudflat has reduced in size as it has converted to saltmarsh; the new quay alignment proposed by the Material Change also removes a slightly smaller amount of mudflat. The compensation proposals remain the same and so it is concluded that the adverse effect on integrity would continue to be adequately compensated for.

1. Introduction and Background

1.1. This report forms part of the application for a material change to the consented Able Marine Energy Park (referred to hereafter as the 'Project'). It addresses the nature conservation issues raised by the Project, specifically in relation to the Conservation of Habitats and Species Regulations 2017, the 'Habitats Regulations'. It comprises the second part of the information to inform the Habitat Regulations Assessment (HRA) for the project, and provides information required to inform an Appropriate Assessment of the likely significant effects previously identified (in Part 1 LSE Test) on relevant sites of international nature conservation importance (i.e. the Humber Estuary SPA/Ramsar site/SAC).

1.2. Part 1 of the HRA report, the Likely Significant Effect report, concluded that the Project had the potential to affect the Humber Estuary SPA/Ramsar site/SAC but no others. It concluded Likely Significant Effects on eight qualifying species of the Humber Estuary Special Protected Area (SPA) and Ramsar site (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, redshank, shelduck and redshank) and on six of the wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal). LSE was also concluded for seven features of the Humber Estuary SAC; estuarine habitats, intertidal mudflats, *Salicornia* and other annuals colonising mud and sand, Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*), grey seal, sea lamprey and river lamprey.

1.3. As a result of the conclusions, it is necessary to undertake an Appropriate Assessment under the Habitats Regulations with regard to those Likely Significant Effects identified for these species. Sufficient information must be provided to allow the competent authority to assess and review the information and make its own determination of effect for an Appropriate Assessment. This report provides that required information. It reviews the Appropriate Assessment carried out for the original DCO application in light of the proposed material change and any changes that have occurred in the baseline ecological conditions.

2. Legislative Framework

2.1. Under the Habitats Regulations a development that is likely to have a significant effect on an SPA requires Appropriate Assessment under Regulation 63 of those Regulations.

2.2. The first test under the Habitats Regulations is whether the development is likely to have a significant effect on any of the populations of importance for which the site has been designated. If it is, as determined by the Competent Authority, then an Appropriate Assessment needs to be carried out by the Competent Authority to determine whether the development could adversely affect the ecological integrity of the SPA (National Planning Policy Framework (NPPF), Natural England's Standard: HRA Habitats Regulations Assessment[1] and the Planning Inspectorate (2017) Habitat Regulations Assessment Advice Note Ten. In this context ecological integrity is defined in "Managing Natura 2000 Sites" (European Communities 2000) as:

[1] http://publications.naturalengland.org.uk/publication/8740045

"the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified"

2.3. In Part 1 of the HRA report it was concluded that the proposed Project could result in Likely Significant Effects on the Humber Estuary SPA/Ramsar avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, redshank, shelduck, knot, curlew, lapwing, mallard, ringed plover, shoveler and teal populations (together with their Supporting Habitat; 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).

2.4. There would also be LSE for the Humber Estuary SAC/Ramsar, for its (a) estuarine habitats, (b) intertidal mudflats, (c) sandbanks which are slightly covered by seawater all the time; (d) *Salicornia* and other annuals colonising mud and sand; (e) Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*); (f) grey seal, (g) sea lamprey and (h) river lamprey populations.

3. Scope of this assessment

3.1. The scope of this report is to provide the information required to allow the competent authority to assess and review the information and make its own determination of effect for an Appropriate Assessment.

3.2. The first part of the HRA report identified the following features of the Humber Estuary SPA/Ramsar/SAC populations for which LSE could not be ruled out, and therefore require Appropriate Assessment:

Qualifying Species:

- Avocet;
- Marsh harrier;
- Bar-tailed godwit;
- Black-tailed godwit;
- Dunlin;
- Redshank;
- Knot; and
- Shelduck.

Additional Assemblage Species:

- Curlew;
- Lapwing;
- Mallard
- Ringed plover;
- Shoveler; and

- Teal.

Supporting Habitat:

- 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);
- Water column.

3.3. With regard to the potential effects on the Humber SAC, the following features have been identified for which LSE cannot be ruled out, and therefore require Appropriate Assessment:

- Estuarine habitats;
- Intertidal mudflats;
- *Salicornia* and other annuals colonising mud and sand;
- Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*);
- Grey seal;
- Sea lamprey; and
- River lamprey.

3.4. The likely significant effects identified above are the same habitats and species identified for the consented scheme and agreed between the Applicant, Natural England and the MMO as recorded in a Statement of Common Ground (SoCG) in August 2012[2].

3.5. This second part of the HRA therefore focuses on these species and their supporting habitats. The specific likely significant effects on the SAC (as agreed in the SoCG) were as follow:

- The effects of permanent loss of estuarine habitat from the footprint of the development.
- The effects of capital and maintenance dredging on estuarine habitats and intertidal mudflats.
- The effects of disposal of dredged material on estuarine habitats and intertidal mudflats.
- The effects of the permanent direct loss of intertidal mudflat from Killingholme Marshes Foreshore (KMFS) due to the footprint of the development.

[2] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001606-SOCG009%20TR030001%20Able%20Humber%20Ports%20Ltd%20Statement%20of%20Common%20Ground%20with%20Natural%20England%20and%20the%20Marine%20Management%20Organisation.pdf

- The effects of the permanent loss of saltmarsh.
- The effects of indirect habitat changes on qualifying habitats (estuarine habitat, intertidal mudflat and saltmarsh).
- The effects of underwater noise from piling on the feeding behaviour of grey seals and the migratory movements of river lamprey.

3.6. The specific likely significant effects on the SPA (as agreed in the SoCG) were as follows:

- The effects of the permanent direct loss of estuarine and specifically intertidal mudflats from KMFS on waterfowl that it supports.
- functional loss of 11.6 ha of mudflat habitat as a result of disturbance.
- The effects on the use of North Killingholme Haven Pits (NKHP) as a roost if the feeding areas on the mudflats at Killingholme Marches Foreshore (KMFS) are lost.
- The disturbance effects on birds due to piling activities during construction of the new quay.
- The disturbance effects on birds using NKHP from construction activities other than piling, and operation of AMEP.
- The effects of loss of terrestrial habitat within the AMEP site at North Killingholme which is used by SPA birds (predominantly curlew).

3.7. As for the original DCO assessment, the possibility of 'in combination' effects has been considered in relation to other proposed developments that could affect these SPA species. Consideration of present day in-combination effects is included within this report in relation to whether site integrity might adversely be affected by the Project in combination with any other developments in the region.

