Hornsea Project Four

Applicant's comments on Natural England's Deadline 7 Ornithology Submissions

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1 Introduction

1.1.1 The Applicant has reviewed all Deadline 7 submissions and responded on an individual basis to the relevant comments from each stakeholder. This document provides a response to the comments raised by **Natural England's End of Examination Position on Offshore Ornithology** (**REP7-104**) and **Natural England's End of Examination Position on the Applicant's Proposed Compensatory Measures** (**REP7-102**).

1.1.2 Please see the Deadline 7 submission of **G1.1 Overarching Acronyms List** (**REP7-063**) and **G1.45 Overarching Glossary** (**REP7-074**) for overarching acronym and glossary lists.

2 Natural England's End of Examination Position on Offshore Ornithology (REP7-104) and its implications for on the Applicant's Proposed Compensatory Measures (REP7-102).

2.1 Habitats Regulations Assessment for Guillemot and Razorbill features of the Flamborough and Filey Coast SPA (FFC SPA)

2.1.1 Natural England provides detailed comments on project alone and in-combination impacts for ornithology receptors at EIA scale at Appendix A of its REP7-104 submission, and detailed comments on project alone and in-combination impacts for HRA at Appendix B of REP7-104. In addition, Natural England provides its end of Examination position on the Applicant's proposed compensatory measures at REP7-102.

2.1.2 This section of the Applicant's comments on those submissions specifically deals with the HRA of the guillemot and razorbill features of the FFC SPA. Any further comments the Applicant has to make in respect of REP7-104 and REP7-102 are in sections 3 and 4.

2.2 The Applicant's position on auk displacement

2.2.1 One of the key methodological differences between the Applicant and Natural England's ornithology assessments is the appropriate "range" to be used to determine mortality impacts as a result of displacement for auks.

2.2.2 The Applicant has submitted substantial evidence to demonstrate why a realistic but still suitably precautionary approach for the purposes of the displacement assessment would be to utilise a range of up to 50% displacement and up to 1% mortality. Those submissions are not repeated here, however the Applicant continues to strongly advocate for its evidence provided in G1.47 Auk Displacement and Mortality Review (REP1-069) and G7.4 Ornithology Position Paper (REP7-085).

2.2.3 Notwithstanding the Applicant's evidence, the Applicant has, since the point of application, presented a full range of impact scenarios at the request of Natural England, utilising displacement and mortality ranges up to 70% displacement and 10% mortality. These impact calculations have been provided based on the Applicant's preferred parameters and also those preferred by Natural England (albeit based on the SNCB standard approach to apportioning, noting Natural England is now only very recently advising a bespoke approach for Hornsea Four). These impact values were most recently presented in G5.25 Ornithology EIA and HRA Annex (REP6-028).

2.2.3.1 For the avoidance of doubt, the Applicant disagrees with both the SNCB standard and bespoke approaches to displacement and mortality values and promotes the strongly evidenced position of 50% displacement and 1% mortality (REP1-069).

2.3 Parameters and AEoI threshold adopted on previous projects

2.3.1 The Applicant notes that for other recent offshore wind decisions, specifically Norfolk Boreas, Norfolk Vanguard and East Anglia ONE North offshore wind farms (BEIS, 2022), the Secretary of State has adopted what is sometimes referred to in those HRAs, on the evidence presented in those cases, as a "reasonable scenario" of a 70% displacement rate and 2% mortality rate for the purposes of assessment of impacts on guillemot and razorbill at the FFC SPA alone and in-combination.

2.3.2 The Applicant considers that this "reasonable" scenario allows for substantial levels of precaution and which can now be considered unrealistic based on its evidence review (presented in G1.47 Auk Displacement and Mortality Review (REP1-069)), which was not before the Secretary of State when carrying out the HRA for those projects and when adopting those parameters. Nevertheless, whilst the Applicant firmly maintains its position of up to 50% displacement and up to 1% mortality parameters, it has (as noted above)

presented all necessary calculations to determine impact values, should the Secretary of State be minded to adopt other increased parameters.

2.3.3 In utilising the 70% displacement and 2% mortality parameters for Norfolk Boreas, Norfolk Vanguard and East Anglia ONE North, the Secretary of State also adopted a threshold, below which it can be concluded there is unlikely to be a population decline, and adverse effects on integrity (AEoI) can be ruled out. That threshold, as advocated by Natural England, was a reduction in population growth rate of 0.5% or more. In each case, the Secretary of State found the impact of the project alone and in-combination, would result in a reduction in population growth rate of less than 0.5%, and as such there was no risk of an AEoI.

2.3.4 The Applicant's understanding of Natural England's position is that it continues to consider 0.5% reduction in population growth rate as a threshold for a risk of AEoI. For example, the Applicant notes the following comments in **REP7-104**:

Reference to "*a reduction in population growth rate of >0.5% per annum*" on page 47 with regards to predicted impacts on guillemot.

Confirmation, on page 58 with regards to predicted impacts on razorbill, that "*Based on the information provided above, the FFC SPA razorbill colony appears to be robust enough to maintain the population at its current level, and sustain additional mortalities from Hornsea Four project's alone impacts, which we do not predict to exceed a 0.5% reduction in growth rate. Natural England advises that an AEOI on the razorbill feature of the FFC SPA can be ruled out based on the project alone*".

2.3.5 The Applicant considers that the 0.5% threshold for risk of AEoI is appropriate when considering impacts from Hornsea Four alone and in-combination. It is consistent with the recent offshore wind farm decisions and with Natural England's most recent advice for Hornsea Four (as referenced above).

2.4 Removal of Hornsea Three from in-combination totals

2.4.1 The Applicant welcomes Natural England's confirmation in **REP7-104** that the apportioned impacts from Hornsea Three on razorbill and guillemot in the breeding season at the FFC SPA can be excluded. Natural England confirm this is because Hornsea Three is unlikely to be connected to the FFC SPA in the breeding season, based on the mean-maximum +1SD foraging ranges of these species (Woodward et al. 2019).

2.4.2 The Applicant notes that the removal of these impacts attributed to Hornsea Three results in a substantial (circa. 25% for guillemot and 8% for razorbill) reduction in annual apportioned impacts for guillemot for the in-combination assessment.

2.4.3 As presented above, the Applicant has revisited its displacement matrices for guillemot (**Table 1)** and razorbill (**Table 2**), to remove the Hornsea Three impacts from the in-combination totals. For context and completeness, the Applicant has provided the following displacement matrices:

- Hornsea Four alone utilising the Applicant's preferred parameters (Guillemot in **Table 3** and Razorbill in **Table 7**);
- Hornsea Four alone utilising Natural England's parameters (with standard SNCB apportioning; Guillemot in **Table 4** and Razorbill in **Table 8**);
- Hornsea Four in-combination with other consented projects utilsiing the Applicant's preferred parameters (Guillemot in **Table 5** and Razorbill in **Table 9**); and
- Hornsea Four in-combination with other consented projects utilising Natural England's parameters (with standard SNCB apportioning; Guillemot in **Table 6** and Razorbill in **Table 10**).

Table 1: Revised guillemot apportioned abundance to the FFC SPA for Hornsea Four and consented projects.

Project	Breeding	Non-breeding	Annual
Beatrice	0	121	121
Blyth Demonstration Site	0	58	58
Dudgeon	0	24	24
EOWDC	0	10	10
Galloper	0	26	26
Greater Gabbard	0	24	24
Gunfleet Sands	0	16	16
Humber Gateway	99	6	105
Hywind 2 Demonstration	0	94	94
Kentish Flats Extension	0	0	0
Kentish Flats	0	0	0
Lincs, Lynn & Inner Dowsing	0	36	36
London Array	0	17	17
Methil	0	0	0
Race Bank	0	31	31
Rampion	0	684	684
Scroby Sands	-	-	-
Sheringham Shoal	0	32	32
Teesside	267	40	307
Thanet	0	6	6
Westermost Rough	347	21	368
East Anglia One	0	28	28
Hornsea Project One**	4,554	356	4,910
Hornsea Project Two**	3,581	579	4,161
Moray East	0	24	24
Triton Knoll	425	33	458
Kincardine	0	0	0
Dogger Bank A**	1,893	270	2,163
Dogger Bank B**	3,318	467	3,785
Dogger Bank C**	1,149	100	1,249
East Anglia Three	0	126	126
Inch Cape	0	140	140
Moray West	0	1,680	1,680
Neart na Gaoithe	0	166	166
Seagreen Alpha	0	206	206

Seagreen Bravo	0	181	181
Sofia**	1,824	163	1,987
Hornsea Three	0*	782	782
Norfolk Boreas	0	606	606
Norfolk Vanguard	0	210	210
East Anglia ONE North	0	83	83
East Anglia TWO	0	74	74
Consented Projects Total	**17,457**	**7,519**	**24,975**
Hornsea Four Applicant's Approach	5,235	2,666	7,901
Hornsea Four SNCB Standard Approach	9,382	1,631	11,013
Consented Projects and Hornsea Four Applicant's Approach Total	**22,692**	**10,185**	**32,876**
Consented Projects and Hornsea Four SNCB Standard Approach Total	**26,838**	**9,150**	**35,988**

Table Note: *Reduction of 8,502 breeding adults apportioned per annum than previously included for assessment within the **G5.25 Ornithology EIA and HRA Annex** (**REP6-028**). ** Project also outwith of the mean max plus 1 SD foraging range.

Table 2: Revised razorbill apportioned abundance to the FFC SPA for Hornsea Four and consented projects.

Project	Migration-free breeding	Post-breeding Migration	Non-migratory Wintering	Return Migration	Annual Total
Beatrice	0	28	15	28	72
Blyth Demonstration Site	0	3	2	3	8
Dudgeon	0	12	20	12	44
EOWDC	0	2	0	1	3
Galloper	0	2	3	13	18
Greater Gabbard	0	0	11	3	13
Gunfleet Sands	0	0	1	0	1
Humber Gateway	0	1	0	1	2
Hywind 2 Demonstration	0	24	0		25
Kentish Flats	-	-	-	-	-
Kentish Flats Extension	-	-	-	-	-
Lincs, Lynn & Inner Dowsing	0	1	1	1	3
London Array	0	1	0	1	2
Methil	0	0	0	0	0
Race Bank	0	1	1	1	4
Rampion	0	2	34	113	149
Scroby Sands	-	-	-	-	-
Sheringham Shoal	0	46	6	1	52
Teesside	0	2	0	1	3
Thanet	0	0	0	1	1
Westermost Rough	91	4	4	3	102
East Anglia One	0	1	4	11	17
Hornsea Project One**	535	164	41	61	800
Hornsea Project Two	1,210	144	19	57	1,430
Moray East	0	38	1	6	44
Triton Knoll	0	9	23	4	36
Kincardine	0	0	0	0	0
Dogger Bank A**	375	54	47	141	616
Dogger Bank B**	461	71	58	174	765
Dogger Bank C**	250	11	26	65	352
East Anglia Three	0	38	41	52	130
Inch Cape	0	98	18	-	115
Moray West	0	121	5	122	247
Neart na Gaoithe	0	187	14	-	200

Project	Migration-free breeding	Post-breeding Migration	Non-migratory Wintering	Return Migration	Annual Total
Seagreen Alpha	0	0	30	-	30
Seagreen Bravo	0	0	34	-	34
Sofia**	346	20	39	100	505
Hornsea Three	0*	69	99	72	240
Norfolk Boreas	0	9	29	12	49
Norfolk Vanguard	0	30	23	31	84
East Anglia ONE North	0	3	2	7	11
East Anglia TWO	0	2	4	8	13
Consented Projects Total	**3,268**	**1,194**	**652**	**1,106**	**6,220**
Hornsea Four Applicant's Approach	215	146	12	15	388
Hornsea Four SNCB Standard Approach	386	146	12	15	559
Consented Projects and Hornsea Four Applicant's Approach Total	**3,483**	**1,339**	**664**	**1,121**	**6,608**
Consented Projects and Hornsea Four SNCB Standard Approach Total	**3,654**	**1,339**	**664**	**1,121**	**6,779**

Table Note: *Reduction of 516 breeding adults apportioned per annum than previously included for assessment within the G5.25 Ornithology EIA and HRA Annex (REP6-028). ** Project also outwith of the mean max plus 1 SD foraging range.