4. Consultation

4.1. This current document has been updated following engagement and statutory consultation with NE prior to the material change application being submitted.

5. Key Ornithological Interests: Baseline Conditions Update relating to SPA species

5.1. This section provides information on the baseline numbers, distribution and behaviour of the 14 bird species that have been taken forward for Appropriate Assessment, examining their use of the baseline survey area (defined to include all of the potential impact zone of the development).

5.2. The data sources on waterbird numbers within the area that could be affected by the proposed development are summarised in Table 1, which gives the peak count for each key species from each source. Overall, there is broad agreement between the sources with regard to the important waterbird populations in this zone.

Table 1. Overall peak waterbird (and marsh harrier) counts for the Killingholme Marshes Foreshore.

Species	SPA status*	ES TTTC	ES WeBS	% *Humber ES*	WeBS Core 15-19	WeBS Low 11-12	JBA 2017-18	ABP 2018-19	ABP 2019-20	NC 2021	% *Humber update*
Shelduck	Q	109	9	*2.4%*	75	138	168	76	56	34	*3.7%*
Shoveler	A	0	11	*8.9%*	53	0	4	0	0	0	*24.7%*
Mallard	A	14	13	*0.7%*	45	10	3	22	10	14	*4.3%*
Teal	A	12	13	*0.5%*	0	6	310	1064	828	1466	*39.6%*
Marsh harrier	Q	0	0	*0%*	0	0	0	0	0	0	*0%*
Avocet	Q	0	0	*0%*	49	8	36	104	251	205	*10.1%*
Lapwing	A	325	15	*1.8%*	0	3	665	2374	1254	1121	*14.4%*
Ringed plover	A	210	0	*17.0%*	68	4	39	19	24	2	*9.3%*
Curlew	A	158	61	*3.7%*	66	109	136	68	96	29	*5.1%*
Bar-tailed godwit	Q	123	0	*4.4%*	1	35	5	2	14	0	*2.4%*
Black-tailed godwit	Q	2566	50	*66.0%*	1524	816	538	2070	2183	170	*48.0%*
Dunlin	Q	1029	87	*5.7%*	326	289	503	680	512	232	*4.3%*
Knot	Q	0	1	*0%*	2	0	67	0	0	0	*0.4%*
Redshank	Q	540	83	*10.5%*	116	38	806	204	140	71	*28.0%*

** Q = qualifying species, A = assemblage species*

Table 2. Overall peak waterbird (and marsh harrier) counts for the North Killingholme Haven Pits.

Species	SPA status*	TTTC ES (IECS)	WeBS Core ES	% *Humber ES*	WeBS Core 15-19	WeBS Low 11-12	JBA 17-18	% *Humber update*
Shelduck	Q	9	7	*0.2%*	9	12	8	*0.3%*
Shoveler	A	61	29	*49.5%*	8	0	4	*3.7%*
Mallard	A	34	71	*3.4%*	13	7	40	*3.8%*
Teal	A	46	30	*1.7%*	0	11	104	*2.8%*
Marsh harrier	Q	0	0	*0%*	0	0	1	*>1%*
Avocet	Q	16	27	*5.3%*	54	5	44	*2.2%*
Lapwing	A	5	276	*1.6%*	0	0	269	*1.6%*
Ringed plover	A	0	1	*0.1%*	1	0	0	*0.1%*
Curlew	A	7	12	*0.3%*	4	4	4	*0.2%*
Bar-tailed godwit	Q	1	0	*0.0%*	0	0	2	*0.1%*
Black-tailed godwit	Q	3800	3338	*97.8%*	3336	2000	655	*73.4%*
Knot	Q	12	0	*0.0%*	84	0	0	*0.4%*
Dunlin	Q	270	380	*2.1%*	663	0	450	*4.2%*
Redshank	Q	249	215	*4.8%*	230	1	450	*15.6%*

** Q = qualifying species, A = assemblage species*

5.3. Tables 3 and 4 summarise the monthly pattern of occurrence from the **British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) core counts**, showing the peak count each month over the most recently available five-year period.

Table 3. BTO WeBS Core Count Monthly Peak counts 2015-16 – 2019-20, Killingholme Marshes Foreshore

Species	Jan	Feb	Mar	Apr	May	Aug	Sep	Oct	Nov	Dec
Shelduck	50	221	102	43	60	75	49	81	105	32
Shoveler	78	47	58	40	10	3	93	0	70	91
Mallard	47	23	16	8	18	58	73	43	46	98
Teal	428	273	150	63	2	12	67	298	303	296
Marsh Harrier	0	0	0	0	0	0	0	0	0	0
Avocet	0	13	131	33	24	0	0	48	2	15
Lapwing	1930	876	22	4	6	4	0	26	445	363
Ringed Plover	1	1	5	0	0	305	22	2	0	0
Curlew	68	66	105	16	13	48	53	65	97	120
Bar-tailed Godwit	1	0	0	0	0	0	0	0	0	6
Black-tailed Godwit	19	600	578	420	63	1650	2450	1120	1982	2400
Knot	0	0	0	0	0	0	0	12	0	0
Dunlin	245	400	202	0	61	6	680	91	609	1000
Redshank	166	154	58	210	0	52	82	101	203	180

Table 4. BTO WeBS Core Count Monthly Peak counts 2015-16 – 2019-20, North Killingholme Haven Pits

Species	Jan	Feb	Mar	Apr	May	Aug	Sep	Oct	Nov	Dec
Shelduck	6	24	14	13	9	16	7	1	1	0
Shoveler	27	34	19	7	0	5	1	34	20	46
Mallard	77	35	22	18	12	29	130	45	54	84
Teal	133	53	67	18	0	19	15	34	73	58
Marsh Harrier	0	0	0	0	0	0	0	0	0	0
Avocet	0	0	61	33	40	6	205	175	33	5
Lapwing	74	134	7	5	0	341	128	246	775	611
Ringed Plover	0	0	0	0	0	4	2	1	0	0
Curlew	5	22	7	12	3	16	6	7	8	7
Bar-tailed Godwit	0	0	0	0	0	0	0	0	0	0
Black-tailed Godwit	1	390	222	123	170	3350	5400	4600	2710	11
Knot	0	0	0	0	0	0	420	285	0	0
Dunlin	3	375	1	2	0	45	160	2950	1510	138
Redshank	91	232	251	43	1	451	345	157	355	240

5.4. The **BTO Low Tide Counts** from 2012-13 (the most recent available) are summarised in Tables 5 and 6. These show higher peak count than WeBS core counts which probably reflect the timing of the counts at low, rather than high, tide.

Table 5. BTO Low Tide Count totals for the Killingholme Marshes Foreshore sector (CH066), 2011-12.

Species	01/10/11	01/03/12	01/04/12	01/05/12	01/06/12	01/07/12	01/08/12	01/09/12	PEAK
Shelduck	0	12	2	1	2	0	0	0	**12**
Shoveler	0	0	0	0	0	0	0	0	**0**
Mallard	3	2	2	4	7	0	0	5	**7**
Teal	11	4	0	0	0	0	0	0	**11**
Marsh Harrier	0	0	0	0	0	0	0	0	**0**
Avocet	0	2	5	0	0	0	0	0	**5**
Lapwing	0	0	0	0	0	0	0	0	**0**
Ringed Plover	0	0	0	0	0	0	0	0	**0**
Curlew	4	3	0	0	0	0	0	0	**4**
Bar-tailed Godwit	0	0	0	0	0	0	0	0	**0**
Black-tailed Godwit	0	0	0	0	0	0	2000	650	**2000**
Dunlin	0	0	0	0	0	0	0	0	**0**
Knot	0	0	0	0	0	0	0	0	**0**
Redshank	0	0	0	0	1	0	0	0	**1**

Table 6. BTO Low Tide Count totals for the North Killingholme Haven Pits sector (CH017), 2011-12.

Species	01/10/11	01/03/12	01/04/12	01/05/12	01/06/12	01/07/12	01/08/12	01/09/12	PEAK
Shelduck	120	89	61	78	138	54	51	72	**138**
Shoveler	0	0	0	0	0	0	0	0	**0**
Mallard	0	8	6	4	10	0	10	5	**10**
Teal	0	6	0	0	0	0	0	0	**6**
Marsh Harrier	0	0	0	0	0	0	0	0	**0**
Avocet	0	8	0	0	0	0	0	0	**8**
Lapwing	0	0	0	0	0	0	0	3	**3**
Ringed Plover	0	2	0	4	0	0	0	0	**4**
Curlew	22	109	4	13	76	106	88	42	**109**
Bar-tailed Godwit	0	35	0	0	0	0	0	0	**35**
Black-tailed Godwit	530	219	0	0	288	816	1	21	**816**
Dunlin	289	0	3	0	0	0	0	71	**289**
Knot	0	0	0	0	0	0	0	0	**0**
Redshank	33	38	17	2	0	23	3	17	**38**

5.5. The results of the September 2017- May 2018 JBA surveys are summarised in Tables 7and 8.

Table 7. Monthly peak counts from Killingholme Marshes Foreshore, September 2017- May 2018 (Source: JBA 2019).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Shelduck	5	168	102	105	64	74	96	41	20	**168**
Shoveler	0	0	4	0	0	0	0	0	0	**4**
Mallard	1	3	2	0	0	0	0	3	0	**3**
Teal	29	310	298	71	122	173	133	32	0	**310**
Marsh Harrier	0	0	0	0	0	0	0	0	0	**0**
Avocet	0	36	16	0	0	15	34	15	4	**36**
Lapwing	0	200	212	342	665	233	18	2	1	**665**
Ringed plover	33	18	0	0	0	5	11	39	28	**39**
Curlew	4	35	70	60	65	119	136	30	2	**136**
Bar-tailed godwit	0	0	5	0	0	0	0	0	0	**5**
Black-tailed godwit	362	267	24	0	6	2	1	0	538	**538**
Dunlin	18	376	503	156	501	12	80	26	42	**503**
Knot	0	0	0	0	0	0	0	0	**0**	**0**
Redshank	70	806	284	292	370	135	115	111	0	**806**

Table 8. Monthly peak counts from North Killingholme Haven Pits, September 2017- May 2018 (Source: JBA 2019).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Shelduck	0	3	0	0	3	0	6	5	8	**8**
Shoveler	0	0	0	0	0	0	1	4	0	**4**
Mallard	9	7	40	18	15	4	8	2	0	**40**
Teal	2	29	24	53	104	23	45	24	0	**104**
Marsh harrier	0	1	0	0	0	0	1	1	0	**1**
Avocet	3	23	44	0	0	0	33	8	2	**44**
Lapwing	100	180	269	202	38	5	11	0	0	**269**
Ringed plover	0	0	0	0	0	0	0	0	0	**0**
Curlew	2	4	4	2	0	0	1	0	0	**4**
Bar-tailed godwit	0	0	0	0	0	0	2	0	0	**2**
Black-tailed godwit	655	500	2	0	0	0	0	20	1	**655**
Dunlin	20	450	32	24	0	0	0	0	0	**450**
Knot	0	0	0	0	0	0	0	0	**0**	**0**
Redshank	0	450	112	24	12	2	227	160	0	**450**

ABP DATA 2018-19 and 2019-20

5.6. Data were obtained from ABP from their monitoring surveys undertaken over several sites, including KMFS. The recent data from 2018-19 and 2019-20 for KMFS are summarised in Table 9, which gives the monthly peak counts over this survey period,

and the annual peaks for each of the two years. Of particular note are the higher numbers of teal, lapwing and avocet than recorded in previous surveys.

5.7. Further analysis of the use of KMFS by these three species is presented in Appendix UES11-3. The recent increased use of the site by these species is likely to have been influenced by recent changes in the intertidal habitat caused by accretion and consequential saltmarsh colonisation of former mudflat at the site. This has enabled some species to feed for longer through the tidal cycle and provides roosting habitat even through high tide states (at least during neap tides). Teal and avocet now make use of the site for both feeding and roosting in higher numbers than previously recorded, and there has been increased use by lapwing, though predominantly for roosting. The site continues to be important for black-tailed godwit for both feeding and roosting, particularly in autumn/early winter though also in spring (see Tables 3 and 4).

5.8. The existing scheme includes for the provision of compensation for habitat loss, and has been designed to compensate for the direct loss to development of 45ha. of intertidal and subtidal habitat and to and a further indirect loss of 11.6ha. of functional habitat through disturbance. 2 ha. of saltmarsh will also be lost to the compensation scheme at Cherry Cobb Sands to create a channel from the estuary into the site. As such, the habitat will not be totally lost but will become intertidal mudflat. As the compensation is based on replicating lost habitat on a like for like basis, there is no reason why it would not still be adequate to provide alternative habitat for the current bird numbers using the KMFS site.

Table 9. ABP Survey Data for Killingholme Marshes Foreshore sector, October-March 2018-19 and 2019-20: monthly peak counts and annual peaks.