Table 3: Guillemot displacement matrix for Hornsea Four alone utilising the Applicant's preferred parameters, values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	1	2	2	3	4	8	16	24	32	40	47	55	63	71	79
10%	0	8	16	24	32	40	79	158	237	316	395	474	553	632	711	790
20%	0	16	32	47	63	79	158	316	474	632	790	948	1,106	1,264	1,422	1,580
30%	0	24	47	71	95	119	237	474	711	948	1,185	1,422	1,659	1,896	2,133	2,370
40%	0	32	63	95	126	158	316	632	948	1,264	1,580	1,896	2,212	2,528	2,844	3,160
50%	0	40	79	119	158	198	395	790	1,185	1,580	1,975	2,370	2,765	3,160	3,555	3,950
60%	0	47	95	142	190	237	474	948	1,422	1,896	2,370	2,844	3,318	3,792	4,266	4,741
70%	0	55	111	166	221	277	553	1,106	1,659	2,212	2,765	3,318	3,871	4,425	4,978	5,531
80%	0	63	126	190	253	316	632	1,264	1,896	2,528	3,160	3,792	4,425	5,057	5,689	6,321
90%	0	71	142	213	284	356	711	1,422	2,133	2,844	3,555	4,266	4,978	5,689	6,400	7,111
100%	0	79	158	237	316	395	790	1,580	2,370	3,160	3,950	4,741	5,531	6,321	7,111	7,901

Table 4: Guillemot displacement matrix for Hornsea Four alone utilising Natural England's parameters (with standard SNCB apportioning), values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	1	2	3	4	6	11	22	33	44	55	66	77	88	99	110
10%	0	11	22	33	44	55	110	220	330	441	551	661	771	881	991	1,101
20%	0	22	44	66	88	110	220	441	661	881	1,101	1,322	1,542	1,762	1,982	2,203
30%	0	33	66	99	132	165	330	661	991	1,322	1,652	1,982	2,313	2,643	2,973	3,304
40%	0	44	88	132	176	220	441	881	1,322	1,762	2,203	2,643	3,084	3,524	3,965	4,405
50%	0	55	110	165	220	275	551	1,101	1,652	2,203	2,753	3,304	3,854	4,405	4,956	5,506
60%	0	66	132	198	264	330	661	1,322	1,982	2,643	3,304	3,965	4,625	5,286	5,947	6,608
70%	0	77	154	231	308	385	771	1,542	2,313	3,084	3,854	4,625	5,396	6,167	6,938	7,709
80%	0	88	176	264	352	441	881	1,762	2,643	3,524	4,405	5,286	6,167	7,048	7,929	8,810
90%	0	99	198	297	396	496	991	1,982	2,973	3,965	4,956	5,947	6,938	7,929	8,920	9,911
100%	0	110	220	330	441	551	1,101	2,203	3,304	4,405	5,506	6,608	7,709	8,810	9,911	11,013

Table 5: Guillemot displacement matrix for Hornsea Four in-combination utilising the Applicant's preferred parameters, values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	3	7	10	13	16	33	66	99	132	164	197	230	263	296	329
10%	0	33	66	99	132	164	329	658	986	1,315	1,644	1,973	2,301	2,630	2,959	3,288
20%	0	66	132	197	263	329	658	1,315	1,973	2,630	3,288	3,945	4,603	5,260	5,918	6,575
30%	0	99	197	296	395	493	986	1,973	2,959	3,945	4,931	5,918	6,904	7,890	8,877	9,863
40%	0	132	263	395	526	658	1,315	2,630	3,945	5,260	6,575	7,890	9,205	10,520	11,835	13,150
50%	0	164	329	493	658	822	1,644	3,288	4,931	6,575	8,219	9,863	11,507	13,150	14,794	16,438
60%	0	197	395	592	789	986	1,973	3,945	5,918	7,890	9,863	11,835	13,808	15,781	17,753	19,726
70%	0	230	460	690	921	1,151	2,301	4,603	6,904	9,205	11,507	13,808	16,109	18,411	20,712	23,013
80%	0	263	526	789	1,052	1,315	2,630	5,260	7,890	10,520	13,150	15,781	18,411	21,041	23,671	26,301
90%	0	296	592	888	1,184	1,479	2,959	5,918	8,877	11,835	14,794	17,753	20,712	23,671	26,630	29,589
100%	0	329	658	986	1,315	1,644	3,288	6,575	9,863	13,150	16,438	19,726	23,013	26,301	29,589	32,876

Table 6: Guillemot displacement matrix for Hornsea Four in-combination utilising Natural England's parameters (with standard SNCB apportioning), values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	4	7	11	14	18	36	72	108	144	180	216	252	288	324	360
10%	0	36	72	108	144	180	360	720	1,080	1,440	1,799	2,159	2,519	2,879	3,239	3,599
20%	0	72	144	216	288	360	720	1,440	2,159	2,879	3,599	4,319	5,038	5,758	6,478	7,198
30%	0	108	216	324	432	540	1,080	2,159	3,239	4,319	5,398	6,478	7,557	8,637	9,717	10,796
40%	0	144	288	432	576	720	1,440	2,879	4,319	5,758	7,198	8,637	10,077	11,516	12,956	14,395
50%	0	180	360	540	720	900	1,799	3,599	5,398	7,198	8,997	10,796	12,596	14,395	16,195	17,994
60%	0	216	432	648	864	1,080	2,159	4,319	6,478	8,637	10,796	12,956	15,115	17,274	19,433	21,593
70%	0	252	504	756	1,008	1,260	2,519	5,038	7,557	10,077	12,596	15,115	17,634	20,153	22,672	25,192
80%	0	288	576	864	1,152	1,440	2,879	5,758	8,637	11,516	14,395	17,274	20,153	23,032	25,911	28,790
90%	0	324	648	972	1,296	1,619	3,239	6,478	9,717	12,956	16,195	19,433	22,672	25,911	29,150	32,389
100%	0	360	720	1,080	1,440	1,799	3,599	7,198	10,796	14,395	17,994	21,593	25,192	28,790	32,389	35,988

Table 7: Razorbill displacement matrix for Hornsea Four alone utilising the Applicant's preferred parameters, values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	0	0	0	0	0	0	1	1	2	2	2	3	3	3	4
10%	0	0	1	1	2	2	4	8	12	16	19	23	27	31	35	39
20%	0	1	2	2	3	4	8	16	23	31	39	47	54	62	70	78
30%	0	1	2	3	5	6	12	23	35	47	58	70	82	93	105	117
40%	0	2	3	5	6	8	16	31	47	62	78	93	109	124	140	155
50%	0	2	4	6	8	10	19	39	58	78	97	117	136	155	175	194
60%	0	2	5	7	9	12	23	47	70	93	117	140	163	186	210	233
70%	0	3	5	8	11	14	27	54	82	109	136	163	190	218	245	272
80%	0	3	6	9	12	16	31	62	93	124	155	186	218	249	280	311
90%	0	3	7	10	14	17	35	70	105	140	175	210	245	280	315	350
100%	0	4	8	12	16	19	39	78	117	155	194	233	272	311	350	388

Table 8: Razorbill displacement matrix for Hornsea Four alone utilising Natural England's parameters (with standard SNCB apportioning), values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	6
10%	0	1	1	2	2	3	6	11	17	22	28	34	39	45	50	56
20%	0	1	2	3	4	6	11	22	34	45	56	67	78	89	101	112
30%	0	2	3	5	7	8	17	34	50	67	84	101	117	134	151	168
40%	0	2	4	7	9	11	22	45	67	89	112	134	156	179	201	224
50%	0	3	6	8	11	14	28	56	84	112	140	168	196	224	251	279
60%	0	3	7	10	13	17	34	67	101	134	168	201	235	268	302	335
70%	0	4	8	12	16	20	39	78	117	156	196	235	274	313	352	391
80%	0	4	9	13	18	22	45	89	134	179	224	268	313	358	402	447
90%	0	5	10	15	20	25	50	101	151	201	251	302	352	402	453	503
100%	0	6	11	17	22	28	56	112	168	224	279	335	391	447	503	559

Table 9: Razorbill displacement matrix for Hornsea Four in-combination utilising the Applicant's preferred parameters, values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	1	1	2	3	3	7	13	20	26	33	40	46	53	59	66
10%	0	7	13	20	26	33	66	132	198	264	330	396	463	529	595	661
20%	0	13	26	40	53	66	132	264	396	529	661	793	925	1,057	1,189	1,322
30%	0	20	40	59	79	99	198	396	595	793	991	1,189	1,388	1,586	1,784	1,982
40%	0	26	53	79	106	132	264	529	793	1,057	1,322	1,586	1,850	2,115	2,379	2,643
50%	0	33	66	99	132	165	330	661	991	1,322	1,652	1,982	2,313	2,643	2,974	3,304
60%	0	40	79	119	159	198	396	793	1,189	1,586	1,982	2,379	2,775	3,172	3,568	3,965
70%	0	46	93	139	185	231	463	925	1,388	1,850	2,313	2,775	3,238	3,701	4,163	4,626
80%	0	53	106	159	211	264	529	1,057	1,586	2,115	2,643	3,172	3,701	4,229	4,758	5,287
90%	0	59	119	178	238	297	595	1,189	1,784	2,379	2,974	3,568	4,163	4,758	5,353	5,947
100%	0	66	132	198	264	330	661	1,322	1,982	2,643	3,304	3,965	4,626	5,287	5,947	6,608

Table 10: Razorbill displacement matrix for Hornsea Four in-combination utilising Natural England's parameters (with standard SNCB apportioning), values shaded in green indicate levels which resulted in a predicted reduction in growth rate of under 0.5% per annum.