Species	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2018-19	Peak 2019-20
Shelduck	31	44	56	48	51	76	**76**	**56**
Shoveler	0	0	0	0	0	0	**0**	**0**
Mallard	22	3	0	0	1	10	**22**	**10**
Teal	413	915	510	828	1064	888	**1064**	**828**
Marsh Harrier	0	0	0	0	0	0	**0**	**0**
Avocet	251	33	23	0	76	152	**104**	**251**
Lapwing	65	372	1642	1550	2374	6	**2374**	**1254**
Ringed plover	24	16	1	3	6	7	**19**	**24**
Curlew	49	62	96	68	63	63	**68**	**96**
Bar-tailed godwit	0	0	2	3	14	0	**2**	**14**
Black-tailed godwit	2183	22	220	162	372	271	**2070**	**2183**
Dunlin	455	512	659	680	381	136	**680**	**512**
Knot	0	0	0	0	0	0	**0**	**0**
Redshank	184	140	156	170	117	204	**204**	**140**

Able Data 2020-21

5.9. The data collected for Able UK by Nick Cutts during December 2020 – March 2021 from the Killingholme Marshes Foreshore are summarised in Table 10, where the total counts from each survey are presented.

Table 10. Count totals Killingholme Marshes Foreshore sector, December 2020- March 2021 (Source: Nick Cutts). *Note: partial coverage of north end of sector only during Dec-Jan).*

Species	09/12/2020	23/12/2020	07/01/2021	21/01/2021	04/02/2021	18/02/2021	05/03/2021	PEAK
Shelduck	8	0	2	0	20	34	13	34
Shoveler	0	0	0	0	0	0	0	0
Mallard	2	2	14	4	13	4	8	14
Teal	1466	994	470	520	431	212	354	1466
Marsh Harrier	0	0	0	0	0	0	0	0
Avocet	0	0	0	0	0	0	205	205
Lapwing	980	950	310	1121	240	0	0	1121
Ringed Plover	0	2	0	0	0	0	0	2
Curlew	6	3	11	2	28	26	29	29
Bar-tailed Godwit	0	0	0	0	0	0	0	0
Black-tailed Godwit	0	0	0	0	170	0	0	170
Dunlin	75	35	40	0	22	232	10	232
Knot	0	0	0	0	0	0	0	0
Redshank	13	71	42	7	53	52	43	71

Terrestrial Fields

5.10. As noted in the original ES (paragraphs 11.5.90 *et seq*.), some of the Killingholme Fields (the terrestrial fields located between the Humber Sea Terminal and Immingham Dock) are regularly used by waterbird species associated with the Humber Estuary. The fields were identified in the original ES as providing functionally linked land for the SPA, particularly for feeding and roosting curlew (with a peak count of 106, or 2.4% of the Humber Estuary population at that time). Redshank, black-tailed godwit, lapwing, redshank, whimbrel, and shelduck were also recorded during the original ES baseline surveys but in numbers below 1% of the Humber Estuary population.

5.11. A further survey in autumn 2016 (Cutts and Hemingway 2017[3]) found reduced curlew numbers present in the AMEP fields than previously (peak 15, equivalent to 0.6% of the Humber population), possibly because of their less favourable condition (with a

[3] Cutts, N. & K. Hemingway. 2017. *Able Curlew Fields and North Killingholme Frontage Ornithological Survey Programme Autumn 2016.* Report to Able UK Ltd. Institute of Estuarine & Coastal Studies, University of Hull.

longer sward developed as arable/improved grassland fields have reverted to neutral grassland). The same study reported a higher use (peak 110 curlew, 4.1% of the Humber population) on grassland on the adjacent operational Tank Farm (outside the AMEP site), over both high and low tide periods, so the species was simply preferring other nearby grassland at the time.

5.12. Additional to the reduction in suitability of the remaining terrestrial fields within the AMEP site, as the development is being implemented more of these fields are being removed, as reported also in the updated Phase 1 habitat survey in Appendix UES11-1). Overall, therefore, use of this part of the AMEP site by curlew is likely to continue to reduce, but has been mitigated for by the creation of alternative wetland habitat at the Halton Marshes Wet Grassland Mitigation Area (following agreement to transfer the mitigation measures to this site from the previous Mitigation Area A).

5.13. Furthermore, curlew use of the KMFS has not increased numerically since the original ES (see Table 1 above), though the area does hold a higher proportion of the Humber population (5% compared with 3.7% previously), as a result of a decline in the curlew population elsewhere in the estuary.

6. Key Ecological Interests: Baseline Conditions Update relating to SAC species and habitats

Estuarine Habitats

6.1. A range of mud, sands and gravels are present within the subtidal area of middle estuary, these with associated biological communities, and with biotopes describing these in Chapter 10 Table 10-2 of the Updated ES.

6.2. The area within which AMEP will directly impact tends to exhibit muddier sediments with muddy sands or sandy muds sometimes with small quantities (<1%) of gravel (slightly gravelly sandy mud or slightly gravelly muddy sand). Additional surrounding habitats that could be affected by the development include included muddy habitats including sandy muds or muddy sands (or slightly gravelly muddy sand/sandy muds) and two sandier sites (Allen, 2020: Appendix UES10-4).

6.3. The direct impact and surrounding areas were also characterised by low numbers of *Capitella* sp. but included modest numbers of species such *Corophium volutator* and *Streblospio shrubsolii*. However, many of the taxa present in these areas were recorded at relatively few sites. In terms of biomass the direct impact area was dominated by *Carcinus maenas* (1 site only), *Limecola balthica, Corophium volutator, Arenicolidae* sp. (*Arenicola marina*) and *Gammarus salinus* these species collectively accounting for over 90% of total biomass.

Intertidal mudflats

6.4. Allen (2006) describes the intertidal benthic community of the middle estuary south shore to be less diverse than in outer estuary, being dominated by *Corophium volutator, Streblospio shrubsolii, Hediste diversicolor* and the Spionid polychaete *Pygospio elegans*. Low abundances of *Macoma balthica* were also present with numbers increasing towards the outer estuary and in mid shore areas. These

communities are typical for an estuarine habitat and primarily structured according to salinity, shore height and presumably sediment type. Whilst some communities are relatively impoverished these appear to be typical for such habitats and some variation in community structure is expected in a dynamic estuary.

6.5. The increase in intertidal elevation and colonisation by saltmarsh communities at the AMEP site has led to a loss of mudflat extent and influenced the distribution of several key species of invertebrate such as *Hediste diversicolor*. However, in the muddier areas, the 2015 and 2016 surveys (UES Appendices UES10-3 and UES10-4) recorded a broadly similar assemblage to that recorded in the baseline of 2010 for the original ES.