Displacement (%)	Mortality Rates (%)															
	0%	1%	2%	3%	4%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1%	0	1	1	2	3	3	7	14	20	27	34	41	47	54	61	68
10%	0	7	14	20	27	34	68	136	203	271	339	407	474	542	610	678
20%	0	14	27	41	54	68	136	271	407	542	678	813	949	1,085	1,220	1,356
30%	0	20	41	61	81	102	203	407	610	813	1,017	1,220	1,423	1,627	1,830	2,034
40%	0	27	54	81	108	136	271	542	813	1,085	1,356	1,627	1,898	2,169	2,440	2,711
50%	0	34	68	102	136	169	339	678	1,017	1,356	1,695	2,034	2,372	2,711	3,050	3,389
60%	0	41	81	122	163	203	407	813	1,220	1,627	2,034	2,440	2,847	3,254	3,660	4,067
70%	0	47	95	142	190	237	474	949	1,423	1,898	2,372	2,847	3,321	3,796	4,270	4,745
80%	0	54	108	163	217	271	542	1,085	1,627	2,169	2,711	3,254	3,796	4,338	4,881	5,423
90%	0	61	122	183	244	305	610	1,220	1,830	2,440	3,050	3,660	4,270	4,881	5,491	6,101
100%	0	68	136	203	271	339	678	1,356	2,034	2,711	3,389	4,067	4,745	5,423	6,101	6,779

2.4.4 Please note, the tables presented assume the same displacement parameters are applied to all projects, as is the standard approach to assessment. This approach can be considered significantly precautionary when considering a precautionary displacement and mortality rate is applied for all projects, especially considering as stated by Natural England (REP7-104) the majority of North Sea OWFs reside in areas of low importance.

2.5 Implications for assessment and conclusion on AEoI

2.5.1 The displacement matrices provided above, demonstrate the following:

- For guillemot using the Applicant's preferred approach to assessment and a 70% displacement and 2% mortality rate, the project alone impact is 111 predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.09%** per annum (when considering the closest impact value presented within Table 45 (guillemot FFC SPA population modelling results) of G4.7 Ornithological Assessment Sensitivity Report (REP6-027));
- For guillemot using Natural England's approach to assessment (standard SNCB methodology for apportioning) and a 70% displacement and 2% mortality rate, the project alone impact is 154 predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.14%** per annum (when considering the closest impact value presented within Table 45 (guillemot FFC SPA population modelling results) of G4.7 Ornithological Assessment Sensitivity Report (REP6-027));
- For guillemot using the Applicant's preferred approach to assessment and a 70% displacement and 2% mortality rate, the in-combination impact is 460 predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.41%** per annum (when considering the closest impact value presented within Table 45 (guillemot FFC SPA population modelling results) of G4.7 Ornithological Assessment Sensitivity Report (REP6-027));
- For guillemot using Natural England's approach to assessment (standard SNCB methodology for apportioning) and a 70% displacement and 2% mortality rate, the in-combination impact is 504 predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.46%** per annum (when considering the closest impact value presented within Table 45 (guillemot FFC SPA population modelling results) of G4.7 Ornithological Assessment Sensitivity Report (REP6-027));
- For razorbill using the Applicant's preferred approach to assessment and a 70% displacement and 2% mortality rate, the project alone impact is five predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.01%** per annum (when considering the closest impact value presented within Table 46 (razorbill FFC SPA population modelling results) of G4.7 Ornithological Assessment Sensitivity Report (REP6-027));
- For razorbill using Natural England's approach to assessment (standard SNCB methodology for apportioning) and a 70% displacement and 2% mortality rate, the project alone impact is eight predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.03%** per annum (when considering the closest impact value presented within Table 46 (razorbill FFC SPA population modelling results) of G4.7 Ornithological Assessment Sensitivity Report (REP6-027));
- For razorbill using the Applicant's preferred approach to assessment and a 70% displacement and 2% mortality rate, the in-combination impact is 93 predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.29%** per annum (when considering the closest impact value

presented within Table 46 (razorbill FFC SPA population modelling results) of **G4.7 Ornithological Assessment Sensitivity Report (REP6-027)**); and

- For razorbill Natural England's approach to assessment (standard SNCB methodology for apportioning) and a 70% displacement and 2% mortality rate, the in-combination impact is 95 predicted breeding adult mortalities per annum, which results in a predicted reduction in growth rate of **0.29%** per annum (when considering the closest impact value presented within Table 46 (razorbill FFC SPA population modelling results) of **G4.7 Ornithological Assessment Sensitivity Report (REP6-027)**).

2.5.2 In each case therefore, the use of 70% displacement and 2% mortality parameters results in a predicted reduction in growth rate of less than 0.5% per annum. This supports the Applicant's position that it can be confidently concluded there is no risk of an AEoI in relation to maintaining the abundance of the guillemot and razorbill feature of the FFC SPA for Hornsea Four alone or in-combination with other consented projects.

2.5.3 This approach and findings are entirely consistent with the decision of the Secretary of State and the advice of Natural England in respect of the Norfolk Boreas, Norfolk Vanguard and East Anglia ONE North offshore wind farms, and Natural England's own final stated position in **REP7-104**, both in terms of parameters and thresholds (other than "bespoke apportioning"). This is also notwithstanding the Applicant's detailed submissions on why a range of up to 50% and 1% is more appropriate and supported by the best available evidence (**G1.47 Auk Displacement and Mortality Evidence Review** (**REP1-067**).

2.5.4 It is important to note that the Applicant has not applied Natural England's revised position on connectivity cited for Hornsea Three (based on being outside of the mean max plus 1 Standard Deviation (SD) foraging range based on Woodward et al. (2019)) to other applicable consented projects, which for reference the Applicant considers would have the potential to reduce the consented projects apportioned abundance to the FFC SPA guillemot feature by up to 74% per annum. This further highlights the significant level of precaution already incorporated within the in-combination assessment for the guillemot feature of the FFC SPA and should provide added confidence.

2.5.4.1 In relation to the further considerations and conservation objectives cited by Natural England, the Applicant considers that these points have already been addressed by the Applicant or simply to do not apply to Hornsea Four as summarized in **Table 11** and **Table 12**.

Table 11:Applicant's response to Natural England's points on further context and considerations.

Further Context and considerations	Applicant's Response
How important the area is for guillemot during the chick rearing moult stage as key supporting habitat	As stated by Natural England in their ornithology position paper (REP7-104), any connectivity between Hornsea Four and guillemots from the FFC SPA during the chick rearing moult stage is relatively short lived (less than a single month), which suggests the Hornsea Four area is of little importance due to birds quickly pulsing through the site to reach their preferred wintering grounds. Furthermore, through the Applicant's Developable Area Approach any areas which may have been considered to have higher productivity have been excluded from the DCO application (Figure 12-4 in B2.5 Without Prejudice Derogation Case (APP-182)), which is further backed up by the results of the G5.7 Indirect Effects of Forage Fish and Ornithology (REP5-085).
How other nearby consented projects will influence the importance and use of the Hornsea Four area	The potential effects of OWFs in-combination have been assessed and can be confidently concluded as not resulting in an AeoI as summarised above.
Uncertainty surrounding how birds will respond to the wind farm	In order to better understand the behavioural responses of auk species to OWFs the Applicant undertook a literature review and meta-analysis of all current post consent monitoring studies (G1.47 Auk Displacement and Mortality Evidence Review (REP2-085)), the results of which were used to inform the Applicant's approach to assessment.
How indirect effects will influence prey resources during the chick rearing moult period	The Applicant has undertaken an extensive assessment of indirect effects as presented in G5.7 Indirect Effects of Forage Fish and Ornithology (REP5-085).
Climate change	Climate change is arguably one of the greatest risks facing seabird populations. The development of OWFs such as the size of Hornsea Four, would provide significant contribution to the UK's net-zero goal for reducing greenhouse gas emissions which are in place to actively tackle the issue of climate change.
The potential implications of avian influenza	Avian influenza (or any other factor which may influence seabird populations both natural or anthropogenic) has the potential to reduce seabird populations over the lifespan of the project, however in doing so would also equally reduce the number of seabirds included within the ornithological baseline environment for not only Hornsea Four, but all other OWF developments whose baseline characterisation data was collected prior to avian influenza taking effect. This would result in a proportionate reduction in the level of predicted impact from OWFs and therefore does not need to be included or considered when drawing conclusions from current EIA and HRA assessments. While it has been communicated (via the RSPB in our Statement of Common Ground (SoCG) Meeting on 03 August 2022) to the Applicant that avian influenza has had a detrimental effect on some species and sites (e.g. gannet at the Bass Rock), the impacts upon other seabird species at Flamborough and Filey Coast (FFC) Special Protection Area (SPA) is yet to be fully established. Therefore, the conservation status of FFC SPA and the seabird assemblage currently remains unchanged.

Table 12: Applicant's response to Natural England's points on conservation objectives.

Conservation objectives	Target	Season	Applicant's Response
Breeding populations: abundance	**Guillemot** Maintain the size of the breeding population at a level which is above 41,607 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. **Razorbill** Maintain the size of the breeding population at a level which is above 10,570 breeding pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Breeding (Summer) season	As summarised within this report, an AeoI can be ruled out in relation to maintaining the size of the breeding population.
Disturbance caused by human activity	Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed	Breeding (Summer) season	Hornsea Four is located outwith of the guillemot mean max foraging range of 55 km for guillemot and at the limit of razorbill's range of 73.8 km (Woodward et al. 2019) and therefore poses little to no risk in relation to affecting roosting, nesting, foraging and feeding. This is further highlighted in Figure 17, 18, 19 and 20 in **B2.2 Report to Inform Appropriate Assessment Part 1** (**REP5-012**). In relation to moulting birds, the applicant has excluded the areas highlights within **G5.7 Indirect Effects of Forage Fish and Ornithology** (**REP5-085**) as having high productivity through the Developable Area Approach, thus minimising disturbance.
Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding).	Year round – to ensure the habitat remains suitable for when the feature is present	Hornsea Four is located approximately 69 km away from the FFC SPA breeding habitat for auks and therefore poses no risk to maintaining the extent, distribution, and availability of breeding habitat.
Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (eg. Sandeel, herring, sprat) at preferred sizes.	Year round	As concluded within **A2.3 Fish and Shellfish Ecology** (**APP-015**) it can be concluded that Hornsea Four will not have a significant adverse effect on the key food and prey items for qualifying features of the FFC SPA. As detailed within **B2.7 Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Kittiwake Compensation Plan** (**REP7-020**), the Applicant has already planted 2 hectares of seagrass which is a key habitat for prey items and has committed to planting a further 28 hectares which will provide a significant benefit to maintaining the availability of prey availability for the FFC SPA.

Connectivity with supporting habitats	Maintain safe passage of birds moving between nesting and feeding areas.	Year round	Hornsea Four is located outwith of the guillemot mean max foraging range of 55 km (Woodward et al. 2019) and therefore poses no risk in relation to maintaining safe passage of birds moving between nesting and feeding areas. This is further highlighted in Figure 17, 18, 19 and 20 in **B2.2 Volume B2 Chapter 2 Report to Inform Appropriate Assessment Part 1** (**REP5-012**).

2.5.5 In conclusion, the Applicant considers it absolutely clear, beyond any reasonable scientific doubt, from the evidence and assessments provided that there is no risk of an AEoI on guillemot or razorbill from the FFC SPA as a result of predicted impacts from Hornsea Four alone or in-combination with other consented projects.

2.6 Implications for compensatory measures

2.6.1 Notwithstanding the clear position that there is no risk of an AEoI from Hornsea Four alone or in-combination on the guillemot or razorbill features of the FFC SPA, the Applicant has presented a robust and scalable compensation package, which allows the Secretary of State to grant consent, if it is concluded there is a risk of an AEoI occurring.

2.6.2 The Applicant notes Natural England's misunderstanding in **REP7-102** that sites currently identified would be insufficient to provide compensation at a 1:1 level for predator eradication.

2.6.3 The Applicant confirms that its current "short list" proposals for locations for predator eradication within the Bailiwick of Guernsey are sufficient to compensate for the impact values presented in the previous Section 2 – albeit the conclusion ought to be no AEoI given the threshold adopted on other projects and referred to by Natural England in **REP7-104**.

2.6.4 The Applicant can also, if the Secretary of State finds that it is justified (the Applicant's position being that it is not), accommodate further precaution within the displacement matrices to deliver compensatory measures. This could accommodate impact values up to 70% displacement and 5% mortality based on NE's parameters (utilising SNCB standard apportioning).

2.6.5 However, as noted in the compensation plans, this would require the Applicant to return to its long list of sites to identify further locations for predator eradication. Nevertheless, the predator eradication compensation measure would remain deliverable, given its scalability.

2.6.6 In addition, the predator eradication measure would be supported by the package which includes by-catch reduction and the potential for a contribution to be made to the Marine Recovery Fund (MRF), something which the Applicant notes is supported by Natural England.

2.7 Final comments

2.7.1 Other than the confirmation provided above that the Applicant could deliver compensatory measures for these impact values, this submission does not consider Natural England's "bespoke" approach to apportionment for Hornsea Four which is a departure from the SNCB standard and the approach taken on all other offshore wind farms to date. The Applicant has presented evidence as to why that approach is inappropriate for assessment of Hornsea Four as set out in **G5.34 Applicant's response to Natural England's additional guidance on apportioning of seabirds to FFC SPA for Hornsea Project Four (REP5a-018)** and **G7.4 Applicants Ornithology Position Paper (REP7-085).**

2.7.2 The Applicant has demonstrated in this submission:

- Substantial evidence has been submitted into Examination that supports the use of a range of up to 50% displacement and 1% mortality parameters for the purposes of assessment for auk species. This evidence was not before the Secretary of State when making decisions on the Norfolk Boreas, Norfolk Vanguard and East Anglia ONE North offshore wind farm Orders;
- Notwithstanding, if the Secretary of State does rely upon 70% displacement and 2% mortality parameters (as in those projects), it is clear, based on the parameter tables above, that the threshold for AEoI is not reached for Hornsea Four alone or in-

combination with other consented projects. That is the case whether using the Applicant's preferred approach to assessment, or Natural England's approach (with SNCB standard apportioning). The relevant threshold for a risk of AEoI (as per the decisions on previous projects and Natural England's advice in **REP7-014**) is a 0.5% reduction in population growth;

- If the Secretary of State is however minded to conclude an AEoI, notwithstanding this evidence and assessment, the Applicant has demonstrated through its compensation package that it can compensate for predicated impact values. This is given the scalable nature of the predator eradication measure (and the ability of the Applicant to return to its long list to identify further sites if required), and given the measure is supported by a package, including by-catch reduction and the potential for a contribution to the MRF. It is incorrect to state that predator eradication measure could not compensate for Natural England's unrealistic impact values which result from a new bespoke approach, but such levels of impacts are simply not justified on the evidence;
- The Secretary of State therefore has all of the information required to carry out an appropriate assessment of Hornsea Four alone and in-combination, and to secure compensatory measures for auks, should it be found to be necessary.

3 Applicant's responses to Natural England's End of Examination Position on Offshore Ornithology (REP7-104)

Reference	Stakeholder's Written Representation	Applicant's Response
	We note that the Applicant has adjusted the BDMPS reference populations adopted for black-legged kittiwake Rissa tridactyla (kittiwake hereafter), Common guillemot (guillemot hereafter) Uria aalge and Atlantic puffin Fratercula arctica (puffin hereafter) in REP6-027 and REP6-029. Natural England have not agreed these changes and highlight that the larger numbers adopted by the Applicant will influence the interpretation of potential increases in baseline mortality resulting from predicted impacts for EIA. In the analysis presented within this document we have used the Natural England advised BDMPS values for these species in order to address this.	Please see Section 2.1 of **G4.7 Ornithological Assessment Sensitivity Report** (**REP6-027**) and the Applicant's further explanation in Section 3.2.1 of **G8.3 Applicant's Comments on Deadline 6 Ornithology Submissions** (**REP8- 004**).
	The Population Viability Analysis (PVA) presented by the Applicant in REP6-027 has also made use of these unagreed BDMPS values. This has resulted in larger starting populations being subjected to the predicted impacts with potential consequences for interpretation of population level effects for EIA for kittiwake, guillemot and puffin. Natural England have advised the Applicant of this issue and are awaiting a response on the matter. It has not been addressed by the Applicant at Deadline 6 and we are therefore unable to comment on the BDMPS PVA outputs for these species. This severely limits our assessment of the potential effects of the predicted impacts on the relevant BDMPS populations.	Please see Section 2.1 of **G4.7 Ornithological Assessment Sensitivity Report** (**REP6-027**) and the Applicant's further explanation in Section 3.2.1 of **G8.3 Applicant's Comments on Deadline 6 Ornithology Submissions** (**REP8- 004**).
	At Deadline 5a Natural England advised the Applicant of an issue relating to a newly identified problem with the NE/JNCC PVA tool that we advocate the use of [REP5a029]. We identified that it would affect the Applicant's kittiwake PVA outputs for both EIA and HRA and provided suggested advice on measures to be taken to address the issue. The Applicant does not appear to have addressed this in their Deadline 6 submissions. This limits our ability to evaluate the potential effects of the predicted impacts on the relevant kittiwake populations, though we note it does not materially affect any of the conclusions drawn.	The Applicant reran PVA analysis for the potentially affected runs following guidance provided by Natural England as presented in **G8.11 Clarification Note on Kittiwake PVA and BDMPS population estimates** (**REP8-011**), the results of which found no change to the PVA results presented in **G4.7 Ornithological Assessment Sensitivity Report** (**REP6-027**).
	Avian Influenza Epidemic	Avian influenza (or any other factor which may influence seabird populations both natural or anthropogenic) has the potential to reduce seabird populations over the lifespan of the project, however in doing so would also equally reduce the number of seabirds included within the ornithological baseline environment for not only Hornsea Four, but all other OWF developments whose baseline characterisation data was collected prior to avian influenza taking effect. This would result in a proportionate reduction in the level of predicted impact from OWFs and therefore does not need to be included or considered when drawing conclusions from current EIA and HRA assessments.
	EIA Conclusions	For all EIA assessments presented within Natural England's ornithology position paper (**REP7-104**), Natural England have not considered a full range-based approach due to only presenting their own preferred parameters for assessment. The Applicant would therefore recommend that the ExA and the SoS also utlise the Applicant's assessment presented within the **G5.25 Ornithology EIA and HRA Annex** (**REP6-028**), which as detailed in **G4.7 Ornithological Assessment Sensitivity Report** (**REP6-027**) can be considered to have greater confidence when inferring possible predicted impacts.

Reference	Stakeholder's Written Representation	Applicant's Response
	Additional Sources of Uncertainty	Please see Applicant's response in **G8.3 Applicant's Comments on Deadline 6 Ornithology Submissions** (**REP8-004**) in relation to the sources of uncertainty highlighted by Natural England.
	HRA Conclusions	For all HRA assessments presented within **Natural England's End of Examination Position on Offshore Ornithology** (**REP7-104**), Natural England have not considered a full range-based approach due to only presenting their own preferred parameters for assessment. The Applicant would therefore recommend that the ExA and the SoS also utlise the Applicant's assessment presented within the **G5.25 Ornithology EIA and HRA Annex** (**REP6-028**), which as detailed in **G4.7 Ornithological Assessment Sensitivity Report** (**REP6-027**) can be considered to have greater confidence when inferring possible predicted impacts.
	Seabird Assemblage	In relation to the seabird assemblage the Applicant maintains it's position that an AEoI can be ruled out in relation to the seabird assemblage conservation objectives to both maintain the assemblage's abundance and supporting habitat.

4 Applicant's response to Natural England's End of Examination Position on the Applicant's Proposed Compensatory Measures (REP7-102)

Reference	Stakeholder's Written Representation	Applicant's Response
1	Background Natural England have engaged constructively and in detail with the Applicant on matters relating to compensation throughout the Evidence Plan Process, and into the Examination period for the proposed Hornsea Four offshore wind farm (OWF). Due to previous Secretary of State (SoS) rulings, the Applicant has determined that an adverse effect on integrity (AEoI) in-combination with other plans or projects cannot be ruled out for black-legged kittiwake Rissa tridactyla (hereafter, kittiwake) at Flamborough & Filey Coast Special Protection Area (FFC SPA) and will require compensatory measures to be secured. For species where AEoI remains disputed, namely common guillemot *Uria aalge albionis* (hereafter, guillemot) and razorbill *Alca torda* from FFC SPA, compensatory measures are proposed 'without prejudice'. For FFC SPA Northern gannet *Morus bassanus* (hereafter, gannet) in principle measures were also identified, although following updates to the impact assessment for that species the potential for AEoI in-combination with consented projects has now been ruled out. Following provision of the revised impact assessments at Deadlines 5 and 5a, Natural England consider that AEoI cannot be ruled out for guillemot alone and razorbill in-combination with other consented plans and projects, thus requiring compensation to be secured for these species. The Applicant has progressed several compensatory measures, with the aim of compensating for predicted impacts on kittiwake by the provision of an artificial nest site (ANS), and guillemot and razorbill through reducing bycatch mortality and undertaking predator (rat) eradication. A substantial body of work has been delivered to evidence and develop these measures, and the commitment of the Applicant to delivering ecologically sound compensation is not in doubt.	The Applicant appreciates Natural England's constructive engagement on matters relating to compensation through the Evidence Plan Process and during the Examination. The Applicant has engaged extensively with Natural England regarding the proposed compensation measures over the last two years and undertaken 6 compensation workshops them and other key stakeholders including the RSPB and the Wildlife Trust. The Applicant also welcomes Natural England's confirmation that a "substantial body of work" has been delivered by the Applicant to evidence and develop the suite of compensatory measures, and its acknowledgement of the Applicant's clear commitment to "deliver ecologically sound compensation". To that end, the Applicant has provided a number of responses to Natural England's comments over the course of the Examination (for example see **REP3-046, REP4-044, REP5-081, REP5a-014, REP7-083** and **REP1-038**) and submitted a number of submissions in support of, or providing updates on progress with the compensation measures including: • **G5.4 Predator Eradication Implementation Update (REP5-082)**; • **G5.13 Bycatch Reduction Technology Selection Phase Summary (REP5-068)** ; • **G5.35 Predator Eradication and control opportunities within the Bailiwick of Guernsey (REP5a-019)** ; • **G6.3 Kittiwake onshore artificial nesting structure site selection and delivery progress (REP6-031)** ; • **G6.6 Fish Habitat Enhancement Seagrass Restoration Implementation Study and Fish Monitoring Summary (REP6-033)**; and • **G7.3 Platform Repurposing Transfer of Regulation (REP7-084)**. The Applicant considers that a robust case demonstrating the ecological efficacy of the proposed compensation measures has been provided in **B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187), B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189), B2.8.3 Compensation measures for FFC SPA Predator Eradication: Ecological Evidence** and **B2.8.1 Compensation measures for Flamborough and FFC SPA: Bycatch Reduction: Ecological Evidence**. The updated Compensation Plans (**B2.7 FFC SPA Kittiwake Compensation Plan (REP7-019), B2.8 FFC SPA Guillemot and Razorbill Compensation Plan (REP7-027),** and **G5.17 FFC SPA: Gannet Compensation Plan (REP5-071)**) and Roadmaps (**B2.7.2 Compensation measures for FFC SPA: Kittiwake Offshore Artificial Nesting Roadmap (REP7-021), B2.7.4 Compensation measures for FFC SPA: Kittiwake Onshore Artificial Nesting Roadmap (REP7-023), B2.8.2 Compensation measures for FFC SPA: Guillemot and Razorbill**