6.6. The original ES baseline commonly recorded *Tubificoides benedii*, Nematoda, the polychaete *Streblospio shrubsolii* and the amphipod crustacean *Corophium volutator* from the intertidal survey. The bivalve *Macoma* (*Limecola*) *balthica* was widespread and the polychaete *Hediste diversicolor* was present at most of the upper shore stations.

6.7. A broadly similar intertidal invertebrate assemblage was recorded in 2015 and 2016 at the AMEP site (Appendices UES10-3 and UES10-4), although with some restrictions in the extent of the typical intertidal mudflat community correlating to saltmarsh community colonisation.

6.8. It is considered likely that the increase in elevation and saltmarsh colonisation seen in 2015 and 2016 has continued to the present day, with a substantial extent of the AMEP development intertidal frontage now featuring saltmarsh in the upper to mid shore. As such, it is likely that the extent and/or composition of the intertidal invertebrate community recorded in this area will have altered in response to the increase in elevation and associated saltmarsh development.

6.9. The 2016 subtidal survey (Allen, 2020: Appendix UES10-4) reported the subtidal bed to feature a very impoverished faunal community typical for the middle Humber and in line with findings from previous surveys (as described in the original ES and in the Updated ES supporting documentation Appendices UES10-3 and UES10-4), including species such as *Capitella* sp., *Arenicolidae* sp. (*Arenicola marina*), *Eurydice pulchra, Gammarus salinus*, *Corophium volutator*, *Nematoda* spp., *Polydora cornuta, Pygospio elegans, Streblospio shrubsolii* and *Tubificoides benedii*.

6.10. Allen (2016) concluded that the infaunal communities recorded during the 2015 subtidal survey around the potential dredge disposal areas were typical for dynamic mud, sand or mixed sediment subtidal sediments in the mid to outer Humber Estuary.

6.11. On this basis, it is concluded that there is the probability of natural variation in community composition over time, reflecting changes in estuarine dynamics, but given the community adaptation and continued active utilisation of the dredge deposit grounds, no significant change outwith these parameters is expected.

Saltmarsh: (1) Salicornia and other annuals colonising mud and sand, and (2) Atlantic sea meadows (Glauco-Puccinallietalia maritimae)

6.12. At the time of the original baseline work, there was little or no evidence of substantial saltmarsh vegetation occurring across the central mudflat of the AMEP development, other than some fringing communities on the upper shore adjacent to the flood bank, upstream adjacent to North Killingholme.

6.13. However, the potential for accretion of the intertidal mudflat and associated increase in elevation and potential colonisation by saltmarsh was identified in the Examining Authorities Report (2013).

6.14. A clear expansion in the extent of saltmarsh communities e.g. as surveyed in 2020 and 2021 (Appendix UES10-1: Thomson Environmental Consultants, 2020. North Killingholme Marshes Saltmarsh Survey 2020), has occurred on the intertidal frontage of the proposed AMEP development site since the original ES baseline work of the DCO.

Grey Seal

6.15. Due to the low frequency of occurrence and high mobility of marine mammals in the low to middle estuary, dedicated surveys were not conducted for the original ES nor to support this material amendment. The occasional presence of grey seal in the vicinity of the AMEP development relates to the potential presence of prey items, and the populations of the species in the wider region e.g. Southern North Sea.

River Lamprey and Sea Lamprey

6.16. The direct comparison between the different fish baseline data is limited by the use of different sampling methods, with different selectivity, used in different habitats and with variable sampling effort (e.g. within and between seasons). Also, the natural variability in population dynamics (e.g. inter-annual fluctuations in recruitment) may affect the fish species occurrence and abundance in the catches over time.

6.17. Considering these factors, and in the context of the wider knowledge of fish assemblages and their distribution in the lower Humber Estuary, there were no significant changes in the baseline for fish at the AMEP site. There was no evidence of preferred use of these areas by migratory fish, confirming earlier observations. Only a single river lamprey was recorded, during the November-December 2013 subtidal otter trawling (from the control area north of the AMEP site; see Updated ES Table 10-10), and no sea lamprey.

7. Ecological Integrity Test

7.1. As there has been deemed to be a likely significant effect on the SPA/SAC (as has been concluded for the AMEP Project Material Change in Part 1 of the HRA report), then the Competent Authority will be required to decide whether the plan or project would adversely affect the integrity of the site, in the light of the relevant conservation objectives. An adverse effect on integrity is one that is likely to prevent the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation.

7.2. The Conservation Objectives for the Humber Estuary SPA[4] are as follows:

[4] Source: Natural England web site: http://publications.naturalengland.org.uk/publication/5382184353398784

"Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The population of each of the qualifying features, and,*
- *The distribution of the qualifying features within the site."*

7.3. The conservation objectives for the Humber Estuary SAC are as follows:

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;
  - The extent and distribution of qualifying natural habitats and habitats of qualifying species
  - The structure and function (including typical species) of qualifying natural habitats
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which qualifying natural habitats and habitats of qualifying species rely
  - The populations of qualifying species, and,
  - The distribution of qualifying species within the site.

7.4. Site-specific objectives were also considered in the assessment for all LSE species/communities, as set out in Natural England's Supplementary Advice on Conservation Objectives for the Humber Estuary SPA[5] and for the Humber Estuary SAC[6].

8. Assessment of Effects on SPA, Ramsar and SAC Species and Communities

Construction Phase

8.1. As set out in the original ES and the Updated ES Aquatic Ecology and Terrestrial Ecology and Nature Conservation chapters (Chapters 10 and 11 of both documents), the main potential effects of the construction of the Development on SPA/Ramsar ornithological features are considered to be:

- Direct loss of intertidal habitat within the Humber Estuary SPA/Ramsar through construction of project infrastructure;

[5] https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9006111&SiteName=humber&SiteNameDisplay=Humber+Estuary+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=15

[6] https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030170&SiteName=humber&SiteNameDisplay=Humber+Estuary+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=8,8

- Indirect Loss of intertidal habitat within the Humber Estuary SPA/Ramsar;
- Loss of fish habitat within the Humber Estuary SPA/Ramsar that could affect bird foraging;
- Loss of terrestrial habitat functionally linked to the Humber Estuary SPA/SAC;
- Disturbance to birds and fish (noise and visual);
- Underwater noise disturbance affecting fish;
- Dredging and other construction effects on water quality;
- Disposal of dredge spoil.
- Cumulative effects.

8.2. The main potential effects of the construction of the Development on SAC/Ramsar ecological features are considered to be:

- Direct loss of intertidal habitat within the Humber Estuary SAC/Ramsar through construction of project infrastructure;
- Indirect Loss of intertidal habitat within the Humber Estuary SAC/Ramsar;
- Loss of fish habitat within the Humber Estuary SAC/Ramsar;
- Disturbance to fish and marine mammals (noise and visual);
- Underwater noise disturbance affecting fish and marine mammals;
- Dredging and other construction effects on water quality;
- Disposal of dredge spoil.
- Cumulative effects.