Reference	Stakeholder's Written Representation	Applicant's Response
		Bycatch Reduction: Roadmap (REP7-029), B2.8.4 Compensation measures for FFC SPA Predator Eradication Roadmap (REP7-031) and **B2.8.6 Compensation measures for FFC SPA Fish Habitat Enhancement Roadmap (REP7-033)**) set out a clear pathway to demonstrate that the mechanism for delivery of the compensation measures can be implemented. The Applicant has continued to develop the compensation measures right to the end of Examination. For example, and notably, the Applicant has signed a memorandum of understanding (MoU) with Alpha Petroleum Resources Limited and Energean UK Limited with a view to the potential repurposing of the Wenlock Platform. The Applicant has also secured a MoU with the States of Guernsey (dated 10th June 2022) providing a framework to ensure support and long-term security of the predator eradication compensation measure. This is a fast-paced, developing topic. In this context, the Applicant refers to **G5.8 Ørsted's approach to strategic ecological compensation (REP5-086)** which defines strategic compensation including its purpose and the mechanism for funding MRF, or equivalent fund. It is considered important that Hornsea Four has the option to place reliance upon the delivery of strategic compensation, in addition to the evidence submitted to date for project specific compensation measures. The compensation proposal therefore comprises a package of measures and potential pathways to deliver compensation, both at project and strategic levels, which enhance confidence in delivery.
2. Natural England's summary position on the proposed compensatory Measures Page 2 All measures	All of the proposed measures are to be implemented remotely to the impacted site, and the accrual of any material benefit to the national site network is uncertain. While Natural England support the implementation of compensation at a species bio-geographic population scale, the likely level of benefit to the national site network should be carefully considered in conjunction with uncertainty around method effectiveness and project impacts when deciding on the required scale of compensatory measures (discussed further below and in Appendix 1). These concerns are intensified when the proposals are assessed against the predicted scale of the impacts on FFC SPA species when calculated using Natural England's advised methodology, for which see our Deadline 7 offshore ornithology position (B7) and Appendix 1. In addition, for some measures fundamental details remain outstanding e.g., the location of the measure.	We welcome Natural England's confirmation that compensation can be implemented at the species bio-geographic population scale. The scale of compensation is set out in the Overview document (**B2.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP7-017)**) and Compensation Plans (**B2.7 Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Kittiwake Compensation Plan (REP7-019)**) and **B2.8 Guillemot and Razorbill Compensation Plan (REP7-027)** submitted at Deadline 7, based upon the ecological efficacy as demonstrated in the Evidence reports and that the measures are viable and can be delivered, as set out in the Roadmaps and Compensation Plans. The locations for the compensation measures have been refined and this has been presented in **A4.6.1 Compensation Project Description (REP7-008)** and discussed a during a meeting with Natural England on 7th July 2022 and also at Issue Specific Hearing 12. The Derogation case is a robust package and goes far beyond the detail provided in a derogation case for any other OWF project DCO prior to the point of consent.
Page 2 Offshore Nesting	Natural England consider the implementation of an offshore ANS to be an appropriate measure for impacts on kittiwake from an ecological perspective, although we retain concerns around risk and longevity if only a single structure is provided.	The Applicant welcomes Natural England's support of an offshore ANS. The Applicant confirms that the ANS can be delivered for the lifetime of the project. The Applicant provided information on how the regulatory framework governing an offshore ANS, e.g. decommissioning liability, could be applied in **G7.3 Platform Repurposing Transfer of Regulation (REP7-084)**. The drafting in Schedule 16 of the DCO (paragraph 7) also ensures that an offshore ANS cannot be decommissioned except following approval from the Secretary of State in consultation with the relevant SNCB.

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Onshore Nesting	Natural England maintains that further onshore ANS implementation is of dubious benefit in the light of the planned provision of approximately 3,000 nest spaces on the Southern North Sea coast by other OWF projects. It has not been demonstrated that there is a sufficient pool of habitat-limited kittiwake recruits, suitable locations and/or prey availability available to meet and sustain the existing demand for this measure. Further, we note the significant difficulties existing projects are experiencing in securing and developing sites onshore. We have consistently advised that this measure should not be taken forward, and as such, will not be providing further advice or feedback on these proposals.	The Applicant has undertaken a diligent site selection process for an onshore ANS and has recently completed site visits to four shortlisted sites to undertake photographing and mapping of factors such as availability of nest space in the area and the proximity of the potential land options to neighbouring nesting birds. Following a review of the site visit results, the Applicant has found available land parcels one north of Whitby and one south of Whitby, that offer strong ecological grounds for ANS success and where nesting availability limitations can be demonstrated. An overview and update on onshore artificial nesting site selection is provided at **G6.3 Kittiwake Onshore Artificial nesting Structure Site Selection and Evidence on Nesting Limitations update (REP6-031)**. The Applicant is now progressing negotiations with the relevant landowners. As a result, the Applicant is confident that this compensation measure is viable and deliverable, should this option be selected (noting that an offshore ANS is the preferred option).
Page 3 Bycatch reduction	We do not consider the proposed bycatch reduction technology to be proven and bycatch rates of auks within the selected fishery have not been reported due to restrictions on data sharing. There has been no evidence of razorbill being bycaught in the target fishery. Even with proven methods, bycatch reduction is inherently difficult to implement successfully, particularly over long timelines given the dynamic nature of fisheries. Despite these issues, we remain supportive of ongoing trials of the Looming Eye Buoy (LEB).	Please see our response M36 and M37 in **G7.2 Applicant's comments on other submissions received at Deadline 6 (REP7-083)**. The Applicant maintains there is no AEoI for guillemot and razorbill (and the Applicant and NE are now in agreement that AEoI for gannet can be excluded). However, should compensation be required, the Applicant is confident the suite of compensation measures proposed for auks is sufficient. The Applicant has demonstrated with the bycatch technology selection phase that bycatch reduction can be successfully implemented and delivered. The Applicant has managed to secure 22 fishers for the Bycatch Implementation Study (with a high likelihood these fishers would be included in the delivery of the compensation measure (if required)). The Applicant notes, and welcomes, Natural England's continued support for the ongoing trials of the Looming Eye Buoy (LEB).
Page 3 Predator eradication	The scoping and selection of predator eradication sites remains in progress and fundamental evidence gaps remain regarding extant seabird populations, evidencing predation pressure, and quantifying the potential nesting habitat provision. Key elements such as community engagement are also still in early phases. The measure may be of limited benefit for guillemot, a species that tends to select cliff ledge nest sites that are generally inaccessible to rats. Accepting that guillemot may also nest in habitat more easily accessed by rats, it is not clear if other pressures are also acting at the shortlisted sites to deter breeding (e.g., limited prey availability). Predator eradication will also require a significant lead-in time before any benefits accrue and is another very difficult measure to implement successfully.	Please see our response to 'Page 2 All measures' above, M26 and M18 in **G7.2 Applicant's comments on other submissions received at Deadline 6 (REP7-083).** The Applicant has also presented within **G5.4 Predator Eradication Implementation Study Update (REP5-082)** robust reasons why the shortlisted locations (i.e., those islands within the Bailiwick of Guernsey) are suitable for a predator eradication project to benefit guillemot and razorbill. Please also see the letters of comfort from Alderney Wildlife Trust and States of Guernsey (presented in **B2.8.4 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Predator Eradication Roadmap (REP7-032)**) (in addition to the letter of support for an eradication programme from States of Alderney in response to the consultation in August 2021), as to the importance of this work to remove the rat predation the seabirds are suffering in the Bailiwick of Guernsey.
Page 3 Seagrass restoration	Natural England maintains that fish habitat (seagrass) restoration cannot be considered compensation, as a link between seagrass restoration and the productivity of the impacted species cannot currently be demonstrated or quantified. We also consider that it cannot be treated as a back-up to account for the high levels of uncertainty in other measures. This is also due to the likely timeframes to implementation, and uncertainty regarding the level of impact on target species. Nevertheless, we welcome and support	The Fish Habitat Enhancement measure is a resilience measure as detailed within the Compensation Plans and Roadmap. The Applicant has already planted 2 hectares of seagrass and will commence the planting of a further 2 hectares, in autumn 2023. The Applicant is on target to restore 30 hectares of seagrass prior to operation of the windfarm. As detailed within the **G6.6 Fish Habitat Enhancement Seagrass Restoration Implementation Study and Fish Monitoring Summary (REP6-033) and B2.8.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Fish Habitat Enhancement Roadmap (REP7-033)** monitoring and connectivity

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	the measure being retained for resilience/ecosystem enhancement and commend the general approach being taken.	surveys have been commissioned by the Applicant and fyke netting surveys have recorded sandeel and herring and numerous other species within the seagrass beds. The Applicant welcomes the praise and commendation for the approach taken.
3.	Scale of the proposed compensation Due to the (now resolved) concerns with the offshore ornithology baseline, it has not been possible to determine the level of impact, and therefore the target level of compensation, until late in the Examination. As a result, we have been unable to progress discussions with the Applicant on the scale of compensation required and the measures' ability to deliver this within the Examination. We therefore provide an overview of this aspect here…. Including scale, bycatch measure and viability against Natural England's predicted impacts.	Please see our response to 'Page 2 All measures' and 'Page 3 Bycatch reduction' above. The overview Please see **G7.4 Applicants Ornithology Position Paper (REP7-085)** and our response providing predicted compensation values required for the different impact assessment positions in **Appendix B** of **G7.2 Applicant's comments on other submissions received at Deadline 6 (REP7-082)** (submitted at Deadline 7). Specifically for predator eradication, **G1.33 Predator Eradication Island Suitability Assessment: Bailiwick of Guernsey (REP5-057)** sets out in **Table 6** the available nesting spaces that could become safe from rat predation. The Applicant is therefore confident that the scale of compensation required can be delivered and secured if deemed necessary by the Secretary of State. The Applicant also refers Natural England and the ExA and SoS to the previous response regarding the implications of the use of the 'bio-season apportionment values' detailed within **G5.34 Applicant's response to Natural England's additional guidance on apportioning of seabirds to FFC SPA for Hornsea Project Four (REP5a-018)** and the implications for the pressing and urgent need to deliver 50GW of offshore wind energy by 2030, as set out in the British Energy Security Strategy. The 1:2 ratio as set out in the Overview document (**B2.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP7-017)**) is in-line with the guidance (including Defra, 2021). **G1.9 Applicant's comments on Relevant Representations (REP1-038)** response RR-029-APDX:CUUU provides further detail on the justification for the scale of the compensation. The Applicant has shown the measures at a 1:2 ratio can be secured and delivered, and is confident that a 1:2 ratio will provide adequate compensation for the predicted mortality. The Applicant also notes and welcomes Natural England further confirmation that there is connectivity between the Bailiwick of Guernsey and the UK National Site Network.
4	Strategic compensation In applying the precautionary principle, and when considering the legal basis for and requirements of compensatory measures, it is fundamentally difficult for Natural England to support experimental or speculative measures at a project-level scale. Regardless, Natural England do believe that there can be considerable merit in delivering well designed project level compensation. Frequently the increased understanding or secondary benefits (e.g., net gain) are also of considerable nature conservation value. However, Natural England believe that the situation as it stands clearly demonstrates that compensatory measures are best delivered strategically, as set out in our 'Approach to Offshore Wind'1. We consider that project level measures, necessarily restricted in scope by the predicted impacts of the specific project, retain high levels of uncertainty regarding	While the Applicant has developed a well-designed suite of project level compensation measures that can be relied upon, the Applicant shares Natural England's view that, where possible, compensation is best delivered strategically as set out in **G5.8 Orsted's approach to strategic ecological compensation (REP5-086)** due to the potential benefits from collaborative and large scale compensation. For this reason the Applicant included an option in the DCO / without prejudice drafting for a payment to be made to the soon to be established Marine Recovery Fund (MRF) (or equivalent fund), in lieu of delivering one or more compensation measures, or as adaptive management. To confirm the British Energy Security Strategy (BESS) makes a strong commitment to strategic compensation, including the use of MRF for those projects already in the system. As an unequivocal commitment in published Government policy, weight can be attached. This drafting has been included as an "option", to provide flexibility as to the means and form of compensation that can be delivered post-consent (see **G7.4 Applicants Ornithology Position Paper (REP7-085) and the Compensation Plans (REP7-019** and **REP7-029)** for further information). The ambition

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	delivery, appropriate timescales, potential for adaptive management, and scalability. Further, the burden of developing such measures where technological solutions may not yet exist is significant and may prove overly restrictive in the context of individual project timelines... Including sections on British Energy Security Strategy and Marine Recovery Fund, Improving prey availability and Avian influenza.	is for the MRF to be established by the end of 2023 which would be well in advance of operation of the wind farm. An alternative equivalent fund may also be established such as by The Crown Estate through their pledge to support the work of the government's new Marine Recovery Fund or through collaborative strategic compensation (see **G5.8 Ørsted's approach to strategic ecological compensation (REP5-086)**). Please see our previous responses regarding prey resource and Natural England has previously agreed that prey availability as a compensation measure must be Government led (see **B2.6.2 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Prey Resource Evidence (APP-185)**). Please see our response in **Table 11** above. The Applicant understands the epidemic and the impacts of climate change has the potential to have a serious impact on seabirds. The Applicant is striving to help minimise the effects of climate change through offshore wind farm development Avian influenza (or any other factor which may influence seabird populations both natural or anthropogenic) has the potential to reduce seabird populations over the lifespan of the project, however in doing so would also equally reduce the number of seabirds included within the ornithological baseline environment for not only Hornsea Four, but all other OWF developments whose baseline characterisation data was collected prior to avian influenza taking effect. This would result in a proportionate reduction in the level of predicted impact from OWFs and therefore does not need to be included or considered when drawing conclusions from current EIA and HRA assessments.
Appendix 1		
Page 7 Advice on the proposed compensation measures: Kittiwake: Offshore artificial nest structures	Kittiwake Offshore artificial nest structures An offshore Artificial Nesting Structure (ANS), either new or repurposed, is proposed as the primary compensation measure for kittiwake. We consider the measure has potential ecological relevance and is technically feasible. While it remains unclear if nesting habitat is a limiting factor for the breeding population of kittiwake in the southern North Sea due to the presence of uncolonized offshore structures, we acknowledge that in general, nesting habitat will be more limited offshore than onshore. The results of targeted survey effort have been provided and a location for a repurposed platform has been identified. The Applicant has been proactive in progressing the necessary pathways for securing the structure; however, it cannot yet be considered secured. We also understand that the regulator of oil & gas structures (BEIS OPRED) has concerns about the acceptability of this measure should it relate to repurposing such a structure. The identified structure is located within the North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (NNSSR SAC) which is in unfavourable condition. Further discussion will therefore be needed on the implications of this development for the designated site, which has unfortunately not been possible in the Examination. A location for a new	The Applicant welcomes Natural England's comments that an offshore ANS has potential ecological relevance, is technically feasible and that that, in general, nesting habitat will be more limited offshore than onshore. Regarding repurposing, the Applicant has set out clearly during the Examination process how the platform can be moved out of the oil and gas regulatory framework and into the framework to which the Applicant operates and has been undertaking engagement with key stakeholders on this. **G7.3 Platform Repurposing Transfer of Regulation** (**REP7-084**) sets out the proposed regulatory framework to reclassify the platform so that it can be repurposed, operated, maintained and decommissioned as if it were any offshore installation owned by the Applicant. The Applicant is aware of the location of the Wenlock platform within the NNSSR SAC and can confirm that the Wenlock Platform does not overlap with Annex 1 habitat (Reefs or Sandbanks) according to JNCC (Sandbanks: 2019 and Reefs: 2021) data. Furthermore, given the proposal here is for the repurposing of an existing platform and not the construction of a new structure, it is not envisaged that any additional infrastructure will be placed on the seabed as a result of the repurposing of the Wenlock platform (please see Revision 2 of **A4.6.1 Compensation Project Description** (**REP7-002**) and the EIA and HRA of the compensation measures **A4.6.5 Compensation Environmental Impacts Assessment (EIA) Annex Part 1-6** (**REP7-011**) and Revision 3 of **B2.2.2 Habitats**

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	structure has not been identified and/or secured as the Applicant's preference is to repurpose a structure, however a search area of high suitability has been identified using best available evidence.	**Regulations Assessment Compensation Measures Part 1 & Part 2** (**REP7-015**) and the Applicant does not envisage that any material technical changes will be required to the form or function of the existing foundations. Regarding a new offshore ANS, in late 2021, the Applicant identified two location options within the area of highest ecological potential. These were provided to Natural England (and other attendees of the pre-application Derogation and Compensation Workshops) and the feedback from all stakeholders was that Option 1 was the most preferable, and as a result that has been carried forward as the Applicant's preferred location for a new offshore ANS. Geophysical and Geotechnical investigations for this location have been completed and the data is being reviewed and used to inform the design of the nesting structure.
Page 7 Advice on the proposed compensation measures: Kittiwake: Offshore artificial nest structures	Natural England's primary concern with this measure remains that a commitment has only been made to provide a single structure. We consider this to be high risk, particularly for a new structure. Multiple structures 'spread the risk' of non-colonisation. We note that the compensation proposed and accepted by SoS for Hornsea Three included the provision of four structures in at least two locations, each capable of compensating for the predicted impact at a 1:1 ratio, as a way of managing this risk. We welcome that the Applicant has increased the lead in time to three years prior to operation but note that this remains less than the four years consented on other projects, and that the Applicant also now suggests that a timescale need not be conditioned at all [REP5-017]. We do not consider that this approach (both in terms of lead in and number of structures) would afford the Secretary of State sufficient confidence that the compensation would be delivering prior to impact occurring, as recommended in the draft Defra guidance3 , and it would significantly limit the resilience of the measure over the lifetime of the project. Adaptive management will also be more challenging offshore; lower resilience in the measure could increase the likelihood of it being needed. We do acknowledge that increasing structure provision would significantly increase the delivery costs of this measure.	*Scale* The Applicant has provided ecological evidence and rationale in the DCO Application and Examination process to demonstrate that the delivery of one artificial nesting structure in either the offshore or onshore environment (preferred option being offshore repurposed of an existing offshore structure) is appropriate and would be more than capable of supporting the number of breeding pairs of kittiwake required (62). The recent summer 2022 surveys have demonstrated the higher productivity rates of offshore platforms in comparison to onshore colonies and as detailed in **B2.7.1 PR Volume B2 Annex 7.1 Compensation measures for FFC SPA Offshore Artificial Nesting Ecological Evidence (APP-187)** these survey results match the wider evidence that highlights the advantages and resilience of an offshore structure including increased productivity when compared to onshore colonies. Breeding birds at offshore structures also have 360-degree access to prey, reduced competition from other species and reduced predation risk (due to lack of large gull species and corvids breeding offshore). This reduces the risk of the need for adaptive management (full details of the Applicants approach are provided in **B2.7 FFC SPA Kittiwake Compensation Plan (REP7-019).** Timescales As set out during Examination, the programme has been carefully considered to ensure timely delivery of the compensation measure and the evidence to support this is provided in **B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187), B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189).** As also set how in the Applicant's submissions, the Applicant recognises how vital it is that the compensation delivered is not only successful for Hornsea Four, but for the industry and that the progress will be watched closely. The Applicant retains its commitment to implement an artificial nesting structure three breeding seasons ahead of operation of the windfarm, if the Secretary of State considers that this best balances the need to demonstrate the compensation measure will be effective with the pressing and urgent need to deliver 50GW of offshore wind energy by 2030, as set out in the British Energy Security Strategy. However, the Applicant does believe that there is now a strong case for not including a specific timescale in the DCO ahead of operation, but rather to simply state that the artificial nesting structures should be in place prior to operation. This approach