8.3. Each of these is considered in relation to the Integrity Test, in conjunction with the specific pressures identified by Natural England in their Advice on Operations relating to 'Construction of Port and Harbour Structures'. The following are given by NE as medium-high risk category:

- Above water noise
- Abrasion/disturbance of the substrate on the surface of the seabed
- Barrier to species movement
- Changes in suspended solids (water clarity)
- Emergence regime changes, including tidal level change considerations
- Habitat structure changes - removal of substratum (extraction)
- Introduction of light
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Physical change (to another seabed type)
- Physical change (to another sediment type)
- Physical loss (to land or freshwater habitat)
- Removal of non-target species

- Smothering and siltation rate changes (Heavy)
- Smothering and siltation rate changes (Light)
- Underwater noise changes
- Vibration
- Visual disturbance
- Water flow (tidal current) changes, including sediment transport considerations
- Wave exposure changes.

8.4. Low risk pressures during construction included the following, though it should be noted that NE states for these that "*Unless there are evidence-based case or site-specific factors that increase the risk, or uncertainty on the level of pressure on a receptor, this pressure generally does not occur at a level of concern and should not require consideration as part of an assessment*." These have therefore been considered, but it was concluded that there are no factors at this site that would increase the risk above low, so they are not considered as possible risks to site integrity.

- Collision above water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
- Collision below water with static or moving objects not naturally found in the marine environment
- Deoxygenation
- Hydrocarbon & PAH contamination
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of invasive non-indigenous species (INIS)
- Nutrient enrichment
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
- Transition elements & organo-metal (e.g. TBT) contamination.

Change in Construction Phase Effects from the proposed Material Change

8.5. The key changes from the consented scheme affecting the Humber Estuary SPA, SAC and Ramsar site are summarised in Table 11, and relate to changes in habitat loss from the updated scheme.

Table 11. Habitat loss from the consented and the updated Projects.

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
Direct - reclamation to construct quay	1130	Estuaries	13.5	10.4	Within the reclamation site. The set back berth has reduced the area of subtidal loss

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
	1140	Mudflat/sandflat not covered by seawater at low tide	31.5	31.3	Within the reclamation site - supports a range of waterfowl.
	1310/1330	Salicornia and other mud and sand colonizing annuals/saltmarsh	0	1.9	New loss of this community as has recently colonised this area.
Indirect functional loss through disturbance	1140	Mudflat/sandflat not covered by seawater at low tide	11.6	5.5	To the south of the reclamation site - potentially disturbed by operational activity on the quay following completion of construction (275m disturbance zone)
	1310/1330	Salicornia and other mud and sand colonizing annuals	0	2.2	New loss of this community as has recently colonised this area.
	1310/1330	Saltmarsh	0	4.7	New loss of this community as has recently colonised this area.
Compensation Area Changes	1310/1330	Saltmarsh	1.8	2.0	At Cherry Cobb Sands to form the channel across the foreshore from the existing flood defence to Cherry Cobb Sands Creek - this habitat would become mudflat offsetting the loss of Habitat type 1140. Area increased from 1.8 to 2ha in SoCG.

8.6. The principal changes in direct habitat loss from the reclamation works to construct the quay results from two processes. Firstly, a small reduction in the reclamation area through the quay redesign (resulting in a small reduction in the loss of estuary and mudflat habitat). Secondly, there has been colonisation of the mudflat by saltmarsh, which has resulted in an increase in the loss of saltmarsh habitat. The latter has also resulted in changes to the indirect functional loss of habitat through disturbance, with a reduced loss of mudflat and increased loss of saltmarsh.

8.7. There would be no change in the extent of the noise disturbance resulting from the proposed material change as the quay piling will be no closer as consequence of the proposed changes (Updated ES, Chapter 16). There would be some change to the planned lighting regime in order to accommodate the new quay alignment but lighting levels are subject to approval under Schedule 11 of the extant DCO, Requirement 24 and require consultation with Natural England before being approved by the local planning authority.

Operational Phase

8.8. The main potential effects of the operation of the Development on birds are considered to be:

- Disturbance to birds (noise and visual, including lighting);
- Maintenance dredging, including boat disturbance;
- Lighting impacts; and
- Cumulative effects.

8.9. The only operational phase pressure identified by NE in the medium-high risk category is the introduction of light, so specific consideration of this has been made in this assessment.

8.10. Low risk pressures identified by NE relating to 'Operation of Ports and Harbours' comprise the following, though as for the low risk construction phase pressures, there are not any factors at this site that would increase the risk above low, so they are not considered as possible risks to site integrity.

- Above water noise
- Abrasion/disturbance of the substrate on the surface of the seabed
- Barrier to species movement
- Changes in suspended solids (water clarity)
- Collision above water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
- Collision below water with static or moving objects not naturally found in the marine environment
- Hydrocarbon & PAH contamination
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of invasive non-indigenous species (INIS)
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Smothering and siltation rate changes (Light)
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
- Transition elements & organo-metal (e.g. TBT) contamination
- Underwater noise changes
- Visual disturbance

Change in Operational Phase Effects from the proposed Material Change

8.11. The quay redesign will not change the operational phase effects of the Development. The recent colonisation of the mudflat by saltmarsh has resulted in changes to the indirect functional loss of habitat through disturbance that will occur during the operational phase, with a reduced loss of mudflat and increased loss of saltmarsh.

8.12. There would be no change in the extent of the operational noise disturbance resulting from the proposed material change. There would be some change to the planned lighting regime in order to accommodate the new quay alignment, but lighting levels are subject to approval under Schedule 11 of the extant DCO, Requirement 24 and require consultation with Natural England before being approved by the local planning authority.

8.13. There will be indirect functional habitat loss through disturbance during the operational phase of the development, likely displacing 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. As a result, **adverse effect on integrity** has been concluded for this functional loss.

8.14. The Project (including the proposed Material Change) would not, subject to the mitigation secured by the DCO, have any other operational phase effects on any SPA or SAC species/community, so would, following the implementation of the agreed mitigation measures, result in **no adverse effect on integrity**, with regard to any other operational phase impacts.