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		would remove this issue as an impediment to the faster deployment of offshore wind energy, which is a key objective of the BESS. The inclusion of timescales was based on previous decisions (taken pre-BESS), which are not binding precedent and, in the Applicant's submission, it is open to the Secretary of State, consistent with a change in policy as set out in the BESS, to remove those timescales. The Applicant urges the Secretary of State to do so. The Applicant will continue to seek opportunities to accelerate the construction of the artificial nesting structure. It is noted that in February 2022, the UK Department of Business, Energy & Industrial Strategy (BEIS) committed to annual CfD auctions from March 2023 and Auction Round 5. Previously, CfD auctions 1 to 4 had been held on an approximate 2-year cycle. Coupled with the new 50GW target, this demonstrates the clear priority to deliver significant capacity of offshore wind by 2030.
Page 8 Advice on the proposed compensation measures: Kittiwake: Offshore artificial nest structures	A further important consideration if the measure relates to a repurposed structure is the presence of existing breeding kittiwakes. Monitoring will be needed to establish their abundance and productivity. The repurposed structure might reasonably be expected to increase the productivity of existing birds, but it would only be the increase compared to pre-intervention baseline that we could consider as additional, along with any productivity arising from 'new' nesting pairs.	The Applicant agrees with Natural England that monitoring will be required to determine the effectiveness of the compensation. The Applicant has already surveyed the Wenlock platform in 2021 and 2022 and if required for compensation will monitor the colony size and productivity during the lifetime of the project. It is also important to note that the 2022 survey showed an increase in nesting kittiwake from the previous year (productivity is at a higher rate than onshore colonies) and therefore the Applicant is confident this colony will continue to increase in size providing adequate and well-designed space is added to accommodate the increasing population.
Page 8 Advice on the proposed compensation measures: Kittiwake: Offshore artificial nest structures	With respect to the scale of the measure, following Natural England's advised approach to the ornithological assessment results in a Project alone impact of 71 (min 22, max 152) adult kittiwake per annum to be compensated for. Using the Applicant's calculation methodology presented in [REP1-063], 190 nests and/or breeding pairs would be required to deliver the central estimate impact (71) at a 1:1 ratio. The Applicant predicts that an offshore structure would be able to support ~750 nests. We note that a single structure could therefore be expected to support the Applicant's proposed 2:1 ratio on NE impact values for both the central estimate (380 nests) and the maximum predicted impact (712 nests), though this should not be taken as endorsement of that ratio. As the EIA-level impact for kittiwake (92) is fairly close to the HRA impact apportioned to FFC SPA (71) in the case of Hornsea Four, this increases the likelihood that there would be sufficient provision to compensate at this scale, thus accounting for the uncertainty in compensation being delivered to the wider East Atlantic population which FFC SPA sits within, rather than directly to the impacted site. It is important to note that full colonisation cannot be assumed – were it to occur the ANS would be one of the largest artificial colonies ever recorded. Nevertheless, whilst we maintain our concerns regarding the level of risk and lack long-term resilience of provision of a single structure, we consider that provision of ~750 nests offshore offers a reasonable prospect of delivering adequate compensation for kittiwake	The Applicant does not agree with impact numbers and subsequent compensation provision requirements proposed by Natural England (please see **Table 3** Applicant's responses to Natural England's End of Examination Position on Offshore Ornithology (REP7-104) for further details). The Applicant's position is the number of kittiwake pairs that will be affected by potential collision mortality is **23 individuals and approximately 62 breeding pairs** will be required to compensate for the potential effect which is presented within the Overview document (**B2.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP7-017)**) and the Compensation Plan **B2.7 FFC SPA Kittiwake Compensation Plan (REP7-019).** Natural England's suggestion of 712 required nests is stated to be based on the use of the maximum collision risk estimate for kittiwake which is not used for assessment but to merely infer the level of confidence in relation to central (mean) impact estimate. Therefore the Applicant is unsure as to why Natural England is inferring this value be considered in relation to compensation, especially considering that for Hornsea Three compensation the SoS concluded that the level of compensation required be based on the central estimate, not the maximum collision estimate (BEIS, 2020). The 1:2 ratio as set out in the Overview document (**B2.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP7-017)**) is in-line with the guidance (including Defra, 2021). **G1.9 Applicant's comments on Relevant Representations (REP1-038)** response RR-029-APDX:CUUU provides further detail on the justification for the scale of the compensation. The Applicant has shown the measures at a 1:2 ratio can be secured and delivered, and has confidence that a 1:2 ratio will provide adequate compensation for the predicted mortality.

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		The Applicant would like to clarify that while the initial design for the offshore nesting structure could hold around 750 nests that is not the compensation target; the number of kittiwake pairs that require compensation is 62 (as presented in Table 2 of Revision 4 of B2.6 Compensation measures for FFC SPA: Overview (REP7-017). The Applicant therefore agrees with Natural England's statement that full colonisation is not required.
Page 9 Agreed compensation level	Impact levels have now been calculated; however, compensation levels are not agreed. Based on Natural England's advised approach, the impact of the Project alone to be compensated for is 71 (22-152) adult kittiwake per annum (as opposed to 23 for the Applicant's approach).	The Applicant does not agree with the number proposed by Natural England (71 adult kittiwake) and maintains its position that the quantification of effect presented in B2.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP7-017) is **23 adult kittiwake** and that this is appropriate and calculated using the most up to date guidance, having been updated at Deadline 5 following advice from Natural England in Relevant Representations (RR029) on the MRSea baseline modelling.
Page 10	Auks (guillemot and razorbill) The compensatory measures proposed for auk compensation are mammalian predator eradication and bycatch reduction. The commitment to progressing multiple measures for auk compensation is welcomed, as whilst both measures have theoretical merit, neither measure can be considered adequately secured due to outstanding uncertainties regarding feasibility, effectiveness, scale, and location. With respect to bycatch, razorbill have not been encountered in the trial results presented to date so the measure cannot be considered as an option for this species at this stage. Equally, we consider it possible that razorbill are more likely to benefit from invasive mammal eradication than guillemot due to their more frequent preference for nesting at sites easily accessible by rats. This gives further weight to progressing multiple measures in the event that SoS seeks compensation. Nevertheless, whilst progressing multiple possible measures helps to spread the risks around one of those measures not being deliverable, it does not overcome them. Principally, Natural England are concerned that the proposed measures may not be able to achieve a sufficient scale of implementation to compensate for the predicted impacts. According to Natural England's advised methodology, impacts to guillemot fall within the range of 97-2,232 adult mortalities per annum, while razorbill falls within 10-228 adult mortalities per annum. We acknowledge that the higher ends of these ranges, based on a 10% mortality rate, represent an extreme worse-case scenario. Using a more likely mortality rate of 5% with 70% displacement gives suitable values with which to evaluate the compensatory requirements as 1,131 for guillemot and 114 for razorbill. We also highlight that if the reasons for AEoI include the effective habitat loss of functionally linked sea areas that have an important role in the life cycle of FFC SPA auks, as we consider they may well do, bycatch reduction and predator eradication measures are not of a nature that would address this aspect of the impact.	The Applicant notes that Natural England welcome the suite of measures for auk compensation and advise that both measures have theoretical merit. The Compensation Plans, Roadmaps and recent updates of the implementation studies and the bycatch technology selection phase have demonstrated the effectiveness, location, scale, viability and ability to deliver and secure the measures. For example, following successful implementation of the Looming Eyes Buoys (LEB) on vessels along the south coast of England during 2021/2022 the bycatch reduction technology selection phase recorded a bycatch reduction rate of 25% (24.9%). The Applicant has committed to use the LEB on vessels during the non-breeding season 2022/2023 and collect further data from September 2022 to March 2023. For this, the Applicant has so far signed up 22 fishers demonstrating the deliverability of the measure. The Applicant has commissioned predator eradication experts to undertake the implementation studies, colony census, predator surveys and stakeholder engagement has been undertaken (see G5.4 Predator Eradication Implementation Study Update (REP5-082)). The MOU with States of Guernsey has been agreed (dated 10th June 2022) providing a framework to ensure support and long term security of the predator eradication compensation measure. The studies have identified the number of available nesting spaces that could have rat predator pressure removed through implementation of this compensation measure (G1.33 Predator Eradication Island Suitability Assessment: Bailiwick of Guernsey (REP5-057) set out in Table 6). The Applicant has demonstrated the compensation measure is viable and can be delivered and secured. The impacts and compensation required is set out in the B2.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP7-017)) and Compensation Plan (B2.8 Guillemot and Razorbill Compensation Plan (REP7-027)) submitted at Deadline 7. The impact on guillemot is **40 (39.50) breeding adult individuals** and therefore the **compensation required is 175 breeding adults (174.58)** and for razorbill the impact is **2 (1.94) breeding adult individuals** and the **compensation required is 12 (11.98) breeding adults**. Notwithstanding the Applicant's strong disagreement with the approach to assessment set out by Natural England (see Section 2.2, Table 6 (REP5-057) clearly sets out the

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	We note that survey evidence submitted by the Applicant at Deadline 5 [REP5-019] indicated the presence of breeding auks on offshore platforms. Given the outstanding uncertainties with the auk compensatory measures and the scale of compensation required for these species, we consider that there would be merit in exploring the potential for adapting part of an ANS for use by auks, either as an initial measure or as adaptive management. We have previously highlighted this option in our Risk and Issues Log at Deadline 6 [REP6-057] but have not discussed the possibility directly with the Applicant.	available nesting space and ability to compensate within the Bailiwick of Guernsey and if required to accommodate impact values up to 70% displacement and 5% mortality based on NE's parameters (utilising SNCB standard apportioning).the Applicant can compensate for the additional nesting spaces by returning to the long list. The Applicant has provided a suite of measures which are scalable and flexible and also includes the additional option of the MRF (or equivalent fund) if deemed necessary. The Applicant refers Natural England and the ExA and SoS to the previous response regarding the implications of the use of the 'bio-season apportionment values' detailed within **G5.34 Applicant's response to Natural England's additional guidance on apportioning of seabirds to FFC SPA for Hornsea Project Four (REP5a-018)** and the implications for the pressing and urgent need to deliver 50GW of offshore wind energy by 2030, as set out in the British Energy Security Strategy. The Applicant disagrees with the statement that 'whilst progressing multiple possible measures helps to spread the risks around one of those measures not being deliverable, it does not overcome them'. The suite of measures will ensure that the compensation will be delivered recognising that greater benefits will be provided for certain species than others and the suite of measures will thus provide that security. The Applicant notes Natural England's recommendation that there would be merit in exploring the potential for adapting part of an ANS for use by auks, either as an initial measure or as adaptive management. Whilst the Applicant is confident the suite of compensation measures proposed for auks is sufficient, NE's comments regarding additional space for auks on kittiwake nesting structures is noted and will be considered. The Applicant will endeavour to create a mixed seabird colony at the ANS. It should also be noted that the Applicant is actively supporting strategic compensation workstreams which will look to provide artificial nesting structures for guillemot and razorbill based on the evidence collected by the Applicant and recognised by Natural England. Please see our comments above the response regarding prey resource and the need for measures to be Government led (see response to 4. Strategic compensation above and **B2.6.2 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Prey Resource Evidence (APP-185)**).
i)	Bycatch reduction The bycatch reduction measure aims to support auks by reducing their levels of bycatch in commercial fisheries and thus retain more birds in the population. A target fishery has been identified as a potential auk bycatch hotspot, and there is some evidence to suggest that reducing direct mortality here might possibly form a basis for compensatory measures. We retain concerns that whilst delivering compensation via bycatch reduction is theoretically viable, significant uncertainties remain which we consider to be extremely high risk. Natural England highlights that the Applicant's bycatch reduction proposal relies on a single technological intervention, the looming eyes buoy (LEB). The Applicant has reported on the first year of their trial of this technology, however, we must reiterate that Natural England do not	*Efficacy* The Applicant welcomes Natural England's confirmation that bycatch reduction is theoretically viable. The Applicant has provided a suite of measures and undertaken implementation studies to address any uncertainty. The Compensation Plans, Roadmaps and recent updates of the implementation studies and the bycatch technology selection phase have demonstrated the effectiveness, location, scale, viability and ability to deliver and secure the measures. For example, following successful implementation of the Looming Eyes Buoys on vessels along the south coast of England during 2021/2022 the bycatch reduction technology selection phase recorded a bycatch reduction rate of 25% (24.9%). This study has built upon the first published trial of the LEB which was undertaken by Rouxel et al., (2021). The results from the bycatch reduction technology selection phase have shown very similar results to those presented within Rouxel et al., (2021). Due to the high success of the measure the Applicant will continue to pursue this measure. The Applicant has committed to use the LEB on vessels during the non-breeding season