In-combination Assessment

8.15. Plans and projects considered in-combination with the material change application are as follows (those considered in the original application were as set out in the HRA information Report at Section 4.12):

- Able Logistics Park – PA/2009/0600 – North Lincolnshire Council;
- North Killingholme Generating Station (DCO Application);
- Hornsea Offshore Wind Farm (Zone 4) Project 2 (DCO Application);
- Yorkshire Energy Park (17/01673/STOUTE – East Riding of Yorkshire Council);
- Outstrays to Skeffling Managed Realignment Site;
- South Humber Gateway Mitigation Areas (including Cress Marsh, Novartis and the former Huntsman Tioxide site).

8.16. Consideration has also been given to the possible inter-related effects of construction and operation on the Project site at the same time (as parts may become operational at the same time as construction continues in other parts). However, the greater magnitude effects of the construction phase would mean that the operational phase impacts would not materially increase those, even if they were occurring simultaneously within the site.

8.17. With mitigation measures implemented (as set out in Section 7), it is likely that cumulative / in-combination impacts across developments will be reduced to minor levels, and that there would be **no adverse effect on integrity** for these effects for the proposed material change (taking into account the results of the cumulative assessment for the projects listed above, the proposed changes to the AMEP development and the updated ecological baseline).

Assessment Update

8.18. The shadow Appropriate Assessment for the Humber Estuary SAC is summarised in Table 12, comparing the outcome of the DCO Appropriate Assessment with the assessment for the updated Project incorporating Material Change 2.

8.19. **Adverse effect on integrity** was concluded for loss of sub-tidal estuarine habitat, loss of intertidal mudflat and loss of saltmarsh.

8.20. **No adverse effect on integrity** was found for disturbance to grey seals and river and sea lampreys.

8.21. The shadow Appropriate Assessment for the Humber Estuary SPA is summarised in Table 13, comparing the outcome of the DCO Appropriate Assessment with the assessment for the updated Project incorporating Material Change 2.

8.22. **Adverse effect on integrity** was concluded for all eight qualifying species of the Humber Estuary Special Protected Area (SPA) and Ramsar site (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, knot, redshank and shelduck) and for the six wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal) for which LSE was identified, though direct loss of estuarine habitat (including intertidal mud, saltmarsh and sub-tidal), and through indirect functional loss as a result of disturbance. It could also not be ruled out that the continued use of NKHP as a roost site by waders from KMFS, particularly black-tailed godwit, could be affected once mudflats at KMFS were lost.

8.23. **No adverse effect on integrity** was found for (1) loss of terrestrial habitat (due to the provision of replacement foraging and roosting habitat in Halton Marshes Wet Grassland Mitigation Area), for (2) disturbance within NKHP (as a result of the protection from disturbance as set out in the extant DCO at Schedule 11 Requirement 42), for (3) lighting effects on NKHP (through implementation of the agreed lighting mitigation), and (4) from piling (based on the adoption of agreed measures for managing piling activities, are set out in Schedule 8 paragraphs 37-43 of the extant DCO).

Table 12. Shadow Appropriate Assessment for the Humber Estuary SAC/Ramsar: ES/SoCG and update in light of the proposed material change.

Issue	Assessment (ES, SoCG)	Impact of Material Change and Updated Baseline	Assessment update (after material change)
Effects on estuarine habitat (H1130)	Permanent direct losses of 45 ha (31.5 ha of intertidal mudflat and 13.5 ha of sub-tidal habitat) and medium and longer term changes to habitat arising from the quay presence (see *ES Annex B*). The effects result in an adverse effect due to a reduction in the extent and distribution of habitat for which no mitigation is possible. The effects of capital and maintenance dredging and disposal on sub-tidal habitat and benthic communitiesare subject to ongoing discussions. The effects on the wider estuary have been assessed (Deltares, 2012). EA has indicated that an allowanceshould be made for the change of 5 ha of intertidal habitat to sub-tidal. AHPL's has therefore, taken a precautionary approach and accepted this view and included 10 ha of intertidal mudflat in the habitat provided as compensation taking account of the 2:1 ratio for compensatory mudflat (see *ES Table 5.1* and *Annex B*). Migratory movements of lamprey will not be affected by the presence of the new quay as described in *Annex 10.2* of the ES	Quay re-design has reduced direct loss of estuarine habitat. Additionally, habitat change resulting primarily from effects of the Humber International Terminal (HIT) since the original ES (accretion of saltmarsh) has meant that the habitats affected will include more saltmarsh and less intertidal mudflat	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), but no change to conclusions reached, i.e. adverse effect on integrity.
Effects on intertidal mudflat (H1140)	Adverse effect concluded because of permanent direct loss for the new quay (31.5 ha), and in the longer term the indirect effects of the quay will result in the transformation of intertidal mudflat to saltmarsh (*ES Annex B*). These effects result in a reduction in the extent and distribution of intertidal mudflat, for which no mitigation is possible. The effects on intertidal mudflat as part of the effects	Quay re-design has reduced direct loss of intertidal habitat. Additionally, some of the loss that was intertidal mudflat previously has now been colonised by saltmarsh, so	Permanent loss of intertidal mudflat reduced to 31.3ha, but conclusions unchanged, i.e. adverse effect on integrity.

Issue	Assessment (ES, SoCG)	Impact of Material Change and Updated Baseline	Assessment update (after material change)
	on the wider estuary are as described above.	intertidal mudflat loss is reduced further.	
Effects on saltmarsh (H1330 / H1310)	Adverse effect concluded as a reduction in the extent of saltmarsh (2 ha) occurs for which no mitigation is possible.	Loss of saltmarsh increased as a result of recent colonisation of the direct habitat loss area for the quay.	Additional direct loss of 1.9ha of saltmarsh (as result of colonisation of mudflat), but no change to conclusion, i.e. adverse effect on integrity.
Disturbance to grey seals and river and sea lampreys (S1364, S1095 and S1099)	No adverse effect concluded with the implementation of the mitigation measures listed in *ES Section 4.4*.	Change to quay design.	No change to previous conclusion of no adverse effect on integrity.

Table 13. Shadow Appropriate Assessment for the Humber Estuary SPA/Ramsar: ES/SoCG and update in light of the proposed material change

Issue	Assessment (ES, SoCG)	Relevant material change	Assessment update (material change)
Effects on estuarine habitat (H1130)	Adverse effect concluded on internationally important populations of regularly occurring *Annex I* species,migratory species and the waterfowl assemblage, due to the reduction in extent and distribution of the habitat supporting birds. No mitigation is possible	Quay re-design has reduced direct loss of estuarine habitat. Additionally, habitat change resulting primarily from effects of the Humber International Terminal (HIT) since the original ES (accretion of saltmarsh) has meant that the habitats affected will include more saltmarsh and less intertidal mudflat	No change in conclusion - adverse effect on integrity.

Issue	Assessment (ES, SoCG)	Relevant material change	Assessment update (material change)
Effects on intertidal mudflat (H1140)	Adverse effect concluded on internationally important populations of regularly occurring *Annex I* species, migratory species and the waterfowl assemblage, due to the reduction in extent and distribution of the habitat supporting birds. No mitigation is possible	Quay re-design has reduced direct loss of intertidal habitat. Additionally, some of the take area that was intertidal previously has now been colonised by saltmarsh, so intertidal loss reduced further.	No change in conclusion - adverse effect on integrity.
	Cannot confirm the continued use of NKHP as a roost site by waders from KMFS, particularly black-tailed godwit, once mudflats at KMFS lost. The effect cannot be mitigated. Therefore, as scientific doubt remains as to the absence of adverse effects, the competent authority cannot be certain that the scheme will not adversely affect the integrity of the European site.	No change - no construction proposed any closer to the NKHP than DCO	No change in conclusion - adverse effect on integrity.
Loss of terrestrial habitat	No adverse effect due to the provision of replacement foraging and roosting habitat in Mitigation Area A.	No change. Halton Marshes Wet Grassland Mitigation Area has been implemented as a substitute for Mitigation Area A	No change in conclusion - no adverse effect on integrity.
Disturbance effects on birds	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. No mitigation is possible.	Some of the mudflat that was intertidal previously has now been colonised by saltmarsh, so intertidal loss reduced.	No change in conclusion - adverse effect on integrity.
	No adverse effect on birds within NKHP based on a commitment to limit noise at site boundary.	No change.	No change in conclusion - no adverse effect on integrity
	No adverse effects on birds using Mitigation Area A based on commitments to noise limits and to distance limits and storage heights within the operational buffer.	No change. Halton Marshes Wet Grassland Mitigation Area has been implemented as a substitute for Mitigation Area A	No change in conclusion - no adverse effect on integrity

Issue	Assessment (ES, SoCG)	Relevant material change	Assessment update (material change)
	No adverse effects on birds at NKHP from lighting within the AMEP site as described in *Supplementary Information EX19.1 - Lighting Lux Plans.*	No change.	No change in conclusion - no adverse effect on integrity
	No adverse effects from piling based on adoption of measures agreed in the piling methods statement, which are set out in Schedule 8 of the DCO	No change.	No change in conclusion - no adverse effect on integrity

9. Mitigation and Compensation

9.1. The mitigation and compensation measures identified as part of the DCO remain suitable and fit for purpose without requirement for modification. These include:

- provisions for mitigatory and compensatory habitat, including habitats (with associated functional attributes) to be created at the Cherry Cobb Sands compensation site in order to address losses in the intertidal and subtidal habitat and function in and around the AMEP quay.
- provisions under Schedule 8 of the DCO to ensure functional aspects of the Humber Estuary SAC are maintained, including constraints on aspects of works timing to avoid reduce impacts from underwater noise and vibration from piling work, provision of a Marine Mammal Observer to ensure no impacts to marine mammals present in the vicinity of the construction works, and reduce noise and lighting impacts to birds.
- provisions to provide greenfield terrestrial foraging and roosting habitat for birds from the SPA assemblage (predominantly curlew), to replace that lost to AMEP and to reduce noise and lighting impacts to birds.

9.2. Further detail on the agreed mitigation measures pertaining to the development are provided in the original Terrestrial Ecology and Nature Conservation ES chapter[7] and the original DCO (Appendix UES1-1). Measures will be secured through the approval of various plans and method statements as specified in Schedule 8 and 11 of the extant DCO.

9.3. These requirements have been reviewed in light of the proposed material change and the updated baseline, and it has been concluded that they all would still be required for the material change, but that none would need any modification.

9.4. It is noted that a separate application for a non-material change to the DCO to move the location of Mitigation A to Halton Marshes has been approved, though this does not affect the outcome of the Appropriate Assessment.

10. Summary and Conclusion

10.1. This report has provided baseline data and analysis to inform the assessment process should the Competent Authority determine that an Appropriate Assessment is required (as was concluded in the Likely Significant Effects report), drawing on information provided in the Project ES.

10.2. The SPA and SAC Conservation Objectives (as set out in Section 6 above) against which this assessment needs to be made seek to maintain the habitats of the qualifying species in favourable condition.

[7] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000315-11%20-%20Ecology%20and%20Nature%20Conservation.pdf

10.3. The predicted effects of the Project on the relevant SPA and SAC qualifying habitat and assemblage species in the context of the Habitats Regulations have been assessed above, and are summarised in Tables 12 (construction phase) and Table 13 (operational phase). The predicted effects have been assessed against the SPA and SAC Conservation Objectives, to determine whether there would be any adverse effect pf the development on the ecological integrity of the Humber Estuary SPA/SAC/Ramsar site.

10.4. The same conclusion was reached for the material change as for the original DCO application, i.e. that the AMEP project would have an adverse effect on the ecological integrity of the SPA and of the SAC, through direct loss of habitat and through indirect functional loss as a result of disturbance. The residual effects of the AMEP proposals alone, taking account of the mitigation, will have an adverse effect on the integrity of the Humber Estuary SAC, SPA and Ramsar site due to the reduction in the extent and distribution of qualifying interest habitats (estuarine habitats, intertidal mudflat and saltmarsh), and a deterioration in the quality of these habitats for qualifying bird species. In addition, there will be significant disturbance to these bird species, and their populations and distribution will be affected.

10.5. In summarising the likely effects on the qualifying populations/communities for the SPA/SAC/Ramsar site, the assessment process illustrated in the flow diagram in the Planning Inspectorate's Advice Note 10 (reproduced in Figure 1 of Part 1 of the HRA report) is undertaken as follows:

- *"Is the project likely to have significant effect on the site?"*
  - For eight qualifying species, and six assemblage species of the Humber Estuary SPA/Ramsar, and for six features of the Humber Estuary SAC/Ramsar, this cannot, under the definition of likely significant effect under the Habitats Regulations, be ruled out, so the next stage is:
- *"Assess the implications of the effects of the proposal for the site's conservation objectives"*
- *"Will the project affect integrity of the site?"*
  - Yes. Qualifying and assemblage species have been identified as being significantly affected by the Project. In terms of the relevant tests under the Habitat Regulations, it has been concluded that the proposed development would threaten the ecological integrity of the Humber Estuary SPA/SAC/Ramsar site.

10.6. A compensation scheme was agreed for the original DCO and, given that the magnitude of the impacts is slightly reduced on that scheme (but the compensations scheme remains unchanged), that scheme can be expected to still provide the appropriate quantum of compensation. Further details of the losses and compensation ratios for the habitat that will be lost are reviewed in Technical Appendix UES11-2.