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	consider a single year of data collection to be sufficient to draw meaningful conclusions on LEB efficacy. The Applicant has calculated a relative 25% reduction in bycatch of guillemot by comparison of the percentage of LEB treated nets (42.9%) versus control nets (57.1%) that caught one or more guillemot. Natural England consider this calculation to be methodologically inappropriate and of no value in assessing the efficacy of the LEB. To put the value of this calculation into context, with no underlying data on actual bycatch being presented, we could assume that the trial may have found 3 guillemots bycaught in treated nets compared to 4 in the control nets for a 25% reduction. We can surmise this is not the case using the Applicant's calculations of the number of vessels that would be required to compensate their predicted impacts. However, the fact remains that the trial data is highly opaque, and such a simple comparison of the treated and untreated nets pooled across the entire trial period is not informative and is potentially misleading. Furthermore, there is no assessment of statistical significance and therefore even the reduction in bycatch as reported may be coincidental or due to some other factor(s). It is hard to escape the conclusion that the data analysis appears to be fundamentally flawed. Accordingly, we are concerned that the results are in no way comparable to the findings of peer-reviewed studies that utilise established bycatch data analysis techniques. Natural England maintain that it is not possible to assess the potential scale of the measure without a proven implementation method with fully quantified and independently ratified success rates, and a quantified assessment of actual bycatch rates at the target fishery with consideration given to variation across vessels and other co-variates (e.g., gear specifics, environmental conditions). Calculation of the absolute bycatch reduction that might be possible will be required to understand the upper limits of compensation potential (maximum number of individuals that could be saved from direct mortality as bycatch). We cannot currently advise on the potential for bycatch reduction to compensate for any given level of impact. It is also unclear whether the confidentially agreements that have (necessarily) hampered the present analysis would continue to be required once the measure was implemented, preventing the data from ever being publicly available even within the confines of a steering group. Natural England would not be able to support this approach both on the grounds of transparency (see Annex A, Point I of this submission) and the inability to form meaningful success criteria and/or demonstrate with independent verification that the compensation was delivering. In summary, we do not consider the LEB trial and subsequent data analysis to be sufficiently transparent or robust at the current time to draw any conclusion on the technologies ability to significantly reduce bycatch. A multi-year trial and subsequent appropriate statistical analysis of the data will be required. Further, Natural England will need to be able to undertake a sufficient audit of that data and analysis or be suitably assured that an	2022/2023 and collect further data from September 2022 to March 2023. For this, the Applicant has so far signed up 22 fishers demonstrating the deliverability of the measure and all 9 of the previous fishers who took part in the 2021/2022 bycatch reduction technology selection phase have agreed to continue in 2022/2023 demonstrating the support and strong relationships with the fishers to enable the compensation measure to be delivered. *Calculation methods* The Applicant is surprised by the response from Natural England as, in response to our compensation calculation methods, Natural England stated in their Risk and Issues Log at Deadline 3 (**REP3-054**) 'Natural England have reviewed the calculation methods presented in **REP1-063**. Natural England consider the basic methodologies presented to be sound and fit for purpose'. As previously stated in **G1.9 Applicant's comments on Relevant Representations (REP1-038)**, due to contractual restrictions, the results of the bycatch reduction technology selection phase can only be disclosed as percentage reductions in bycatch, i.e. not specific numbers of birds, without consent from the participating fishers. It is vital that the Applicant maintains the excellent relationship with fishers to ensure the long-term implementation of the measure. As stated in **G5.13 Bycatch Reduction Technology Selection Phase Summary (REP5-068)**, submitted at Deadline 5, statistical analysis on variables was undertaken: "a Generalised Linear Model (GLM) was used to test whether bycatch occurrence (i.e. the response variable in the model) changes in relation to a number of parameters such as wind speed and sea state (the explanatory variables in the model)." It should be noted that to increase statistical power, the Applicant has already committed to use the LEB on vessels during the non-breeding season 2022/2023 and collect further data from September 2022 to March 2023. The Applicant has a greater number of fishers involved (22 fishers have agreed so far), thereby enabling greater data collection within the 2022/2023 non-breeding season, which will increase the statistical power of the dataset. The Applicant has also managed to secure a data sharing agreement with six participating fishers. Data will be shared with stakeholders to provide further insight into seabird bycatch and support the Bycatch Reduction Technology Selection Phase results presented within **REP5-068**. Furthermore, the data sharing agreement will allow data analysis methods to be discussed with Natural England and with the OOEG. The Applicant would like to reinforce the fact that significant consultation was undertaken with Natural England, and fisheries and bycatch experts (including Yann Rouxel from BirdLife International) during the planning stages of the Bycatch Reduction Technology Selection Phase. The Applicant took advice onboard and used it to inform the design of the trial to enable robust results to be collected. It should also be noted that the Bycatch Reduction Technology Selection Phase built upon the positive results of the Looming Eyes Buoy (acknowledging the difference in species and impact) shown by the Rouxel et al., 2021. It should not therefore be seen as a standalone trial of this technology.

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	independent third party has reviewed and approved the findings of the trial. Noting that several years are available between consent and operation of the windfarm, Natural England do remain fully supportive of the ongoing LEB trial and hopeful that it will ultimately be capable of delivering quantifiable reductions in bycatch of auks and other marine birds. However, auk bycatch reduction is not currently demonstrated as being a viable compensation measure. Also representations within the Bycatch reduction table.	The Applicant has gone above and beyond what has previously been provided by a developer to demonstrate that the technology can be used as compensation. The Applicant would like to make it clear that bycatch reduction and predator eradication are the best compensation options which can be delivered at a project level for guillemot and razorbill. The Applicant welcomes Natural England's support for the ongoing use of the LEB, that Natural England 'consider that efforts to develop and deliver bycatch reduction for auks could represent an important component in the eventual provision of compensatory measures or these species' and that Natural England hopes that this technology 'will ultimately be capable of delivering quantifiable reductions in bycatch of auks and other marine birds'. Please see our response above (Auks (guillemot and razorbill)) regarding scale, and whilst the Applicant strongly disagrees with the advised approach, the Applicant has proposed a suite of measures to ensure that compensation can be achieved. The Applicant welcomes Natural England comment that in terms of timing 'compensation would arise as an immediate and direct population effect'.
ii)	Predator eradication The predator eradication measure aims to allow auk population growth by removing mammalian Invasive Non-Native Species (INNS), in this case, rats, from islands or islets that have suitable unutilised breeding habitat for auks. Following initial eradication the measure includes ongoing monitoring, biosecurity protocols and maintaining those locations rat-free status by further eradication efforts if required. The evidence for predator eradication being effective for auks is highly limited, but Natural England agree that the measure has theoretical merit, chiefly for razorbill. However, we retain a number of concerns about the measure, which we consider is still in the early phases of development. • The specific locations – and therefore also number of locations - for implementation have not yet been confirmed. This is due to the site selection process being ongoing. Crucially, this precludes a full feasibility assessment of the identified sites being undertaken. As such, Natural England cannot advise on the potential value of predator eradication being undertaken at the short-listed locations. • Estimates of additional nesting habitat that could be made available is preliminary and incomplete. It does not properly consider if that habitat is accessible to rats. Therefore, the potential scale of the measure remains vague. • It is frequently assumed or implied in the Applicant's submissions that predation is the pressure acting to prevent auks from breeding at sites where they are not currently present. The impact of other pressures has not been fully considered. It cannot be assumed that removal of rats at a site will necessarily lead to colonisation by auks. • Although in some cases habitat overlap and even evidence of interaction between auks and rats has been found, we do not consider this adequate to	The Applicant welcomes Natural England's confirmation that predator eradication has theoretical merit. We have provided evidence within the Ecological Evidence report and there is evidence such as from predator eradication on Lundy that predator eradication benefits guillemot as well as razorbill (**B2.8.3 Compensation measures for FFC SPA Predator Eradication: Ecological Evidence (APP-194)**). Most of the islands within the Bailiwick of Guernsey with razorbill populations also have guillemot populations. The Applicant's surveys on the islands and islets have demonstrated that rats have access to both guillemot and razorbill breeding areas and so therefore both razorbill and guillemot will benefit and can be compensated by predator eradication (see **Figure 7** in **G5.4 Predator Eradication Implementation Study Update (REP5-082)**). Please see response M26 and M31 at Deadline 6 **G7.2 Applicant's comments on other submissions received at Deadline 6 (REP7-082)** stating the preferred location for predator eradication within the Bailiwick of Guernsey. In addition, during Issue Specific Hearing 12, the Applicant confirmed that its preference would be to focus on the Herm Island complex (Herm, Jethou, including Grand Fauconnière and the Humps (islands and islets within the Ramsar site)), with locations in Alderney providing an adaptive management option. Please see our implementation study reports and compensation plan setting out the evidence of accessibility, predation pressure, stakeholder engagement, approvals and agreements to demonstrate the deliverability of the measure and in addition the Applicant has taken the advice of world-leading predator eradication experts (please see **G5.4 Predator Eradication Implementation Study Update (REP5-082)**, **G1.33 Predator Eradication Island Suitability Assessment: Bailiwick of Guernsey (REP5-057)**, **B2.8.4 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Predator Eradication Roadmap (REP7-032)** and **B2.8 FFC SPA Guillemot and Razorbill Compensation Plan (REP7-027)**).

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	infer that predation pressure is necessarily suppressing auk populations or restricting their available nesting habitat. This is particularly the case where rats have been found at low densities. • Community engagement to date has been relatively limited, and insufficient to assert (as the Applicant does) that there is a significant level of support from within these small populations. Community support is vital for predator eradication projects. The potential scale of compensation achievable cannot yet be determined with any certainty, nor can the compensation be considered secured prior to the identification of delivery locations with secured land rights. We therefore do not have confidence at this stage that the measure will be deliverable. Also representations within the Predator eradication table.	Please see our response above (Auks (guillemot and razorbill)) regarding scale, and whilst the Applicant strongly disagrees with the advised approach, the Applicant has proposed a suite of measures to ensure that compensation can be achieved. Please see our response in Relevant Representations RR-029-APDX:C-KKK **G1.9: Applicant's comments on Relevant Representations (REP1-038)** regarding timing. Surveys were undertaken to gather the information required and there has been no delays to the implementation study deliverables. In addition, the Applicant's updated position on lead-in times (remaining cognisant of recent decisions to allow compensation with the acceptance of mortality debt) have been provided with the most recent compensation Roadmap **(REP7-032)**. The Applicant has provided details of monitoring and adaptive management in the Compensation Plans. The Applicant has demonstrated the ecological efficacy of the compensation measures and is confident that the compensation is robust, viable and can be delivered and secured.

5 References

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